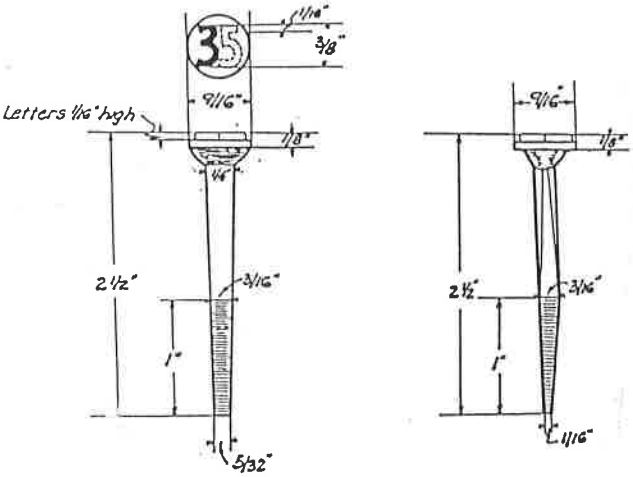
DATE NAILS *and* RAILROAD TIE PRESERVATION

Jeff Oaks

Volume II



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Volume II

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Contents

Volume I.

Volume II.

Volume III.

Illinois Central

Early nails				
1 1/4 × 3/16	rnd I gm	cop	( )	07
2 1/2 × 1/4	rnd I	stl	(07)	08:b,09,10
2 1/2 × 1/4	rnd I	stl	( )	11:c
Test section nails				
2 1/2 × 1/4	rnd R	stl	(07)	12,22,24,25,26:c,29-31
2 1/2 × 1/4	dia R rs	stl	(07)	13,23
2 1/2 × 1/4	sqr R rs	stl	(07)	14
2 1/2 × 1/4	pnt R rs	stl	(07)	15,25
2 1/2 × 1/4	hex R rs	stl	(07)	16,26,26:b
2 1/2 × 1/4	tri on rnd R rs	stl	(07)	17
2 1/2 × 1/4	bowtie R rs	mi	(11)	18,28
2 1/2 × 1/4	cross R rs	mi	(11)	19,29
2 1/2 × 1/4	octagon R rs	mi	(11)	20
2 1/2 × 1/4	tombstone R rs	mi	(11)	21
2 1/2 × 1/4	sqr R rs	stl	(07)	24
2 1/2 × 1/4	rnd R	stl	(05)	26:b
2 1/2 × 1/4	tri R rs	mi	(11)	27,27:b
2 1/2 × 1/4	rnd R	stl	(08)	44:b
2 1/2 × 1/4	rnd I	stl	(06)	48
2 1/2 × 1/4	rnd I	stl	(05)	50
2 1/2 × 1/4	rnd I	stl	(06)	56
Later nails				
2 1/2 × 1/4	rnd R	stl	(25)	27-29,31-44,44:b,45-50,53,55-64
2 1/2 × 1/4	rnd R	stl	(09)	51
2 1/2 × 1/4	rnd R	stl	(06)	52,54
2 1/2 × 1/4	rnd	stl	(25)	blank
Code nails				
2 1/2 × 1/4	rnd R	stl	(25)	PW #5

Early experiments

In 1871 the IC tested some Foremanized ties. This process involved applying a powder of salt, arsenic, and mercuric chloride to the wood. The test was a failure. [ASCE 7-85, 282, 285]

Sporadic tests of zinc chloride treated ties began in 1891. It was not until 1903 that the IC began using treated ties regularly.

Treating plants

Ayer & Lord constructed two treating plants for the IC. The first began operating in Carbondale, IL in 1903 and the second in Grenada, MS in 1904. Ties of various species were treated with zinc chloride by the Burnett process. Red oak was the primary species at the seven retort Carbondale plant. The Grenada plant had two retorts and treated principally pine. [AREA '04, 75][AREA '08, 737]

The IC distinguished between tracks south of the Ohio River, and tracks north and west of the river. It is likely that the Carbondale plant treated ties for the north and western tracks, while the Grenada plant treated ties for the south.

An eighth retort was added to the Carbondale facility sometime 1908-1910. In the same period the Grenada plant was doubled to four. The two plants, with an annual capacity of nearly six million ties, must have done quite a bit of work for other companies. [AREA '04, 75]['10, 138]

Sometime between 1924 and 1930 the Carbondale plant was reduced to six retorts. In 1939 Koppers acquired all Ayer & Lord plants. In the early 1940's the Carbondale plant was again reduced, this time to five cylinders. Between 1945 and 1952 two more retorts were dismantled, probably in 1947, when a new retort was added, leaving four treating cylinders at Carbondale. The Grenada plant remained unchanged at least to 1952. ['30, 419]['44, 433]['52, 397]

(continued)

In 1929 Chief Engineer A. F. Blaess stated that "a very large proportion of our ties have been secured" by the plants at Carbondale and Grenada. The railroad had treating inspectors stationed at the two A&L plants throughout the period extending at least to 1945. ['29, 163]['34, 502]['40, 474, 484, 485] ['45, 302, 305]

At least in 1923 and 1924 the IC had a treating inspector in Louisville, MS. There the American Creosoting Works had a plant which was built in 1912. Various types of timbers were treated there by two precesses: Bethell (full cell) and Rueping. If this plant treated ties for the IC, it would have been by the Rueping process. ['15, 474]['23, 550]['24, 337]

About 1905 or 1906 Rowe & Rowe built a creosoting plant at Southport, LA (adjacent to New Orleans) for the IC. It was an open tank plant which probably creosoted only bridge timbers. This facility does not appear in the lists of treating plants. [Rowe, 328]

Tie treating

The Carbondale plant began operating in 1903, and by the end of the year it had treated 23,364 ties for the IC. That number climbed quickly. By 1927 an average of over two million treated ties had been used annually by the IC since 1903, the majority from the two Ayer & Lord plants. In 1927 the IC consumed 2,510,899 treated ties, and only about 130,000 untreated ties. ['29, 163]

The treatment through 1907 was the Burnett process, with .5 lb/ft^3 of zinc chloride. Because of the amount of rain and moisture along the lines south of the Ohio River, treated ties were used primarily in the northern and western portions of the IC system. In 1907 the IC began also using ties treated with creosote by the Rueping process. This work was also done at the A&L plants, and creosoted ties were used primarily in the South. ['29, 163]

Gradually the proportion of ties treated with zinc chloride declined, "except for a period of two years during the Word War when we could not secure sufficient creosote oil to meet all of our requirements for treating timbers and ties." ['29, 163] During this period, about 1919-1920, the IC used large numbers of untreated fir from the Pacific Coast, apparently on lines north and west of the Ohio River, while about two million $ZnCl_2$ treated ties were used in the South. These gave a very short life, and when creosote became available again in 1921 the IC discontinued the use of zinc chloride. ['24, 253]['29, 164]

In 1926 the use of untreated ties came to an end, with the exception of cypress used in the vicinity of New Orleans. These lasted as long as treated ties, so there was no reason to expend the extra effort in creosoting them. ['29, 164]

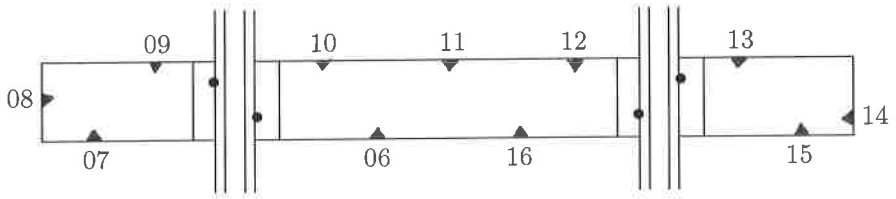
Treating other types of timber

"The use of creosoted piling and bridge decks was begun in 1904." ['29, 165] Some of this work may have been done at the Southport plant, but Grenanda is mentioned in the 1929 article. According to [AREA '09, 619], the IC began creosoting piles and timber in 1903 with 14-18 lb/ft^3. The IC began using creosoted lumber in water tanks in 1917. ['29, 166-167]

The marking of ties

William Kepka wrote to J. R. Miller, ICG's Engineer of Maintenance of Way, in 1975 and received in return a letter along with several documents. In his letter Miller wrote "We do not have a record of the exact date that we started to use tie dating nails, but from all indications it was about 1910." [Aug '76, 5]

Five IC drawings were included with Miller's letter, and all are reproduced in [Aug '76, 6-10]. The first of these, dated June 30, 1906, shows the IC's plan for notching ties:



(continued)

The notches for 09, 10, 12, and 13 were to be 6" in from the base of the rail. Notches for 06, 07, 15, and 16 were to be 12" in from the base of the rail. The 11 was to be centered. The 08 was to be placed 4 1/2" in from the top edge (in the picture) and the 14 was to be 8" in from the top edge. This key is strange, but note that it is independent of the orientation of the tie to the track. Other notching methods require the location of a "line rail." Such a system using unoriented notches would be necessary if the ties were notched at the treatment plant.

Across the face of this diagram is hand written "Void Nov 30— 12." This practice of notching was officially abandoned in 1912 in favor of dating nails. The pre-1912 nails seem not to have been part of the IC's regular plans.

The most interesting feature of the IC nail set is the series of odd-shaped heads. Presumably the railroad was concerned that the date might become obliterated in time, so each year's nails had a different shape. The series began with round nails in 1912, and continued through tombstone-shaped nails in 1921. From 1922 the shapes repeated, 1929 being the last year. Afterwards round headed nails were used.

The second diagram, dated Oct. 1912, shows the odd-shaped nails 12 through 21. The 17 is drawn as a true triangle (not "on round") with point down. Nails were to be centered 10" inside the base of the line rail. The line rail is defined in the fifth diagram:

Tangent track. The line rail is the East or South rail on single track and on double track the outside rail.
Curved track. The line rail is the low or inside rail.

The next three diagrams (dated Mar. 7, 1929 & revised July 1, 1937; the Dec. 5, 1949 revision; and the Feb. 1, 1954 revision) repeat much the same information, with drawings of the later dates. The 1937 drawing shows 37-47, the 1949 48-58, and the 1954 51-62. The PW nail stands for Public Works Administration and was used only in 1934.

The 1949 drawing shows the location of the nail still at 10" inside the base of the line rail, but now 3" in from the edge of the tie. This is repeated in the 1954 drawing.

Nails were to be placed in all switch and cross ties (1954).

"...an automatic tie working machine for performing the operations of adzing, boring, trimming and branding ties was installed at Grenada in the latter part of 1923." "The ties are also branded with the date." "A second tie working machine was installed at Carbondale in 1928." ['29, 168]

The copper 07 is confirmed by John Howard as being IC, and Dave Parmalee has the nail.

The 08:b-10 at first seemed to be from second hand Rock Island ties, but the 09 was found by Larry Fister between the rails, while Rock Island drove nails outside the rail. In 1997 in an antique shop Fister found a collection of IC, Rock Island, Milwaukee Road, C&NW, Wabash, and Santa Fe nails. They were separated by railroad with no error. In the IC box was a (07) 09, which provides a little more support for it being an Illinois Central nail.

The 10 resembles the heavy numbers 10 used by the Great Northern. It is possible that the 08:b and 10 are from used GN ties.

The 11 is definitely an IC nail. Larry Harvey pulled one, and Clyde Walker found three or four of them.

Larry Fister found lots of rnd R (07) 29's in switch ties in a stock yard at Phrimgar, IA. One (07) 30 came from Tara, IA.

Dave Parmalee wrote "ICRR nails 1930 through 1949 are generally only found in ties over eight feet, at switches." Nails from 50 through 61 are common in ties throughout the IC. The (25) 27-29 and 64 are rare. [Dec '75, 4-5]

Some of the non-(25) nails used after 1939 might be Koppers treatment Co. nails. Koppers bought Ayer & Lord in 1939.

(continued)

Test sections 1891-1906

Specific cities are named for many of these tests, but some of the numbers of ties are too large for these to be the actual locations. The Gibbs, TN ties from 1903 are listed as red oak only in ['16] and ['20], but in the list of test sections in ['15] other species were also included. Probably for other zinc chloride tests of red oak ties, other species were also included. The 1906 ties may have been notched.

- Jackson, TN, 1891.
  520 $ZnCl_2$ treated red oak ties were laid near Jackson. This was the IC's first test of $ZnCl_2$. ['29, 162] The Chicago Tie Preserving Co. treated 1,000 experimental ties for the IC in 1890. By 1898 the ties had been lost sight of, after which one section which originally had 420 ties was located. [AREA '05, 777] Is this the same as the Jackson test?
- Illinois division, 1892.
  670 $ZnCl_2$-treated ties were laid. ['29, 162]
- Various points on lines south of the Ohio River, 1893.
  1,500 $ZnCl_2$-treated ties were laid. ['29, 162]
- Louisiana.
  1895 1,200 untreated red cypress. ['16, 291]
  1901 5,309 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
  1906 6 miles $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
- Dubuque, IA.
  1898 25,344 untreated white oak. ['16, 312]['20, 118]
  1900 59,400 untreated white oak. ['16, 312]['20, 118]
  1903 20,000 + 400 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
- Iowa.
  1899 351,600 untreated white oak. ['16, 312]['20, 118]
- Memphis, TN.
  1899 67,200 untreated yellow cypress. ['16, 292]['20, 98]
  1900 19,200 untreated yellow cypress. ['16, 292]['20, 98]
  1901 34,000 untreated yellow cypress. ['16, 292]['20, 98]
  8,400 untreated white oak. ['16, 312]['20, 118]['22, 112]['23, 164]
  1902 48,000 untreated yellow cypress. ['16, 292]['20, 98]
  12,800 + 12,800 untreated white oak. ['16, 312]['20, 118]
  1906 1,679 untreated yellow cypress. ['16, 292]['20, 98]
- Omaha, NE.
  1899 413,424 untreated white oak. ['16, 312]['20, 118]
  1904 19,008 + 6 miles $ZnCl_2$ treated red oak. ['16, 309]['20, 115, 166]
- Vicksburg, MS.
  before 1902 25,600 + 25,600 untreated yellow cypress. ['16, 292]['20, 98]
  1906 38,400 untreated white oak. ['16, 312]['20, 118]
- Louisville, KY.
  1902 91,376 untreated white oak. ['16, 312]['20, 118]
- Tennessee.
  1903 51,200 + 48,000 untreated red oak. ['16, 308]['20, 114]
  1,800 untreated white oak. ['16, 312]['20, 118]
  121,383 + 3,000 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
  1904 38,400 untreated red oak. ['16, 308]['20, 114]
  38,400 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
  1904-1907 30,000 $ZnCl_2$ treated red oak. ['16, 309]['20, 114]
  1905 22,400 untreated red oak. ['16, 308]['20, 114]
  26,021 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]

(continued)

- Gibbs, TN.
  1903 3,080 $ZnCl_2$ treated ties, 90% red oak, elm, ash, beech. ['15, table]['16, 309]['19, 224-226] ['20, 116] The latter three sources just say red oak. Perhaps this was the kick-off test when the new plants opened.
- Chicago, IL.
  1903-1904 200,000 $ZnCl_2$ treated red oak. This is probably the division total. ['16, 309]['20, 115]
- Fulton, KY.
  1903-1905 185,803 $ZnCl_2$ treated red oak. This is probably the division total. ['16, 309]['20, 115]
- Mississippi.
  1904 4,000 + 432 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
  1904-1906 7,000 $ZnCl_2$ treated red oak. ['16, 309]['20, 115]
- Kentucky.
  1905 21,280 untreated chestnut. ['16, 289]['20, 97]
- Birmingham, AL.
  1906 2,100 untreated white oak. ['16, 312]['20, 118]

The first Rueping test

- Corinth, MS, 1907.
  6,080 loblolly pine ties treated with creosote by the Rueping process were installed. 3,200 received 5 lb/ft^3 while 2,880 received 6 lb/ft^3. Ties were both sawn and hewn. This was the IC's first experiment with creosoted ties. These ties may have been notched according to the plan on page 186. ['15, table]['16, 320]['17, 192]['20, 121]

The 1909-1910 tests

Five test sections were established. Nail finds make it clear that some of these sections continued to receive ties well after 1910. The 1909-1910 ties were probably notched.

- Fulton, KY, 1909.
  Ties treated with 5 lb/ft^3 of creosote by the Rueping process.
  274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['17, 100]['20, 94]
  274 red oak. ['16, 308]['20, 112]
  274 loblolly pine. ['16, 320]['17, 192]['20, 121]
  Ties treated with .5 lb/ft^3 of zinc chloride by the Burnett process.
  274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['17, 104]['20, 95]
  274 red oak. ['16, 309]['17, 180]['20, 116]
  274 loblolly pine. ['16, 320]['17, 194]['20, 121]
  Untreated ties.
  274 Mississippi white oak. ['16, 311, 312]['17, 188]['20, 118]
  274 Tennessee white oak. ['16, 311, 312]['17, 188]['20, 118]
- Kankakee, IL, 1909.
  Ties treated with 5 lb/ft^3 of creosote by the Rueping process.
  203 beech and gum. ['16, 296]['17, 100]['20, 94]
  274 red oak. ['16, 308]['20, 112]
  274 loblolly pine. ['16, 320]['17, 192]['20, 121]
  Ties treated with .5 lb/ft^3 of zinc chloride by the Burnett process.
  274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['17, 102]['20, 95]
  274 red oak. ['16, 309]['17, 180]['20, 115]
  274 loblolly pine. ['16, 320]['17, 194]['20, 121]
  Untreated ties.
  547 white oak. ['16, 312]['17, 186]['20, 118]
  On a six mile stretch of track near Kankakee Dave Parmalee found date nails 13, 16, 17, and 21-27. [Dec '75, 4-5]

(continued)

- Lula, MS, 1909, 1910.
  - 1909 ties treated with 5 lb/ft^3 of creosote by the Rueping process.
    - 274 beech, gum, and elm. ['16, 288]['20, 94]
    - 274 red oak. ['16, 308]['20, 112]
    - 274 loblolly pine. ['16, 320]['20, 121]
  - 1909 ties treated with .5 lb/ft^3 of zinc chloride by the Burnett process.
    - 274 red oak. ['16, 309]['20, 116]
    - 274 loblolly pine. ['16, 320]['20, 121]
  - 1909 untreated ties.
    - 548 (2 lots of 274) white oak. ['16, 312]['20, 118]
    - 274 cypress. ['20, 98]
  - 1910 ties treated with .5 lb/ft^3 of zinc chloride by the Burnett process.
    - 274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['20, 94]
- Bloomington, IL, 1910.
  - Ties treated with 5 lb/ft^3 of creosote by the Rueping process.
    - 248 beech, elm, gum, and chestnut. ['16, 288]['17, 100]['20, 94]
    - 274 red oak. ['16, 308]['20, 112]
    - 274 loblolly pine. ['16, 320]['17, 192]['20, 121]
  - Ties treated with .5 lb/ft^3 of zinc chloride by the Burnett process.
    - 274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['17, 104]['20, 95]
    - 274 red oak. ['16, 309]['17, 180]['20, 116]
    - 274 loblolly pine. ['16, 320]['17, 194]['20, 121]
  - Untreated ties.
    - 548 (2 lots of 274) white oak. ['16, 312]['17, 186-188]['20, 118]
  - Northeast of Bloomington Dave Parmalee found many early dates including 13 and 25. [Dec '75, 4-5]
- Greenville, MS, 1910.
  - Ties treated with 5 lb/ft^3 of creosote by the Rueping process.
    - 274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['17, 100]['20, 94]
    - 274 red oak. ['16, 308]['20, 112]
    - 274 loblolly pine. ['16, 320]['17, 192]['20, 120]
  - Ties treated with .5 lb/ft^3 of zinc chloride by the Burnett process.
    - 274 ash, beech, elm, gum, chestnut, and maple. ['16, 287]['17, 104]['20, 95]
    - 274 red oak. ['16, 309]['17, 180]['20, 116]
    - 274 loblolly pine. ['16, 320]['17, 194]['20, 121]
  - Ties treated with J. M. Long's liquid.
    - 49 beech, chestnut, elm, and gum. ['16, 288]['17, 102]['20, 95]
    - 50 red oak. ['16, 308]['17, 108]['20, 114]['22, 111]
    - 274 loblolly pine. ['16, 320]['17, 192]['22, 112] (The latter two sources say 174 ties.)
  - Ties treated with cresol-calcium.
    - 9 white elm. ['16, 292]['20, 98]
    - 9 red oak. ['17, 168]['20, 111]
  - Untreated ties.
    - 274 red cypress. ['16, 291]['17, 116]['20, 98]
    - 274 yellow cypress. ['17, 116]['20, 98]

The 1912 tests

These test sections are known only from nail finds. Kankakee, IL and Bloomington, IL might be included here based on nail finds. See above for these sites.

- Armstrong, IL.
  - J. H. Steury found dates 12, 14, 16, 17, 19, 23, 25, 26, and point-up 27 in the couple miles either side of Armstrong, from Potomac west to Penfield.

(continued)

- Larrabee, IA.
  If this was a test section, it ran from about 4 miles south to 4 miles north of town. Dates found include 12-18, 21-point up 27, and some later than 30. [J-A '88, 5]
- Buckingham, IL.
  Beginning in town, this test extended south past Cabery. Dave Parmalee found 16, 20, 22-26, and 29 here.
- Clinton, IL.
  Dave Parmalee found 19, 22, 24-26, 28 in a 6-mile test from Clinton to Hallsville, IL. In Hallsville Dave was arrested for pulling nails. His story appears in [S-O '98, 12-13]. See also [Dec '75, 4-5].
- Newton, IL.
  Many early dates were found here by Parmalee. [Dec '75, 4-5]

The eight later tests, beginning 1923

Probably, as was the case with other railroads, these tests were inspired by the restoration of the supply of creosote in the early 1920's. "We have established test sections at seven different points where there are large differences in climatic conditions on our line, keeping accurate records as to the age, kind of wood, kind of treatment, and other pertinent data. These tie sections are inspected annually, and all ties taken from track each year are examined and a record made of the cause of removal." ['29, 156]

These test sections were established in 1923 (some a little later), and presumably superceded the tests from the teens, though they too continued to receive ties. Six of the seven test sections are listed in ['53, 191-194], as well as the Ponchatoua test, which seems to have been established in 1928. The seventh of the seven tests mentioned in the quote above can be identified as Carbondale, IL, by the nails found there.

The two different reports of the Metropolis test show that the record in ['53] is very incomplete.

- Canton, MS.
  1923 1,213 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  1926 1,080 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  1927 358 Rueping (creosote) treated oak ties. ['53, 192]
  1931 411 Rueping (creosote) treated gum ties. ['53, 192]
  1935 567 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
  1936 496 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  1940 2,039 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
- Thomasboro, IL.
  1923 297 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  464 Rueping (creosote) treated oak ties. ['53, 192]
  1924 462 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  462 Rueping (creosote) treated oak ties. ['53, 192]
  1925 611 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  1926 624 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  1933 1,000 Rueping (creosote) treated gum ties. ['53, 192]
  1936 139 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  1937 14 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  1941 106 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]

(continued)

- Hollandale, MS.
  - 1923 1,545 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
    223 Rueping (creosote) treated oak ties. ['53, 192]
  - 1924 854 Rueping (creosote) treated oak ties. ['53, 192]
  - 1931 757 Rueping (creosote) treated gum ties. ['53, 192]
  - 1932 1,433 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  - 1934 1,813 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  - 1937 432 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
    243 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  - 1939 423 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
  - 1940 1,477 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
- New Hartford, IA, from 4 miles east to 2 miles west of town.
  - 1923 365 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  - 1929 1,606 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
    1,058 Rueping (creosote) treated oak ties. ['53, 192]
  - 1930 1,425 Rueping (creosote) treated oak ties. ['53, 192]
  - 1931 757 Rueping (creosote) treated gum ties. ['53, 192]
  - 1937 140 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  - 1940 997 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]

  Date nails ranging from 25 through 58 held 1 1/2" diamond aluminum tags at this test section. Dates found include pent 25, hex 26, cross 29, (25) 26-29, 32-34, and 40-58. Tags in pre-1930 ties are sometimes found with only one nail. After 1930 tags are usually held left & right by two date nails. Here is what is found on some tags (read vertically).

G	G	G	G	O	O	O	O	O	O	O	O	O	O	O	O
1	2	3	5	1	A	1	1A	2	2	2A	2	3	4	5	S
A	A	A	A	A	1	A	7	A	A	7	HA	A	A	A	C
7	7	7	7			7			7						2
P	P	P	P	PA	PR	PR	2	2	R	R	RO	RO	RO	WO	WO
1	R	R	A	1	CP	CT	PX	PX	O	O	A	A	R	R	R
A	A	R	1	6040	6040	70-30	5050	50	R	R	1	2	A	A	R
8			6040		8	7	8	50	A	R					
								8							

  5050, 6040, and 70-30 clearly refer to proportions of chemicals used in treatment. Probably the top letter(s) indicate the species of wood while the rest encodes the treatment. Here are some guesses: G = Gum, O = Oak, P = Pine, RO = Red Oak, WO = White Oak, CP = Creosote-Petroleum, CT = Creosote-tar, 7 = 7 lb/ft^3, 8 = 8 lb/ft^3. See [J-A '89, 10-11].

- Coulterville, IL.
  - 1924 382 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
    5,251 Rueping (creosote) treated oak ties. ['53, 192]
  - 1934 200 Rueping (creosote) treated gum ties. ['53, 192]
  - 1937 22 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  - 1940 481 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]

  The test section ran about three miles in each direction from the crossing of the Missouri-Illinois RR in town. Bill Bunch found 24, 26, rnd R (07) 24, 25, 30, rnd R (25) 28, 29, 32, 34, 36, 37, 39-56, 59, rnd R (08) 44, rnd I (05) 50, and rnd I (07) $\frac{\text{AL}}{34}$. Over 100 24's were pulled. Some nails were found in a siding, so the railroad did not restrict its test to the main track.

(continued)

Ties were marked with aluminum tags held by two date nails, like those at New Hartford (see above). The 24's and 26's came one to a tie, and the 59's are probably not part of the test, as they held no tags. The rnd R (07) 28 and 29 accompanied the (25) blank nail. One tag, which reads PI / A / 8 was held by the $\frac{\text{AL}}{34}$ and a (25) 34. The AL nail is an Ayer & Lord treatment nail, so the tags were attached at the treatment plant. It would have been impractical to attach them when the ties were inserted in the track, considering the complex amount of information.

- Carbondale, IL.

  The test section ran from about a mile south of the passenger station, south for no more than three miles. Bill Bunch found 24, (25) 29, (07) 29, (25) 43, 47, 48, 50-56, PW, rnd R (08) 44, and rnd I (06) 56. Also, he found eight rnd R (25) 33's in one pole. These nails were holding some sort of electrical equipment. Unlike the tests at Coulterville and New Hartford, these ties were not tagged.

- Metropolis, IL, 1.5 miles north of town.

  It seems that the vast majority of ties were inserted in 1926. ['29, 156] Because the numbers in the 1929 and 1953 reports are completely different, I list them separately. There is probably some overlap, but it is not obvious.

  All ties listed in ['29, 155-156] were treated with 5.25 lb/ft^3 of creosote, and were laid in 1926. About half of each species were adzed and the other half rough:

507	red oak	100	elm
508	cypress	100	sycamore
505	pine	98	maple
511	white oak	102	black gum
100	chestnut	100	magnolia
100	beech	100	sweet gum
100	ash		

  Ties listed in ['53, 192-193] do not include such a variety of woods, but show different treatments:

  1926 3,565 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  2,176 Rueping (creosote) treated oak ties. ['53, 192]
  700 Rueping (creosote) treated gum ties. ['53, 192]
  99 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
  100 Rueping (60-40 creosote-tar) treated red oak ties. ['53, 193]
  45 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  45 Rueping (creosote-petroleum) treated red oak ties. ['53, 193]
  43 Rueping (creosote-petroleum) treated white oak ties. ['53, 193]
  1940 544 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]

- Ponchatoula, LA.

  1928 739 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  767 Rueping (creosote) treated oak ties. ['53, 192]
  1929 1,250 Rueping (creosote) treated southern yellow pine ties. ['53, 192]
  100 Rueping (zinc chloride) southern yellow pine ties. ['53, 191]
  880 Rueping (creosote) treated oak ties. ['53, 192]
  100 Rueping (Wolman salts) treated southern pine ties. ['53, 194]
  100 Rueping (zinc meta arsenite) treated southern pine ties. ['53, 194]
  1931 385 Rueping (creosote) treated gum ties. ['53, 192]
  1935 242 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
  39 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  1936 443 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
  40 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  1937 107 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]
  1939 320 Rueping (60-40 creosote-tar) treated pine ties. ['53, 193]
  1940 94 Rueping (creosote-petroleum) treated southern pine ties. ['53, 193]

(continued)

Later tests

- Goodman, MS, 1948.
  300 Rueping (Penta) treated southern yellow pine ties. ['53, 194]
  300 Rueping (Penta) treated red gum ties. ['53, 194]
- Hammond, LA, 1948.
  John M. Hoffmann pulled twenty to thirty rnd I (06) 48's in a three block stretch of track in town. [Dec '75, 1]

Locations of finds of early nails which may not be test sections

- Sioux Falls, SD.
- Myrtle, MN.
  14's were found here in 1995 by Larry Akers.
- Lyle, MN.
  Kevin Fister found a hex 26 here. Other old nails were found here also.
- Charles City, IA.
  12-14 were found. Nails found at Orchard, Floyd, and Nashua are part of this "test." [J-F '89, 2] [J-A '89, 10-11]
- George, IA to Sheldon, IA.
  Harvey and Fister found the 08 and 09 near Sheldon, and Harvey found an 11 south of George. This is probably not a test section. Old IC nails turn up all over Iowa in small numbers.
- Tara, IA.
  On the line from Fort Dodge to Council Bluffs, the section ran from the Tara yard almost to Knierim, about 8 miles total. 12, 22, and 28 were found. [M-J '93, 9][M-J '94, 1]
- Water Valley, MS.
  22's and 23's were found here.

Articles

[Dec '76, 3], [Feb '77, 5] (bowtie 18's), [J-A '88, 5], [J-F '89, 2, 8-9], [M-J '89, 6-7], [J-A '89, 10-11], [S-O '89, 9-10], [M-J '93, 9].

Illinois Central Gulf

Code nails

2 1/2 × 1/4	rnd R	stl (09)	CILC / OWNER
			CROC / SN MAT CA / LEAS
			EQUI / LEASE
			FML
			FTLC / OWNER
			LFC / OWNER / 1151.1 / LS
			LFC / OWNER / 1151.2 / LS
			MDFC / OWNER
			PROP OF / EQUIPCO
			TULC / OWNER

ICG was formed when the IC and GM&O merged in August, 1972. In March, 1988 ICG became the Illinois Central.

These nails were inserted beginning 1975, and are located between the rails, closer to one rail. The railroad leased the ties for five years at a rate below what purchase of the ties would have set them back. After five years the leasing company would come and pick up their ties and re-sell them for nearly their full price to other railroads, landscaping companies, and others. The nails, if found in ties in the track, are probably still in use and should not be pulled. See [M-A '78, 1].

(continued)

CILC / OWNER	Continental Illinois Leasing Corporation, owner
CROC / SN MAT CA / LEAS	Crocker-McAllister, San Mateo, California
EQUI / LEASE	Equilease Corporation
FML	First Maryland Lease Corporation
FTLC / OWNER	First Tennessee Leasing Corporation, owner
LFC / OWNER / 1151.1 / LS	Lease Financial Corporation, owner. Lease # 1151.1
LFC / OWNER / 1151.2 / LS	Lease Financial Corporation, owner. Lease # 1151.2
MDFC / OWNER	McDonnell Douglas Finance Corporation, owner
PROP OF / EQUIPCO	Equipco lessors
TULC / OWNER	Trans Union Leasing Corporation, owner

The nail CROC / SN MAT CA / LEAS has also been pulled from ties in Panama. Also, Ken Gronewald found many of these nails unused in an ICG track building, so the nails were probably driven when the ties were placed in the track. [S-O '89, 9]

ICG often stamped dates into the middle of the tie. The following stamps have been found:

$$\begin{matrix}\text{I.C.G.R.R.}\\ \text{G 8 1}\end{matrix}, \begin{matrix}\text{ICG}\\ \text{G82}\end{matrix}, \begin{matrix}\text{ICG}\\ \text{G83}\end{matrix}, \begin{matrix}\text{ICG}\\ \text{G85}\end{matrix}, \text{and } \begin{matrix}\text{ICG}\\ 84\end{matrix} \text{ through } \begin{matrix}\text{ICG}\\ 87\end{matrix}.$$

In one tie was $\begin{matrix}\text{IC}\\ ?5\end{matrix}$. The '?' is hidden by a fungus, and may be a 7.

Illinois Southern

2 1/2 × 1/4	rnd I	stl	(07)	8,14,19

The IS became part of the Missouri-Illinois RR in February, 1921.

Illinois Terminal

2 1/2 × 1/4	rnd I	stl	(07)	11-15,22-31,33
2 1/2 × 1/4	rnd R	stl	(07)	26,28,29
2 1/2 × 1/4	rnd R	stl	(10)	28
1 1/2 × 3/16	rnd R	mi	(11)	28
1 1/4 × 3/16	rnd I	mi	(11)	30
2 1/2 × 1/4	rnd R	stl	(06)	31
2 1/2 × 1/4	rnd I	stl	(06)	32
2 1/2 × 1/4	rnd R	stl	(09)	32,33,35,49
2 1/2 × 1/5	rnd R gm	stl	(04)	42

The 42 and 49 may not belong, and the (11) 28 may be 1 1/4".
The rnd I (11) 30 and the rnd I (06) 32 may be from ex-E&LS ties.
See Merle Denney's nail hunt article in [M-J '85, 15].

Indiana Harbor Belt

From second hand ties

2 1/2 × 1/4	sqr I	stl	(07)	23,27-30
2 1/2 × 1/4	sqr I	stl	(05)	26

The nails originated on the NYC, which owned the IHB.

Indianapolis, Columbus & Southern Traction

This electric railway ran from Indianapolis, IN to Semour, IN. In September, 1912 it became the Interstate Public Service Co., and by 1918 it was the Interstate Public Service Co. of Indiana. The Indiana RR assumed operation in August, 1930.

(continued)

The IC&S built a low pressure creosoting plant in 1909 in Columbus, IN. Sometime between 1922 and 1924, possibly in 1923 when it was expanded, the plant was sold to the Columbus Creosoting Co. The CCCo. became the Hoosier Creosoting Co. late 1944 or 1945, and by 1952 the plant fell into the hands of the W. C. Sharp Treating Co. ['12, 285]['13, 454]['22, 483]['24, 313]['44, 429]['45, 264]['52, 399]

Test sections

The test sections below may include other species of wood. All are listed as red oak in ['20]. The tests were conducted in cooperation with the U. S. Forest Service. ['11, 169]

- Edinburgh, IN, 1909.

  970 ties were laid with the following treatments.

  172 Asphaltic crude oil.
  159 Creosote, 14 lb/ft^3.
  431 Creosote, 7-8 lb/ft^3.
  208 Low pressure zinc-creosote. ['20, 111, 112, 117]

- Taylorsville, IN, 1909.

  771 ties were laid with the following treatments.

  183 Asphaltic crude oil.
  431 Full-cell creosote, 7-8 lb/ft^3.
  59 Full-cell creosote, 12 lb/ft^3.
  99 Full-cell creosote, 14 lb/ft^3. ['20, 112]

International Railways of Central America

Probably from second hand ties

2 1/2 × 1/4	rnd R	stl	(07)	39,40,46,47,49-51,61,62

The IRCA ran through Guatemala and El Salvador. These nails were pulled in Guatemala. Others can probably be found. Many used ties from the U. S. are shipped to Central America for re-use in tracks there. See also Panama.

Interstate

2 1/2 × 1/4	rnd R	stl	(03)	30,31
2 1/4 × 9/32	sqr R	stl	(07)	31-34
2 1/4 × 9/32	rnd R	stl	(07)	34
2 1/2 × 1/4	sqr R	stl	(07)	35-42
2 1/2 × 1/4	rnd I	stl	(06)	43,44
2 1/2 × 1/4	rnd R	stl	(06)	43,44
2 1/2 × 1/4	cut R	stl	(05)	50,51
2 1/2 × 1/4	sqr I	stl	(05)	52-59
From bridge timbers				
2 1/2 × 1/4	rnd R	stl	(03)	31
2 1/4 × 9/32	rnd R	stl	(07)	34
2 1/2 × 1/4	rnd R	stl	(07)	37
2 1/2 × 1/4	sqr R	stl	(07)	37,42
2 1/2 × 1/4	sqr I	stl	(05)	58
From second hand ties				
2 × 1/4	rnd I	stl	(07)	24
2 1/2 × 1/4	rnd R	stl	(01)	29
2 1/2 × 1/4	rnd R	stl	(07)	29,37
2 1/2 × 1/4	rnd I	cop	(60)	29
2 1/2 × 1/4	rnd I	stl	(07)	30,30:c,31-34
2 × 1/4	rnd R	stl	(07)	34:b

(continued)

The Southern RR acquired control of the Interstate in 1961.

The square 31-33 have been found in two shank lengths, 2" and 2 1/4".

Many other nails have probably been found in bridge timbers.

Southern Wood Piedmont switch nails are also found here, having been used after the Southern takeover.

See Steve Worboys' nail hunt article in [N-D '89, 9-10].

Sources for second hand nails

Louisville & Nashville

2 1/2 × 1/4	rnd R	stl	(01)	29
2 × 1/4	rnd R	stl	(07)	34:b

Pittsburg, Shawmut & Northern

2 1/2 × 1/4	rnd I	cop	(60)	29
2 1/2 × 1/4	rnd I	stl	(07)	30:c,31-34

Iowa Terminal

From second hand ties

2 1/2 × 1/4	rnd R	stl	(05)	29
1 3/4 × 3/16	rnd R gm	stl	(07)	31
2 1/2 × 1/4	rnd R	stl	(06)	53

The IT is an electric railroad in Iowa. In July, 1987 their name changed to Iowa Traction & Charles City.

The 29 is from the Cotton Belt, the 31 is an ex-Milwaukee Road nail, and the 53 came from the Rock Island. See Larry Fister's article in [J-A '89, 10-11].

Jamestown, Westfield & Northwestern

From second hand ties

1 3/4 × 5/16	rnd I	stl	(01)	12-15
1 3/4 × 5/16	rnd I	stl	(05)	16,17
2 1/2 × 1/4	sqr I	stl	(07)	18,26:b
2 1/2 × 1/4	rnd R	stl	(07)	22,25,25:b,26:b,27:b,28,31,32
2 1/2 × 1/4	sqr I	stl	(05)	24,26,26:b,28,31
2 1/2 × 1/4	sqr R	stl	(05)	25
1 1/4 × 3/16	rnd I gm	cop	(60)	26:b
2 1/2 × 1/4	rnd I	cop	(60)	29
2 1/2 × 1/4	rnd I	stl	(03)	30
2 1/2 × 1/4	rnd I	stl	(07)	30:b
2 1/4 × 1/4	cut I	stl	(03)	31
2 1/2 × 1/4	rnd I	stl	(64)	??

The JW&NW was a 32.2 mile western New York State electric line abandoned December 12, 1949 ([Edson] says August, 1950).

All nails were found between the rails except the (03) 30, which was found outside the rail, close to the end. This nail is too rusty to determine if it is 30:a or 30:b.

Sources for second hand nails

Narragansett Pier

2 1/2 × 1/4	rnd I	stl	(03)	30
2 1/4 × 1/4	cut I	stl	(03)	31

(continued)

New York Central

2 1/2 × 1/4	sqr I	stl	(05)	24,26,26:b,28,31
2 1/2 × 1/4	sqr R	stl	(05)	25
2 1/2 × 1/4	sqr I	stl	(07)	27

Nickel Plate Road

2 1/2 × 1/4	sqr I	stl	(07)	26:b

Pittsburg, Shawmut & Northern

2 1/2 × 1/4	rnd I	cop	(60)	29

Shadow sets

Enigma set

2 1/2 × 1/4	rnd I	stl	(64)	??

Stubby shadow set

1 3/4 × 5/16	rnd I	stl	(01)	12-15
1 3/4 × 5/16	rnd I	stl	(05)	16,17
2 1/2 × 1/4	sqr I	stl	(07)	18

Johnstown & Stony Creek

Probably from second hand ties

2 1/2 × 1/4	rnd R	stl	(07)	33,36-40,42-47,52
1 1/2 × 1/4	rnd R	stl	(07)	41

This railroad was 2.54 miles long, and connected with the PRR and B&O in Johnstown, PA. In August, 1983 it became part of Conrail.

These nails were pulled by Dave Parmalee. [M-J '79, 2]

Kanawha, Glen Jean & Eastern

2 × 1/4	cut R	stl	(03)	30-38

The KGJ&E, a 14 mile West Virginia line, was taken over by the C&O in October, 1940.

Two articles appeared in *Nailer News*, one by Dave Parmalee ([M-J '79, 2-3]) and the other by Al Byers ([M-A '88, 4]).

Kansas City, Mexico & Orient

2 1/2 × 1/4	rnd I	stl	(07)	22-25,28:b
2 × 1/4	rnd R	stl	(07)	26
2 1/2 × 1/4	rnd R	stl	(07)	27-29
2 1/2 × 1/4	rnd R	stl	(18B)	28,29
2 1/2 × 1/4	rnd R	stl	(18A)	29

In 1926 the Consumers Tie Service Co. built a one retort treating plant at Altus, OK, which treated ties for the KCM&O. The railroad took over the plant December 1, 1928 and operated it until the Santa Fe takeover. [S-O '96, 5]

This U.S. portion of this line was purchased by the Santa Fe August 31, 1929. In Mexico the railroad continued under the same name (Ferrocarril Kansas City Mexico y Oriente) until sometime 1951-1955, when it merged with Ferrocarril Nor-Oeste de Mexico (Mexico North-Western) to become Ferrocarril de Chihuahua al Pacifico (Chihuahua Pacific). See Henry Potter's article and photo in [M-A '80, 1-2].

Perhaps the railroad used raised nails in ties treated at the Altus plant, and indented nails for ties treated elsewhere.

At least in the US, nails were placed outside the rail, on the opposite side as the post-1929 Santa Fe nails which are found in the same track.

(continued)

The (18A) and (18B) 29's have only been found in switch ties in the yards. The numbers on the 26 look more like those on the 2 1/2" 26:b.

J. R. Kinnard has found a rnd R (18B) 26. He and Elias Castillo have found the rnd R (07) 28.

The (18B) 28 does not appear to be galvanized.

The 5 is slightly lower than the 2 on the 25.

Nail hunt: [M-A '94, 1].

Kansas City Southern

1 1/2 × 1/4	rnd I	stl (07)	10-15,15:b,16-24
2 1/2 × 1/4	rnd I	stl (07)	23,25,26:b,27-29
2 1/2 × 1/4	rnd R	stl (07)	29
2 1/2 × 1/4	rnd R	stl (17)	30,31,31:b,32-46,48-50,52-62
2 1/2 × 1/4	rnd R	stl (19)	51
2 1/2 × 1/4	rnd R	stl (09)	51

In 1904 the KCS laid some experimental ties. Some received 12 lb/ft^3 (full cell) of creosote, while others were treated by the Allardyce method. [AREA '09, 619]['16, 315]

The Shreveport Creosoting Company, a subsidary of the American Creosoting Co., built a two-retort treating plant at Shreveport, LA in 1910. The plant, which opened the same year, creosoted ties, pilings, and other timbers by the Lowry process for the KCS, International & Great Northern, and Texas & Pacific. It was still treating ties for KCS as of 1924. ['13, 89, 450][WPN 2-24, 21]['24, 339]

A second plant was constructed by the Shreveport Creosoting Co. at DeRidder, LA in 1919. The Gulf, Colorado & Santa Fe (AT&SF) and KCS ran to DeRidder. The plant did not serve the GC&SF, so it probably did work for the KCS. Both treating plants were still operating in 1952. ['30, 423]['52, 399]

John Iacovino found that the 31-48 are located just inside the east rail in Kansas City, KS.

From John M. Hoffman's article [Apr '75, 7]: The rnd R 29 is from Missouri, and no 47 has been found. Nails are also found in bridge timbers. "They have also been situated in pilings, cross braces, sills and cross flooring found on the old covered trestles still in use. In all instances they have been located on the north or west sides of these type trestles."

Mel Smith, in [M-A '85, 2], wrote that no 47 was used, and Dave Parmalee, in [J-F '78, 1], wrote that no 47 had been found yet.

Curtis Deason reported, complete with drawings, three odd nails pulled from track jointly operated by the Milwaukee Road and KCS. They appear in [N-D '77, 3] and are

2 1/2 × 3/16	rnd I gm	cop ( )	1,7
2 1/2 × 1/4	rnd R	stl ( )	4°

The measurements are guesses from Curt's drawing.

Dick Gartin supplied a photo of part of the set in [S-O '86, 3], but the nails are not KCS. He later published a more correct photo in [J-A '91, 11]. Even here the 59 pictured is really (25), and does not belong to the set. The 47's are not KCS nails. The 31:b he shows might be spurious, also, as John Iacovino puled 31:a's in Kansas City, KS.

George Moser found a 2 1/2" (01) 09 nailed in a rafter in a line shack near a KCS 14. The 09 is probably an SP nail.

A 2" 16 is reported, and is probably a nail factory mistake. A 2" 24 has been found which has numbers unlike the 1 1/2" 24, so it is either a short 2 1/2" nail or was actually intened to be 2".

Kansas City Terminal

1 1/4	× 3/16	rnd I gm	cop	(60)	28
2 1/2	× 1/4	cut R	stl	(07?)	29-31
2 1/2	× 1/4	rnd R	stl	(07)	37
2 1/2	× 1/4	rnd R	stl	(17)	43,44,49
1 1/4	× 3/16	rnd R gm	cop	(60)	50,51
1 1/4	× 3/16	rnd R	cop	(61)	52,54-57
1 3/4	× 3/16	rnd I	cop	(60)	52:c
1 1/4	× 1/5	rnd I	cop	( )	53
1 1/4	× 3/16	rnd I	cop	(60)	58-61

The 52:c might really be (61). At least three of the ( ) 53's are known.
See [M-A '86, 4] for a nail hunt article.

Kansas, Oklahoma & Gulf

1	× 1/4	rnd R	stl	(06)	35-38

In the 1930's the KO&G was consolidated with the Midland Valley and the Oklahoma City-Ada-Atoka railroads. In my May, 1936 Official Guide the railroads are listed together with a common map and list of officials. Did all three railroads use these nails? The OC-A-A was created from part of the M,K&T in 1923. Because the M-K-T is listed as having used the 37 and 38, there may be a connection between these sets.

The KO&G was taken over by the Texas & Pacific in September, 1964, and was incorporated into the T&P in April, 1970.

This list is taken fron DNC. Many treatment company nails have been pulled here, including NL 38 and International Creosoting 28.

Kennecott Copper Co.

2	× 1/4	rnd R	stl	(18C)	47,48,50-52
?	× 1/4	rnd I	stl	(??)	49
?	× 1/4	rnd R	stl	(06)	59

These nails were found about 1978 in mine tracks at Ruth, NV, near Ely.

Larry Meeker saw and recorded the nails, which were in someone else's collection. "The 49 and 59 were stuck in styrofoam, and I didn't have access to see the shanks. I deduced (06) for the 59 from looking at DNC, but the 49 is unlike anything I've seen in DNC (the bottom of the 4 has a flag)."

Key System

2 1/2	× 1/4	rnd I	stl	(07)	31

Key System was an interurban line. Larry Meeker pulled only one of these 31's, in Oakland, CA. No others have been found.

Lackawanna & Wyoming Valley

2 1/2 × 1/4	rnd R	mi	(11)	14,15
2 1/2 × 1/4	rnd I gm	mi	(11)	14
2 1/2 × 1/4	rnd R	stl	(07)	16,27,28:b,29,32,33
2 1/2 × 1/4	rnd I	stl	(07)	26
2 1/2 × 1/4	rnd R	stl	(03)	29-31,31:b
2 1/2 × 1/4	rnd R	stl	(10)	34
2 1/2 × 1/4	rnd R	stl	(21)	35-37

Short line code set

Code nails

1 1/2 × 1/4	rnd I	stl	(07)	0,1,3,4,7,8	(Set #28)
1 1/2 × 1/4	rnd I	stl	(07)	0	(Set #29)

From second hand ties

1 1/2 × 3/16	rnd I	mi	(13)	R 11
2 1/2 × 1/4	rnd R	stl	(07)	28:b,30,33,39,42,46,48,49,50,57
2 1/2 × 1/4	rnd I	stl	(07)	29,31,32,40
2 1/2 × 1/4	rnd R	mi	(11)	30
2 1/2 × 1/4	sqr R	stl	(07)	41

The L&WV, operating 19 miles Pennsylvania, was an electric railroad until January, 1960, when the Erie Lackawanna gained ownership. In April, 1976 it became part of Conrail, and has since been dismantled.

See [M-J '79, 2] for Dave Parmalee's nail hunt. He pulled all dates 25 through 37, and found an old bridge whose ties yielded large 3/4" head cast indent (11) 14's, rnd R (11) 14, 15, and rnd R (07) 16's. The indent 14's were driven into the sides of the bridge ties. No others have been found.

See the treatment company section in the back of the book for a description of the short line code set.

The following nails were pulled from ties scattered near the roadbed. The ties from which they came may not have been used on the L&WV.

1 1/2 × 3/16	rnd I	mi	(13)	R 11
2 1/2 × 1/4	rnd R	stl	(07)	39,42,49
2 1/2 × 1/4	rnd I	stl	(07)	29

Sources for second hand nails

Delaware, Lackawanna & Western

2 1/2 × 1/4	rnd R	mi	(11)	30
2 1/2 × 1/4	sqr R	stl	(07)	41

And probably some of the rnd R (07) nails.

Pennsylvania

1 1/2 × 3/16	rnd I	mi	(13)	R 11

Lake Champlain & Moriah

From second hand ties

2 1/2 × 1/4	rnd R	stl	(07)	30

The LC&M was a northern NY short line abandoned in 1968.

Lake Shore & Michigan Southern

In December, 1914 the LS&MS became part of the New York Central, having been owned by the NYC before. See NYC for general comments on the New York Central System.

Samuel Rockwell, Principal Assistant Engineer, spoke at the 1900 AREA meeting: "On our road we have been marking ties since 1893. I have been using a cast-iron hammer and a very large figure three, four, five or six—of course, you can guess at the ten—and the 'three' marks are still discernible, although they are dim; but we mark all our ties, and think it pays." In 1904, on the "Southern Pacific and the LS&MS, the ties are stamped when put into the track with a cast iron hammer having a raised figure on the striking face denoting the year." "The usual practice is to stamp the tie in the end, on the line side, and sometimes on the top." [Camp, 135]

The Federal Creosoting Co. built a four retort treating plant for the Lake Shore & Michigan Southern and Michigan Central railroads in 1909 at Toledo, OH. The plant, which creosoted various hardwoods by the Lowry process, began treating in the Spring of 1910 and was still operating in 1952. The original ten year contract called for a minimum of 1,200,000 ties to be treated annually. [Goltra I, 45, 71]['52, 396]

In 1910 and 1911 the LS&MS established some test sections. From the 1914 AWPA report: "Keep record of every tie on certain sections." "Short test sections accurately supervised by engrg. dept. should be much more accurate and reliable than records based on an entire line." [DNC, 290]['14, table]

In the 1910-11 tests, "The Lake Shore & Michigan Southern uses a copper tag in conjunction with the dating nail with the number on the tag referring to a detailed description of the tie and treatment." ['14, 406]

Test sections

- ?, 1879.
  Some ties treated with $CuSO_4$ by the Thilmany process were installed. They lasted only three years. [ASCE 7-85, 279]['16, 328]

All 1910 tests are listed in the sources as New York Central, though they are on the LS&MS.
The first four sites below are grouped under "Buffalo, NY" in ['16, 288]. The number of ties in ['16] is given as 6,288, which agrees with the totals below.

- Lake View, NY, 1910.
  2,997 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Silver Creek, NY, 1910.
  1,038 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Ripley, NY, 1910.
  1,512 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Erie, PA, 1910.
  741 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]

The next site is listed in ['16, 288] as "Erie, PA", by which they probably meant the Erie division.

- Mentor, OH, 1910.
  7,488 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]

The number of ties at the next three sites add to 5,651, which is 55 ties off from the "Norwalk division" total of 5,706 given in [16, 288]. Norwalk was not too close to these sites, so we may be dealing with different tests altogether.

- Cleveland, OH, 1910.
  4,710 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- West Park, OH, 1910.
  341 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Elyria, OH, 1910.
  600 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]

The number of ties in the next six sites add to 7,961, just three ties short of the "Sandusky, OH" total in ['16, 288].

(continued)

- North Storage, OH, 1910.
  1,160 Lowry treated red oak, beech, and maple. I cannot find North Storage on my maps. ['17, 172]['20, 113]
- Amherst, OH, 1910.
  1,184 Lowry treated red oak, beech, and maple. ['17, 174]['20, 113]
- Sandusky, OH, 1910.
  494 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Venice, OH, 1910.
  1,203 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Baybridge, OH, 1910.
  633 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]
- Danbury, OH, 1910.
  3,287 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113]

The next two sites are division totals.

- Swanton, OH, 1910.
  6,000 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113] The location given in ['16, 288] is "Air Line division."
- Elkhart, IN, 1910.
  6,000 Lowry treated red oak, beech, and maple. ['17, 172]['20, 113] This test is listed as "Elkhart division" in ['16, 288].
- Cleveland Short Line, 1911.
  5,000 Lowry treated beech, maple and red oak ties were laid. This test is an anomoly. It is the only test shown as LS&MC, and the meaning of "Short Line" is unclear. This test is not identical to the 1910 Cleveland test, because the ties here received a different amount of preservative. ['16, 288]['20, 94]

Lake Superior & Ishpeming

2 1/2 × 1/4	rnd R	stl	(07)	31,32,34,35,53,54,57,58
2 1/2 × 1/4	rnd R	stl	(06)	33,35,36,40,42-44,46-52,55,56
2 1/2 × 1/4	rnd R	stl	(10)	36,39,41
2 1/2 × 1/4	rnd R	stl	(05)	37,38
2 1/2 × 1/4	rnd R	stl	(47)	45:b
2 × 1/4	rnd R	stl	(07)	59

This list is taken from DNC, which is a modified form of Wiswell's list in [Feb '75, 8] of the nails pulled by Herman Heiden. Also, rnd R "L" or "7",and a rnd I 16 have been pulled from this line, but they are probably from second hand ties.

Russ Olsen wrote that the Manistique & Lake Superior and LS&I sets should be the same from 31 up because "I talked with a guy who worked for the M&LS and he said that the reason the nails were the same was that the two roads went together to buy these nails so they could get a cheaper rate."

Some nails might be from second hand ties.

La Salle & Bureau County

From second hand ties?

2 1/2 × 1/4	rnd R	stl	(07)	28-31
2 1/2 × 1/4	rnd I	stl	(06)	32

The L&BC was a north-central Illinois short line, operating no more than 15 miles of track. It was taken over in 1985 by Chicago Rail Link. The 28-31 were also used by the CB&Q, which connected with the L&BC.

Lehigh & Hudson River

2 1/2 × 1/4	rnd I	stl	(07)	10,16,17,18:b,19-25,25:b,26:b,27-39,47-50,51:b,52-56
2 1/2 × 1/4	sqr I	stl	(07)	11
2 1/2 × 1/4	rnd I	stl	(01)	12-15
1 1/2 × 1/4	rnd R	stl	(07)	39
2 1/2 × 1/4	rnd R	stl	(07)	46,47
From second hand ties				
2 1/2 × 1/4	rnd R	stl	(07)	28,32,36,38-41
2 × 3/16	rnd R	mi	(11)	29,31
2 × 1/5	rnd R	stl	(04)	32:b,35:b
2 1/2 × 1/4	rnd I	stl	(05)	36

Tie treating

The L&HR began using treated ties in the first half of 1910. Date nails were placed in all treated ties. They used creosote, probably by some empty cell method. The L&HR was too small to own or lease their own treatment plant, so their ties were purchased from some commercial plant.

Ties statistics

Russ Hallock has turned up some L&HR papers relating to tie replacement. I have three of these documents, and a page of statistics prepared by Russ from other papers he has. The following table combines the information from these four documents. Underlined numbers are ones I calculated from other quantities.

(continued)

...**Lehigh & Hudson River**

Year	Total ties placed	Untreated & second hand ties placed	Treated ties placed Total	main track	side tracks	Treated ties purchased
1910	46,039†					
1911	30,879†		1,366	1,366	0	5,000
1912	34,140†		23,034	23,034	0	29,934
1913	62,909†		28,552	28,552	0	19,734
1914			21,026	21,026	0	25,653
1915			5,396	5,396	0	
1916*	27,097	14,852	12,245	12,245*	0	15,426
1917	29,556	9,316	20,240	20,240*	0	20,030
1918	28,040	4,429	23,611*	13,988*	9,623	30,079
1919	28,359	12,455	15,904*	13,100	2,804*	23,512
1920	19,759*	8,047	11,685*	9,838*	1,847	3,990
1921	20,278	5,286	14,992*	6,726*	8,266	21,748
1922	14,584	7,184	7,400*	4,880*	2,520	
1923	18,131	8,493	9,638*	8,201*	1,437	7,836
1924	21,687	6,287	15,400	8,519	6,881	
1925	18,432	3,021	15,411*	6,504*	8,807	
1926	20,307	3,037	17,270*	6,797*	10,473	
1927	10,764	848	9,916‡	5,746	4,170‡	
1928	6,823	220	6,603	1,760•	4,870	
1929	6,822	436	6,114*	2,020•	4,094	
1930	8,958	365	8,593	4,400•	4,193	
1931	7,182	111	7,071	3,160•	3,911	
1932	7,191	38	7,153	2,280•	4,873	
1933	3,458	575	2,883	1,980•	903	
1934	4,011	1,116	2,895	2,000•	895	

* These figures are contradicted in another document, but not by much.
†These quantities are for the fiscal year beginning July 1 of the preceding year.
‡These figures are given in another document as 13,898 and 8,152 respectively.
• These figures seem to be rounded to the nearest 10. The number of treated ties placed in side tracks is calculated using this approximation.

No second hand or untreated ties were used in the years 1940-1944, or 1962-1964. For the other years these numbers range from 77 up to 2,127. No nails were used in the years 1940-1945.

Russ wrote that with the possible exception of 1910, ties were treated with creosote. He also made the following calculations of the percentage of treated main line ties removed, 1924-1938.

1911	33.5%	1923	5.6%
1912	37.8%	1924	2.7%
1913	30.8%	1925	1.4%
1914	17.1%	1926	1.0%
1915	18.1%	1927	0.7%
1916	10.1%	1928	4.2%
1917	11.9%	1929	0.5%
1918	14.9%	1930	0.1%
1919	26.5%	1931	0.1%
1920	7.8%	1932	0.1%
1921	5.7%	1933	0.1%
1922	7.4%	1934	0%

(continued)

He wrote on the page with the data he prepared: "It was stated that removed ties were either burned or reused in sidings, yard or passing tracks...No record was kept of untreated ties removed. It was not stated but it seems likely that the date nails were used only in ties which had been treated. Removals for ties dated "10" were mentioned only in two years, but in those, their numbers were roughly comparable to the "11" date removals.

"Clearly, several batches of ties were of poor quality, 1919 and 1928 for example, while others, 1916 for example, were superior." Could the numbers be large for some years because of derailments?

Here is another document:

Report of creosoted ties removed from track—calendar year 1926

Year tie was placed in track shown on dating nails	Removed because of rot	Removed for split ends	Removed because of derailment	Removed because of rail cutting	Total
1910		27			27
1911		13			13
1912	5	62	42	64	173
1913	1	132	27	8	168
1914	12	25	4	12	53
1915	1	3	6		10
1916		12	3	6	21
1917		8	5	2	15
1918	1	5	2	3	11
1919	12	15		7	34
1921	1		5		6
1925		1			1
Total	33	303	34	102	532

Note that no ties dated 20, 22-24 were removed.

Russ pulled one 10 in the yard in Warwick, NY, and has never found an 11. Richard Mauren pulled two 11's, in the center of the tie. According to Mauren, the scarce dates after 11 are 15, 19, 33, 34, both 39's, and rnd R 47. He found a few rnd I (07) 58's near Belvediere, NJ where the L&HR joined the PRR, so the nails are probably borrowed from the Pennsylvania. George Oliva describes variations on the 46 in [Spring 2003, 18].

Sources for second hand nails

Erie or Delaware & Hudson
2 1/2 × 1/4 rnd I stl (05) 36

Lehigh & New England
2 1/2 × 1/4 rnd R stl (07) 28,32,36,38-41

Nashville, Chattanooga & St. Louis
2 × 1/4 rnd R mi (11) 29,31
2 × 1/5 rnd R stl (04) 32:b,35:b

Lehigh & New England

2 1/2 × 1/4 rnd I stl (07) 21,22
2 1/2 × 1/4 rnd R stl (07) 23-26,27:b,28-42

The L&NE ceased operations October 31, 1961. Portions were acquired by the CRR of NJ, and 28 miles of trackage continued operation as the L&NE Ry until 1975.

(continued)

Nails are found between the rails. Russ Hallock, as best as he recalls, found the 26-29 outside the rail. Richard Mauren reports that nails are mostly in the center of the tie, with the 24 off center. I found the 30-42 between the rails, with the nails becoming progressively closer to the center of the tie as the dates increase. Maybe the L&NE had a specific spot in the tie for each year. Someone needs to bring a tape measure the next time they are on the L&NE.

Wiswell described this set in [Feb '75, 8]. He included the 40:b, not 40:a in his list, but I found 40:a.

Lehigh Valley

2 1/2 × 1/4	rnd I	stl	(07)	10,12-14,15:b,17,19:b,20,21
2 1/2 × 1/4	sqr I	stl	(07)	10
2 1/2 × 1/4	dia I	stl	(07)	10:c
2 1/2 × 1/4	sqr I	stl	(07)	11
2 1/2 × 1/4	rnd I	stl	(01)	15
2 1/2 × 1/4	rnd R	mi	(11)	15,16:b,16:c,16:d
2 1/2 × 1/4	dia R rs	stl	(07)	17:b
2 1/2 × 1/4	rnd I	stl	(21)	40-42
2 1/2 × 1/4	rnd R	stl	(07)	43,51

Early experiments

Walter G. Berg of the LV wrote in 1904 "In spite of the fact that I designed and built creosoting works for the Lehigh Valley Railroad at Perth Amboy in 1886 and subsequently operated same for six years, I was always endeavoring to have the zinc process added to the works as an adjunct for use in treating ties. We treated a large number of experimental softwood ties with creosote, and the bulk of these are still in use after fourteen years' service in yard tracks, but the ties were protected from cutting by tie-plates." [AREA '04, 100]

In 1886 the LV tested some creosoted oak and pine ties. ['16, 305] That they placed in service creosoted ties and other timbers in 1890 can be deduced from Berg's statement above, and from these quotes in ['31, 178]:

> There was in use in 1909 in the tracks and other structures of the Lehigh Valley a considerable amount of treated material which had already given nearly twenty years of satisfactory service..." "...there are still in service in both tracks and structures, ties and timbers that were treated with creosote oil and put into service over forty years ago."

The ties received 8-12 lb/ft^3, and more than doubled the life of untreated ties. [AREA '09, 619]

Octave Chanute spoke of the plant in April, 1900:

> ...the Lehigh Valley erected that plant, to treat its own piles and timbers, at Perth Amboy, and all timber it treated for two or three years was then treated with very good success. Subsequently, to keep the plant busy and earn the interest on its first cost, which was said to be $83,000, the road organized a department to run it [in order to treat material for other companies]. That department has been treating timber for quite a number of years and has done, I believe, some very good work, but I have been told that it was found that it did not pay; that competition cut the prices so much that contracts were accepted which yielded no profit; and a year and a half ago [ca. October, 1898] the Lehigh Valley Railroad shut down its plant. The road has now leased the plant to the people who are introducing the Hasselmann process into this country. [WSE 4-00, 120]

The tie treating plant

In 1909 the LV signed a contract for the Federal Creosoting Co. to construct a one-retort treating plant at Bound Brook, NJ. It went into operation in 1910, creosoting ties, switch timbers, bridge ties, etc. by the Lowry process. It was still in use in 1952. The location of the plant is given as Manville, NJ in ['52, 396], so it may have been located between the two towns. ['13, 448]['31, 177]['52, 396][WPN 7-23, 112] [WPN 3-31, 28]

(continued)

From 1910 to 1919 ties were treated with straight imported creosote oil, after which a creosote-coal tar solution was used. ['31, 177]

The nails

The positions of the nails are as follows. Outside the south or east rail: 10-13. Between the rails, close to the south or east rail: 13 (rarely), 14. Between the rails, 1/3 close to the south or east rail: (01) 15. Middle of the tie: 16, 17, 19-21. Outside the rail: 40-43. The (11) 15 is found between the rails.

Only two 16:c's and one 16:d are known. One each were pulled north of Honeoye Falls, NY. Three diamond 17's are known. One was pulled near Farmington, NY.

From 1925: "Use of dating nails has served its purpose on the Lehigh Valley. We discontinued using them two years ago." [AREA '26, 711][DNC, 331] He meant "four years ago."

The 51's were pulled by Glenn Wiswell in one stretch of track. They have never been found elsewhere.

An old-timer told Leo Johnson that the section foreman at Cortland, NY was given dating nails, and was told to do what he wanted with them, whereupon he buried them near the station. Leo discovered bushels of nails there, all but the diamond 10 found in abundance. Here is what he found.

2 1/2 × 1/4	dia I	stl	(07) 10:c	(rare)
2 1/2 × 1/4	sqr I	stl	(07) 10,11	
2 1/2 × 1/4	rnd I	stl	(07) 12,13,15:b	
2 1/2 × 1/4	rnd R	mi	(11) 15	

The rnd, sqr, and dia 10's were later pulled from sidings in Cortland by John Iacovino. Apart from these Cortland finds, the dia 10, sqr 10, and rnd I (07) 15 have never been found on the LV. It is possible that Cortland was the location of a test track, and that the extra nails were dumped there at the end of each year.

For a photo of the set see [J-A '93, 7]. Nail hunt: [M-J '90, 9]. See also my article summarizing the LV's experience with tie treating and dating in [Winter 2003, 6-10].

Litchfield & Madison

2 1/2 × 1/4	rnd I	stl	(09) 28-30,30:b,31,32
2 1/2 × 1/4	rnd R	stl	(09) 30,35,37

The L&M, a 54 mile Illinois railroad, became part of the C&NW January 2, 1958.

Long Island

1 1/4 × 3/16	rnd I gm	cop	(60) 19-21,23,24
1 1/4 × 3/16	rnd I gm	cop	(66) 22
1 1/4 × 3/16	rnd I	cop	(66) 25,26
1 1/4 × 3/16	rnd I	cop	(07) 27
From protect boards			
1 1/4 × 3/16	rnd I gm	cop	(60) 25
1 1/2 × 3/16	rnd I	cop	(63) 30
1 1/4 × 3/16	rnd I	cop	(63) 31

In 1868 the Long Island RR used some bridge stringers treated with $ZnCl_2$. They were a failure. [ASCE 7-85, 258]

In a September 12, 1903 letter Octave Chanute listed the Long Island RR as currently using date nails. Nothing else is known about pre-1919 nails on this RR. [Fall 2002, 18-19]

See Bob Myers' articles in [M-A '84, 1-4] and [M-J '92, 4-5]. Tie nails are found between the rails, usually half way between the north rail and the middle of the tie.

Protect boards are the wooden slats that are used to protect the area above the third rail (650 volts DC) in Long Island Rail Road electrified territory. From these slats Bob pulled from two locations two 25's, five 30's, and a 31. These nails are rare.

All nails have supported, or cup heads except the (60) 24, 25, and the (07) 27.

Los Angeles & Salt Lake

See Salt Lake Route.

Los Angeles Junction

2 1/2 × 1/4	rnd I	stl (06)	51-68

The LAJ began operations in 1925, and is independent. It is a 54 mile switching line.

A rnd R (06) 52 and two rnd R (06) 61's were found. They are probably the result of keg mix-ups. See Mel Smith's article in [M-A '85, 2].

Louisiana & Arkansas

The L&A was owned by the Kansas City Southern from 1939 until it was absorbed by the KCS in 1992. All nails are KCS.

Louisville & Nashville

2 1/2 × 1/4	rnd I	stl (07)	10,12
2 1/2 × 1/4	rnd R	stl (07)	13-16,16:b,17-23,23:b,24-26,26:b,27,28,29:b,30
2 1/2 × 1/4	rnd I GM	stl (07)	15
2 1/2 × 1/4	dia R rs	stl (07)	19,20
2 1/2 × 1/4	rnd R	stl (22)	21
2 1/2 × 1/4	rnd R	stl (18B)	21,22
2 1/2 × 1/4	rnd R	stl (10)	24,25,27-29
2 1/2 × 1/4	rnd R	stl (01)	27-29
2 × 1/4	rnd R	stl (04)	31,32,35,36,38
2 × 1/4	rnd R	stl (07)	33,34:b
2 × 1/4	rnd R	stl (19)	37:b,39,39:c
From poles			
2 × 1/4	rnd R	stl (04)	35,36,38
2 × 1/4	rnd R	stl (19)	40,41
2 1/2 × 1/4	rnd R	stl (19)	41,42
Code nails			
2 1/2 × 1/4	rnd R	stl (07)	A #1,B #1,C #1,D #5,E #1,F #4
2 × 1/4	rnd R	stl (07)	A #2,C #3
2 × 1/4	rnd R	stl (05)	A #3,C #4,D #6,F #3
2 × 1/4	rnd R	stl (06)	A #4
2 × 1/4	rnd R	stl ( )	A #5
2 × 1/4	rnd R	stl (19)	B #2,L #1
2 1/2 × 1/4	rnd R	stl (05)	C #2,D #4
2 × 1/4	rnd R	stl (05)	0-6,7-9 (Set #1)
2 × 1/4	rnd R	stl (06)	1-5,7,8 (Set #2)
2 × 1/4	rnd R	stl (07)	0,2,4-6,7-9 (Set #3)
2 × 1/4	rnd R	stl (19)	1,3 (Set #4)
2 1/2 × 1/4	rnd R	stl (07)	0-6,7-9 (Set #16)

Southern Wood Piedmont nails are found in L&N switch ties.

Treating bridge piles

The New Orleans, Mobile & Chattanooga went into operation in 1870 with five foot gauge track. The main line ran from New Orleans to Mobile, along the Gulf coast. After a few corporate changes the coastal line became part of the Louisville & Nashville in April, 1880.

Many bridges of this coastal railroad were built to span nooks and arms of the sea, and even before the line was completed, the teredo had begun to destroy the untreated piles used in construction. In 1869 an open tank treating plant was built at West Pascagoula, MS for boiling piles in creosote, but the penetration was not enough to stop the shipworms. [WPN 3-41, 32]

(continued)

Two years after the railroad was completed the bridge over the Bay of Biloxi collapsed under a freight train, sending the locomotive and some cars into the water. The cause was weakened piles due to the teredo, and the decision was made to sheath bridge piles with metal. "Between four and five thousand piles were sheathed, part with yellow metal, such as is used for covering ships' bottoms, and part with zinc, with a layer of felt underneath. Four or five hundred were charred and oiled, and as this was less costly than covering with metal, more piles were thus treated subsequently." [ASCE 8-85, 333]

The sources for timber treating in each of the last two paragraphs give completely different information. The author of the 1941 *Wood Preserving News* article, L. L. Adams, Maintenance of Way Engineer, says nothing about sheathing in metal or charring and oiling (unless "oiling" was done at the open-tank plant).

On June 20, 1885 J. W. Putnam of the L&N wrote the letter to Octave Chanute which was published in the ASCE *Proceedings* in 1885. His only reference to the open tank plant occurs five pages later in his description of the 1869 test section as being "near the creosoting works." Perhaps the open tank plant was abandoned before the practice of sheathing was begun.

Putnam wrote that the sheathing and the charring/oil protected the new piles just until they were in turn replaced by pressure creosoted piles beginning 1876. "In 1875 it was decided to rebuild all the bridges on the road with creosoted piles and timber, under the supervision of the writer, who had been investigating the subject for two or three years." [ASCE 8-85, 334]

"After a series of experiments plans were adopted differing considerably from anything in use. Works were constructed at West Pascagoula, Miss., and the work of reconstructing the bridges with creosoted piles and timbers commenced about the first of March, 1876." [ASCE 8-85, 335] This was the first permanent railroad plant in North America. [W-P Oct-Dec '15, 72] Longleaf pine stringers were treated with 16 lb/ft^3 of creosote. [AREA '09, 618]

As of 1890 the West Pascagoula works "creosoted piles to protect them against teredo, also bridge and trestle timber, but [has] never creosoted ties, because it is believed that with ties at 23 to 30 cents apiece the additional expense would not be justified." [Trat I, 31]

Full-cell creosoting was used on "bridge timber and piles exclusively". The plant was rebuilt in 1895, and it burned in 1902. It was rebuilt immediately. After a second fire on August 13, 1915, the L&N rebuilt the plant again, in 1917, on a larger scale. [W-P Apr-Jun '17, 25-27][HWP, 10]

About 1900 the L&N was creosoting poles for Southern Bell. ['23, 309]

"The use of treated timber, other than piles, in bridges and trestles was not started to any extent until the early twenties, and it was not until the late twenties that it became the general practice to use treated timber in all permanent bridges and trestles." [WPN Mar '41, 32]

Treating ties

"In 1912 it was decided to treat crossties to extend their life. As the plant at Gautier [the new name for West Pascagoula] was not of sufficient capacity to treat all timber and also crossties, a plant was constructed at Guthrie, Kentucky, and placed in service in 1914, exclusively for the treatment of cross and switch ties. From 1914 to 1920, inclusive, ties were treated at Guthrie with both creosote (full cell) and zinc chloride, chiefly with the latter preservative until 1918. At that time it was decided that zinc chloride was not so satisfactory as creosote, and by the end of 1920 its use was discontinued." "The use of treated switch ties, like treated timber in bridges, other than piles, was not started until the early twenties and it was not until the late twenties that treated switch ties were generally used over the line." [WPN Mar '41, 33]

As of 1917 ties were treated for lines north of Birmingham, AL. Untreated ties continued to be used on lines south. [W-P Apr-Jun '17, 25]

Test sections

- Near W. Pascagoula, MS, ca. 1869.

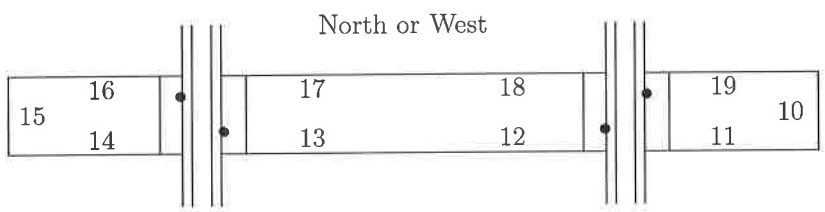
  J. W. Putnam wrote in 1885 "Some hemlock cross-ties were creosoted and laid in the track near the creosote works about sixteen years ago." The ties were well protected. Putnam does not mention the open tank plant explicitly in his letter, but that is what must be meant by "the creosote works," unless he meant to write "six years ago." [ASCE 8-85, 338]

(continued)

- ?, 1877-78.
  600 ties, creosoted at West Pascagoula, were laid. ['13, 197]
- ?, 1878.
  15,000 creosoted pine bridge ties. 12-18 lb/ft^3. [AREA '09, 618]['16, 315]['20, 120]
- ?, 1879.
  1,893 creosoted pine bridge ties. 20-22 lb/ft^3. [AREA '09, 618]['16, 315]['20, 120]
- Rawles Creek, MS, 1907.
  1,274 Bethell creosoted southern yellow pine, short & longleaf ties. ['17, 206]
- Memphis, TN, 1915.
  188 full-cell creosoted red oak and 237 $ZnCl_2$-Burnett treated red oak ties were laid. ['17, 170, 184] ['20, 112, 117] ['17] gives the location as Guthrie, which is the treating plant, not the test section.

Dating ties

"Another method [of dating ties] is that employed experimentally on the Louisville & Nashville where ordinary three inch spikes are driven into the tie, the position of the spikes indicating the year laid." This quote is from ['14, 405] and is reproduced in [DNC, 15] with the following diagram:



The original L&N diagram is dated Aug 7, 1913, and appears in [Aug '76, 4]. It shows further that the nails were to be placed 12" in from the middle of the rail, 2" in from the edge of the tie, except the 10 and 15, which were to be centered 2" in from the end. On the drawing next to the 1910 position, and seemingly added later, appears "1920".

Also from the 1914 AWPA report: "Keep record of every stretch of treated ties in track; also know average life of all ties on each division." "Have used dating nails to a limited extent; also 3-in. spikes." Records had been kept for 40 years. "Impractical to keep a record of each individual tie as cost would exceed benefit derived." [DNC, 290]

In a letter to William Kepka, A. R. Swint, Supvr. Material Dist., wrote "Mr. Winget [Manager of the L&N treatment plant near Guthrie, KY] advised me that the L&N used these date nails from 1910 to the early 1940's" [Aug '76, 3].

W. H. Courtenay wrote in 1922 "I have advocated the dating nail, but we had so much difficulty in getting the foremen to drive the dating nails into the ties, that we sent all the dating nails to the tie-treating plant with instructions to the superintendent to drive them at the time of treatment." [AREA '22, 1167][DNC, 33]

More on date nails

Dave Parmalee wrote an information-packed atricle in [J-F '79, 1-2] which also has a photo of the set. It was reprinted without the photo in [N-D '86, 2-3]. From this article I extracted most of the following.

Most early nails come from the Illinois branch from McLeansboro to Junction. Possibly no pre-1921 nail has been found south of Tennessee.

Most diamond 19's were pulled from a yard track in Earlington, KY. The diamond 20's along with some 19's come from the McLeansboro branch.

The (18B) 22's are more common than the (07) 22's.

"The Louisville, Henderson, and St. Louis RR ran from Evansville, Ind. to Louisville, Ky. It was owned for several years by the L&N and finally merged into it in 1929." See the LH&StL for nails you may have in your L&N set.

(continued)

Nails were used in ties through 1939. Nails through 1942 can also be found in telegraph poles along the railroad. Dates have been found back to 1928 in poles. Only two 42's have been found. The list of L&N pole nails above is very, very incomplete.

Code nails

Still more from Parmalee's article: Probably sometime in the early 1920's the L&N began to number their sidings with code nails. First used was the 2 1/2" rnd R (07) Set #16. "There is a variation in the 2 in this set. When a new siding was added between say numbers 74 and 75, it would be numbered 74A. F is the highest letter known used for this purpose. If siding 74 had two switches, a 7 and a 4 would be driven at both of the switches. Generally, large yards were not numbered.

"Probably in the thirties, another batch was ordered for new and replaced switch ties. These were the 2" type 07 nails with letters A, B and one known C. Oddly, the 1, 3, and B are type 19. Both types, however, are made by U.S. Steel, so this may explain the two shank markings. Also, there is a type 19 'L' in this set. This nail is used as a 7, but that raises an interesting question. Could the L&N letters be found up to the letter L, or was the L supposed to have been manufactured as a 7? Some nails from the first set are found with this set for two reasons. When the switch tie with the code nails is replaced, often if one or more nails are in good shape, they are pulled and re-driven into the new tie. Because of this, and the age of the 2 1/2" nails, many are battered and rusted beyond collectability. The second reason is that some numbers of the first set were still in supply when the second set was ordered.

"Then in the forties, I figure, the third set was ordered. This is the "double dot" set (type 05). It consists of all numbers 0 through 9 and also letters A, C, and D. Then in about another ten years, the fourth and final set was introduced, type 06, with one letter—A. The L&N merged the large NC&StL RR into its system in 1957 and numbered all of the sidings. Most common found are type 05 0, 4, 6, 7, and 9 with type 06 1, 2, 3, 5, and 8. Since few type 06 are found on the original L&N, the other numbers are very hard to come by. There may not be a 9 in this set." Only six 6's are known, and one was used as a 9.

"By the time the L&N took over the Monon in 1971, they had quit using code nails, as the L&N numbered former Monon switches with raised stamped aluminum strips. These are occasionally found on other parts of the L&N, sometimes with some obliterated code nails. Still, a great many switches were not numbered at all."

Two 7s, one 2" and the other 2 1/2" were found in the same tie filed down to make 1's. Dave included in his article a price guide for the code nails which reflects rarity.

A rnd I GM (07) 15 has been found. It is probably the result of a nail factory mix-up.

The (19) CAS #4 is probably a Southern Wood Piedmont nail, since it is found on both the L&N and the Seaboard Air Line, and only in switch ties. Parmalee wrote "I doubt if it means 'Clearance at switch' though these are found in switch ties. They are found in the center of every tie, once a switch with them is discovered, which is not often."

See also [M-A '78, 1] for reference to the 2" C and the F. Steve Worboys wrote a nail hunt article in [N-D '89, 8-10].

The L&N is also host to Southern Wood Piedmont switch nails.

Nail hunt: [J-F '91, 7]. Bruce Gordon wrote an article summarizing L&N nails in [Summer 2003, 4-5].

Louisville, Henderson & St. Louis

2 1/2 × 1/4	rnd R	stl (07)	23,28
2 1/2 × 1/4	sqr R	stl (07)	24
2 1/2 × 1/4	sqr R rs	stl (07)	25-27
2 1/2 × 1/4	rnd R	stl (01)	27-29

The LH&StL was merged into the L&N in June, 1929, having been owned by the L&N for several years. See L&N.

Nails are found outside the rail, which allows us to see that the (07) 23 & 28 and the (01) nails are not from ex-L&N ties. See George Oliva's article in [Fall 2003, 6].

Lowville & Beaver River

Short line code set

2 × 1/4	rnd I	stl (07)	34	

Code nails

1 1/2 × 1/4	rnd I	stl (07)	0	(Set #29)
1 1/2 × 1/4	rnd I	stl (07)	4,8	(Set #28)

From second hand ties

2 1/2 × 1/4	rnd I	stl (07)	13,15:b,15:c,30:c,34:b,44
2 × 1/4	rnd I	stl (07)	24
2 1/2 × 1/4	rnd R	stl (07)	26,29,31
2 × 3/16	rnd R	mi (11)	31
2 × 1/5	rnd R	stl (04)	33,34
2 1/2 × 1/4	rnd I	stl (21)	41

See the treatment company nail section in the back of the book for a description of the short line code set. The (21) 41 was found outside the rail, the (11) and (04) nails were found in the proper positions (see NC&StL for diagram), and all other nails were found between the rails. See Steve Worboy's article in [S-O '92, 6].

The 34:b has smaller numbers than 34:a. The rnd R (07) 26 is something between 26:a and 26:b. The top lip of the 6 does not extend beyond the loop of the 6.

Sources for second hand nails

Lehigh Valley

2 1/2 × 1/4	rnd I	stl (21)	41

Nashville, Chattanooga & St. Louis

2 × 3/16	rnd R	mi (11)	31
2 × 1/5	rnd R	stl (04)	33,34

Pittsburg, Shawmut & Northern

2 1/2 × 1/4	rnd I	stl (07)	30:c,34:b

Schenectady

2 1/2 × 1/4	rnd I	stl (07)	13,15:b,15:c

Maine Central

2 1/2 × 1/4	rnd R	stl (05)	30,31:b
2 1/2 × 1/4	rnd R	stl (07)	31,33,34,34:b,35,36,36:b,37-41,46-62,62:b,63,64
1 1/2 × 1/5	rnd R	stl (07)	42,43,43:b,43:c,44,45
2 1/2 × 1/4	rnd R	stl (06)	56,56:b,60,66,67,68:b
2 × 1/4	rnd R	stl (07)	65
2 1/2 × 1/4	rnd R ts	stl (37)	70-76

Maine Central nails were placed in the center of the tie.

In a 1971 letter to Larry DeMatteo, Bradley L. Peters, Director of Public Relations for the Maine Central wrote "The Maine Central Railroad Company apparently started using tie dating nails in 1930 and still continue to use them. The nails have a round head and shank with raised numbers, with the exception of the year 1932 when a plain roofing nail was used.

"The nails used have been galvanized and are used only in hardwood treated ties, now consisting of maple, birch and oak."

In one location John Iacovino found that every 1955 date nail had a common nail driven next to it. The common nail has a cross-hatch pattern on the head.

Russ Hallock has found some odd nails here. He found a 2 1/2" rnd I stl (07) 32 in Vermont. In the same area he found one or two each of 2 1/2" rnd I (07) 42-45. Near Augusta he pulled a 2" (07) K/41.

At least the nails from the 1970's were driven at the track. Wiswell got unused 70-72 from a supply depot. He wrote "They told me that they used a plain galvanized roofing nail in 1977 but I didn't see any." [Wiswell 78]

(continued)

There was once a question as to whether the 76's were used. They have been found by Everett Baker and Thomas Coyne in a siding on the Mountain division. The Conway Scenic RR once sold 76's in their shop.

Manistee & Grand Rapids

2 1/2 × 1/4	rnd I	stl	(07)	09-18

In November, 1913 the M&GR became the Michigan East & West, which was sold in 1919 to the Wm. T. Joyce Co. The line was abandoned no later than 1921. It may be that the nails listed under East Jordan & Southern came from ties originally used by the M&GR.

Manistee & Northeastern

2 1/2 × 1/4	rnd R	stl	(17)	30:c,31-33,35-47

This 60 mile railroad consisted of two disjoint pieces in Michigan, connected by the Pere Marquette. All but 26 miles were abandoned November 30, 1955. The rest was taken over by the C&O. The Pere Marquette / C&O had owned the line since 1932.

Note that the 47 is listed also under Pere Marquette.

Manistique & Lake Superior

2 1/2 × 1/4	rnd R	stl	(07)	31-36,36:b,40,42-44,53,54,57-59
2 1/2 × 1/4	rnd R	stl	(05)	37,38
2 1/2 × 1/4	rnd R	stl	(10)	36,39,41
2 1/2 × 1/4	rnd R	stl	(47)	45:b
2 1/2 × 1/4	rnd R	stl	(06)	46-52,55,56,59
From second hand ties				
2 1/2 × 1/4	rnd R	stl	(07)	24,25,28
2 1/2 × 1/4	rnd R	stl	(05)	26:b,27
2 1/2 × 1/4	rnd R	stl	(10)	29
2 1/2 × 1/4	rnd R	stl	(17)	30:d,49

The M&LS, which was essentially the northern Michigan section of the Ann Arbor, was owned by the AA, and was abandoned July 19, 1968. It was 38.32 miles long.

Russ Olsen wrote that the M&LS and the Lake Superior & Ishpeming sets should be the same from 31 up because "I talked with a guy who worked for the M&LS and he said that the reason the nails were the same was that the two roads went together to buy these nails so they could get a cheaper rate."

I divided the list into first and second hand by comparing the list with Lake Superior & Ishpeming, so some nails listed as second hand might really belong to the set, while others listed as first hand might be second hand.

The 30:d was used by Soo Line and the 49 by Wabash. The rnd R (07) 24,25, (05) 26:b,27, and (10) 29 were all used by both Cotton Belt and Michigan Central, so it is difficult to tell where they originally came from.

Marcellus & Otisco

From second hand ties				
2 1/2 × 1/4	rnd I	stl	(07)	11,22
2 1/2 × 1/4	sqr I	stl	(07)	12,13,22,23
2 1/2 × 1/4	sqr R	stl	(07)	18
2 1/2 × 1/4	rnd I	stl	(64)	18,19

The M&O was a short line in upstate New York abandoned in June, 1960.

(continued)

The square nails are from second hand New York Central ties. The rnd I 22 was found outside the rail, like the dozens of 22's found on the Arcade & Attica.

See [M-J '90, 9].

Shadow sets

Enigma set

2 1/2 × 1/4	rnd I	stl	(64)	18,19

Maryland & Pennsylvania

1 1/4 × 3/16	rnd I gm	cop	(60)	26,27:b,28,29,32,34,41
1 1/4 × 3/16	rnd R gm	cop	(60)	36,37
1 1/4 × 3/16	rnd I gm	cop	(63)	38-40
1 3/4 × 3/16	rnd R gm	cop	(60)	46
1 1/4 × 3/20	rnd I	alm	(60)	47,48,50-55
1 1/4 × 3/20	rnd I	cop	(60)	49
1 1/4 × 3/16	rnd I	alm	(60)	56
From second hand ties				
2 1/2 × 1/4	rnd I	stl	(07)	24,50,58,60,64,65
2 1/2 × 1/4	rnd I	stl	(05)	25,50,52
2 1/2 × 1/4	rnd R	stl	(07)	35,37,39,43,57
2 × 1/4	rnd R	stl	(07)	44
2 × 1/4	rnd I	stl	(05)	45
2 1/2 × 1/4	rnd I	stl	(06)	55
Code nails from second hand ties				
2 × 1/4	rnd R	stl	(05)	C #3

Alan Frame has turned up a few documents on Maryland & Pennsylvania ties and date nails. He wrote a short article in the Summer 1992 issue of the *Timetable*, the Maryland & Pennsylvania Railroad Preservation and Historical Society Newsletter.

The Ma&Pa chose a different location for date nails for each year. Unlike similar plans from the Nashville, Chattanooga & St. Louis, the Buffalo, Rochester & Pittsburgh, and the Erie, the Ma&Pa plan seems to have no set pattern. It will be described below. First, some quotes from Frame's article: "The records indicated locations for nails from 1928 to 1942, 1946 to 1954. One record skipped the year 1937 but another had it included. Mr. Jeremy E. Murphy stated that 'Tie date nails first used in 1923'. He stated that tie date nails were not used after 1956."

"The railroad ordered a total of 300 pounds of tie date nails in 1946. The nails were 1 3/4" long and made of copper... The order was placed with C. G. Hussey & Co. of Pittsburgh, PA on 3/1/1946 for 100 pounds. The second order for 200 pounds was placed 3/18/1946 with the same company." "An interesting note was found, the total order was for 20,000 nails, of that 5,000 were to go to the Canton Railroad. The total cost of the nails was $81.67 with the discount. During 1947 the railroad switched to aluminum nails. They ordered 20,000 nails with '47' on them with a length of 1 1/4". The Maryland and Pennsylvania Railroad ordered the nails from Clendenin Bros., Inc. of Baltimore on 4/30/1947. This order weighed 59 pounds and cost $35.05 with discount." "The Canton Railroad received 15 pounds or 5,000 nails from this shipment."

"The Clendenin Bros., Inc. won the 1949 order for tie date nails."

It is this information which has finally allowed us to conclude that type (60) nails were made (or at least sold) by the C. G. Hussey & Co. The 47-49 nails, previously categorized as type (60), we can now give their own WESIS type—these were made by Clendenin Bros. of Baltimore. Note that the number style of these nails is uncharacteristic of type (60). I suggest designating the Hussey nails type (62), though they remain type (60) in the list above.

"The Chief Engineer of the railroad would send out notes on 8 1/2" × 5 1/2" paper to each section foreman to tell them where to place the tie date nails. The notes were worded similar to the February 2, 1942 note from E.E. McLellan: 'Place 1942 dating nails 8 inches east of base of east rail'." Alan did some

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field checking to determine the positions of 1955 and 1956 nails. "Thanks to Sam Bistline for guiding me to those nails so I could add the data to this article. Sam has been installing 1990 and 1991 tie date nails mid way between the rails. He has been stamping roofing nails with dates by hand. Access to prestamped nails in small quantities would help him."

28-32 were placed outside the East rail, and 33-39 outside the West rail. 39-50 alternated West-East (42 and 46 both outside the East rail, with no nails used 43-45). Alternating sides continued through 1956, the nails moving between the rails in 1951. Apart from the switches from East rail to West rail to Alternating, the distances from the rail are odd as well. Here is the table:

Location of MA&Pa date nails, 1928-1956

1928	Outside	East rail 4"	1941	Outside	West rail 4"
1929	Outside	East rail 7"	1942	Outside	East rail 8"
1930	Outside	East rail 10"	1946	Outside	East rail 9"
1931	Outside	East rail 11"	1947	Outside	West rail 5"
1932	Outside	East rail 12"	1948	Outside	East rail 6"
1933	Outside	West rail 6"	1949	Outside	West rail 12"
1934	Outside	West rail 7"	1950	Outside	East rail 13"
1935	Outside	West rail 8"	1951	Outside	West rail 13"
1936	Outside	West rail 9"	1952	Inside	East rail 5"
1937	Outside	West rail 9"	1953	Inside	West rail 10"
1938	Outside	West rail 10"	1954	Inside	East rail 10"
1939	Outside	West rail 11"	1955	Inside	West rail 27"
1940	Outside	East rail 5"	1956	Inside	East rail 25"

The nails mentioned by Frame correspond to the list I already had. The following info is not from his article: The second hand nails, except the rnd R (07) 35, 37, 39, and 43, are taken from [Lewis, 86] and are ex-PRR. He also shows a 1/5" rnd R (06) 33 and a 1/4" rnd I 26, type unknown, but whose numbers most closely resemble the cut I (03) 26:c from the Rutland.

Mason City & Clear Lake

2 1/2 × 1/4	rnd I	stl (07)	20
2 1/2 × 1/4	rnd R	stl (07)	21-26,28,29
2 1/2 × 1/4	rnd R	stl (03)	29-31,33,34
2 1/2 × 1/4	rnd R	stl (06)	32,34

The MC&CL, an electric railroad in Iowa, came under the ownership of Iowa Terminal July 1, 1961, though the two railroads never connected.

Bill Lindsay pulled about 5 of the (03) 29's from this line. They were later acquired by Bill Bunch. See [J-F '78, 1].

McCloud River

2 1/2 × 1/4	rnd R	stl (12)	58-60

The McCloud River (Now the McCloud) operates 50 miles in California. In a 1977 letter to Larry Meeker, Chief Engineer J. A. Dixon wrote "As far as I know this RR only used date nails during yrs of 1958 & 1959. I have considered going back to them as we have changed the type of wood used for our ties—but not very seriously though.

"Prior to 58 white ties were installed which would have an average life of abt 7 yrs. We now are getting about 20 yrs out [of] our ties."

But then Jeff Forbis, president of the railroad, wrote to Rolland Meyers June 15, 2000 regarding the 60: "I was able to find a good solid confirmation and a softer (but confirming) positive that indeed 60 date nails were used in McCloud. The best confirmer also advised that none were used after 60. He said that for a few years after that a hammer with a brand was used some...I feel confident that my informer

(continued)

is a good source." A couple years earlier Don Peircy had come up with all three dates from the railroad, and Rolland later also acquired some 60's. [Winter 2002, 2-3]

Mexican Central

See National Railways of Mexico.

Mexican Pacific (Ferrocarril Mexicano del Pacifico)

2 1/2 × 1/4	rnd R	stl (31)	58
2 1/2 × 1/4	rnd R	stl (09)	58
Code nails			
2 1/2 × 1/4	rnd R	stl (31)	B #5,i #3,J #1, #1,P #3,R #4,S #6
2 1/2 × 1/4	rnd R	stl (32)	$\frac{1}{A}, \frac{1}{A}$:b, $\frac{2}{A}, \frac{2}{A}$:b, $\frac{2}{A}$:c

See Mexico for general comments. The Mexican Pacific is a short line which has never operated more than 24 miles of track. Probably many of these nails were really used by the National Railways of Mexico.

There are other variations on the code 2/A.

Mexico

See individual railroads:

Mexican Pacific (F. C. Mexicano del Pacifico),
National Railways of Mexico (F. C. Nacionales de Mexico),
Pacific (F. C. del Pacifico),
Rio Grande, Sierra Madre & Pacific
Sonora-Baja California (F. C. Sonora Baja California), and
Southern Pacific (of Mexico).

Most people who have pulled nails in Mexico have kept only sketchy records as to which nails were used by which railroad. The five sets I list were constructed from information supplied by Elias Castillo, Max Jones, and Mel Smith. If you have something to add or correct, please write. None of these lists is complete.

Some Mexican railways are known to me only because they built tie treating plants. These are:

Year Built	Location	Company	Process	No. of Retorts	
1904	Chihuahua	Chihuahua & Pacific	Burnett or Wellhouse	2	[Rowe, 328]
1907	Madera, Chih.	Madera Co.	Burnett	2	['13, 460]
As of 1909 the railroad which ran through Madera was the Rio Grande, Sierra Madre & Pacific.					
1929	Madera, Chih.	Mexico Northwest Ry. Co.		2	['34, 475]
1932	Muñoz, Tlax.	Mexican Railway Co. Ltd.		1	['44, 434]
1936	Perote, Ver.	Interoceanic Railway of Mexico		1	['44, 434]

See also National Railways of Mexico for other Mexican tie treating plants.

(continued)

Here are the nails from Larry Harvey's Mexican list which do not appear in any of the five sets listed above:

1 1/2 × 1/4	rnd I	stl	(05)	28
1 1/2 × 1/4	rnd R	stl	(32)	28 29 34 34 ⁗, ‴, ′, ″

Probably NR of M. These nails are shown as (??) in DNC.

1 1/2 × 1/4	rnd R	stl	(07)	29,31
2 × 1/4	rnd R	stl	(07)	29
2 × 1/4	rnd R	stl	(32)	32-34,36

Mel Smith has 33 and 36 with 7/32" shanks. Are these the same nails?

2 1/2 × 1/4	rnd R	stl	(09)	53:b	Probably S-BC.
2 1/2 × 1/4	rnd R	stl	(06)	54	
1 × 1/4	rnd R	stl	(06)	56	
2 1/2 × 1/4	rnd I	stl	(06)	58	
2 1/2 × 1/4	rnd R	stl	(18C)	58	
2 1/2 × 3/16	rnd R	stl	(18C)	58	Really 1/4"?
2 1/2 × 1/4	rnd R	stl	(32)	58,71	

The 58 is probably really (31). The 71 may be part of the S-BC set.

2 1/2 × 1/4	rnd R	stl	(31)	63:b,72	Probably part of the S-BC set.
2 × 1/4	rnd R	stl	(17)	75,76	

Code nails

2 1/2 × 1/4	rnd R	stl	(31)	C #6,E #3,F #2

Michigan Central

2 1/2 × 1/4	rnd I	stl	(07)	15-17,18:b
2 1/2 × 1/4	rnd R	stl	(07)	24,25,31
2 1/2 × 1/4	rnd R	stl	(05)	26:b,27
2 1/2 × 1/4	rnd R	stl	(10)	29,30

From second hand ties

1 3/4 × 5/16	rnd I	stl	(01)	7,9
2 × 11/40	rnd I	stl	(07)	9
2 1/2 × 1/4	sqr I	stl	(07)	21,23-25,27-31
2 1/2 × 1/4	sqr I	stl	(05)	26

Code nails from second hand ties(?)

2 × 5/16	rnd I	stl	(07)	0

In February, 1930 the MC became part of the New York Central. It had been owned by the NYC since 1890. See NYC for general comments on the New York Central System.

The Federal Creosoting Co. built a four retort treating plant for the Lake Shore & Michigan Southern and Michigan Central railroads in 1909 at Toledo, OH. The plant, which creosoted various hardwoods by the Lowry process, began treating in the Spring of 1910 and was still operating in 1952. The original ten year contract called for a minimum of 1,200,000 ties to be treated annually. ['13, 89, 452] [Goltra I, 45, 71]['52, 396]

"Previous to 1912 marked ties with hammers and dating nails. Installed several test sections last year [1912 or 1913]." Records had been kept for 9 years, since 1904 or 1905. "Endeavor to distribute test sections over different classes of subsoil and ballast." ['14, table][DNC, 290]

"...the Michigan Central has tried copper nails to escape corrosion but they are expensive and in some cases were extracted form the ties." ['14, 406]

The stubby (01) 7, 9, and (07) 9. were pulled by Russ Olsen, and they are probably from second hand ties. Most likely they come from the Chicago & Northwestern. He pulled one of each date between Topinabee and Chebeygan, MI. A second (07) 9. was found in a fencepost in eastern Michigan. Russ also pulled the stubby 0. He found two, about ten feet apart, south of Caledonia, MI. I do not know if the 0 was originally used by the Michigan Central.

(continued)

On the branch into Buffalo, nails are found between the rails close to the north rail. Some 30's are found close to the south rail, indicating that nails were driven at the treating plant. In South Bend, IN nails are found between the rails, closer to the west rail.

The second hand nails come from the NYC and Big Four. The NYC owned both the Big Four and the Michigan Central.

The common MC nails are the 25-31. No 28 has been found.

The following nails were in Larry Harvey's MC list, but do not seem to fit:

2 1/2 × 1/4	rnd R	stl (04)	44,45
2 1/2 × 1/4	rnd R	stl (19)	46,47

These also listed under CSS&SB and NC&StL. Possibly the NC&StL used the nails, which have turned up in second hand ties on the CSS&SB and the Michigan Central.

Michigan East & West

See Manistee & Grand Rapids.

Middletown & New Jersey

From second hand ties

1 3/4 × 5/16	rnd I	stl (05)	16
2 1/2 × 1/4	rnd I	stl (07)	16,21,24,25,27-35,37,50
2 1/2 × 1/4	rnd I	stl (64)	18
1 1/4 × 3/16	rnd I gm	cop (60)	23:b,24
2 1/2 × 1/4	rnd R	stl (07)	23,24,26:d,28,30,31,33,38,41,45,49,50,52,57
2 × 1/4	rnd I	stl (07)	24
2 1/2 × 1/4	sqr I	stl (05)	27
2 1/2 × 1/4	sqr I	stl (07)	27
2 1/2 × 1/4	rnd R	stl (01)	27:b
1 1/2 × 1/4	rnd I	stl (03)	30,31
2 1/2 × 1/4	rnd I	stl (01)	30
2 × 1/4	cut R	stl (03)	34,34:b,35-37
2 1/2 × 1/4	cut R	stl (03)	35,36
2 1/2 × 1/4	cut R	stl (05?)	35
2 1/2 × 1/4	cut R	stl (07)	35
2 1/2 × 1/4	rnd I	stl (05)	36:b

The Middletown & Unionville, a New York–New Jersey short line, was formed out of part of the New York, Susquehanna & Western in December, 1913. In March, 1947, their name changed to Middletown & New Jersey.

See my articles in [J-A '89, 4-5] and [M-J '90, 10].

Sources for second hand nails

Many of the rnd I (07) nails may be from the Erie, L&HR, or D&H. The rnd R (07) nails may come from the DL&W, D&H, or New Haven.

Chicago & Western Indiana

2 1/2 × 1/4	cut R	stl (05?)	35

A strange find! These have turned up also on the B&M.

Erie

2 1/2 × 1/4	rnd I	stl (05)	36:b

Erie or New York, Susquehanna & Western

2 1/2 × 1/4	rnd R	stl (01)	27:b

New York Central

2 1/2 × 1/4	sqr I	stl (05)	27
2 1/2 × 1/4	sqr I	stl (07)	27

(continued)

New York, New Haven & Hartford

2 1/2 × 1/4	cut R	stl	(03)	35,36

and possibly the rnd R (07) 28, 30.

Shadow sets

Enigma set

2 1/2 × 1/4	rnd I	stl	(64)	18

M&NJ shadow set

1 1/4 × 3/16	rnd I gm	cop	(60)	23:b,24
1 1/2 × 1/4	rnd I	stl	(03)	30,31
2 × 1/4	cut R	stl	(03)	34,34:b,35-37

Stubby shadow set

1 3/4 × 5/16	rnd I	stl	(05)	16

Middletown & Unionville

See Middletown & New Jersey.

Midland Continental

2 1/2 × 1/4	rnd I	stl	(05)	28,31,33,35
1 1/4 × 3/16	sqr I	cop	(60)	30
1 1/4 × 3/16	rnd I gm	cop	(60)	31-38
2 1/2 × 1/4	rnd I	stl	(10)	36
1 1/4 × 3/16	rnd I	cop	(06)	40
2 1/2 × 1/4	rnd R	stl	(09)	53-55

The MC, a 38 mile North Dakota line, was abandoned in February, 1970, with portions being sold to SOO and NP.

The two articles on this line are by Dave Parmalee ([M-J '78, 1]) and Kyle Schaefer ([J-F '86, 1-2]).

Milwaukee Electric Railway & Light

2 1/2 × 1/4	rnd R	stl	(07)	14,16,19,21

From poles

2 1/2 × 1/4	rnd I	stl	(07)	12
2 1/2 × 1/4	rnd R	stl	(07)	27-29
2 1/2 × 1/4	rnd R	stl	(06)	32-35,37

In 1949 part of this line was abandoned. The remaining part became the Milwaukee Rapid Transit & Speedrail, which was abandoned in August, 1951.

These nails are from Wiswell's list in [Jun '75, 8] and were pulled by Len Pallen. Wiswell mentioned two varieties of type (06) 34, but gave no description of them.

Milwaukee Road (Chicago, Milwaukee, St. Paul and Pacific)

2 1/2 × 1/4	rnd I		stl	(07)	08:d
2 × 9/32	rnd I		stl	(07)	A8,R8,X8,Z8,A9,R9,X9,Z9,X10,Z10
2 1/4 × 5/16	rnd I		stl	(07)	R08
1 1/4 × 3/16	rnd I	gm	cop	(60)	27,27:b,28,29,29:b,30
1 1/4 × 3/16	sqr I	rs gm	cop	(60)	27-30
2 1/2 × 1/4	rnd R		stl	(07)	Z-28
1 1/4 × 3/16	rnd I		cop	(07)	29,29:b
1 1/4 × 3/16	sqr I	rs	cop	(07)	29,30
1 3/4 × 3/16	rnd R	gm	stl	(07)	30,30:b,31,31:b,32
1 3/4 × 3/16	rnd R	gm	stl	(05)	33,34
1 3/4 × 3/16	rnd R	gm	stl	(06)	33,34
1 3/4 × 3/16	rnd R	gm	stl	(25)	34
1 1/4 × 1/5	rnd R	gm	cop	(60)	34
1 1/4 × 3/16	rnd R	gm	cop	(60)	34,34:b,34:c,35,35:b,35:c,36,36:b,36:c,37,37:b,38,38:b,38:c, 39,40-42,46,47-51
1 1/2 × 1/4	rnd R	GM	stl	(06)	35
1 1/4 × 3/16	rnd R	C-rim gm	cop	(60)	38-42
2 1/2 × 1/4	rnd R		stl	(18C)	62
Questionable nails					
2 1/2 × 1/4	rnd I		stl	( )	4
1 3/4 × 5/16	rnd I		stl	(01)	6:b
Code nails					
1 1/4 × 3/16	rnd R	gm	cop	(60)	R #5,W #6
Code nails from bridge timbers					
2 1/2 × 1/4	rnd I		stl	(07)	0-9 (Set #20)
From poles					
2 1/2 × 1/4	sqr I		stl	(05)	49,56
From second hand CNS&M ties					
1 1/4 × 3/16	rnd R	gm	cop	(60)	37

The Milwaukee Road was officially the Chicago, Milwaukee & St. Paul until December, 1927, when it became the Chicago, Milwaukee, St. Paul & Pacific.

Tie treating

Like on other large railroads, tie treating was instituted at different times on different divisions of the Milwaukee Road. The middle part of the railroad, consisting of the Dakotas, Minnesota, Iowa, and most of Missouri, first received treated ties in 1902. Along with several test sections, large numbers of $ZnCl_2$ treated ties were used there. [AREA '09, 619]['11, 135] In 1904 the creosoting of piles and timber, with 12-16 lb/ft^3, began. [AREA '09, 619]

In 1908 the eastern part of the railroad, consisting of Illinois and parts of Wisconsin and Missouri, began using Card treated ties. The middle of the CM&StP continued to use Burnettized ties. This follows closely the model of the CB&Q, where zinc chloride was used in the west beginning 1899 and Card treatment in the east beginning 1908.

In the west tie preservation did not catch on sc early. In 1900 a predecessor railroad to the Milwaukee Road installed a disastrous test section in Washington, which may have convinced regional officials that tie treatment was not advisable. In 1905 the CM&StP began their Pacific extension from Mobridge, SD to the Pacific coast. It was completed in 1909, and new construction was probably all done with untreated ties. J. H. Waterman wrote in 1914 that in the extreme west "few of the ties gave over four years' service, and at the end of five years all of them were taken out. This was on one hundred miles or more of new track which was built five years ago, in 1908, and to date they are renewing every tie which had not been renewed prior to 1913." ['14, 287] I do not know when the west first began using treated ties, but it was definitely before 1927. It may have been when they began renewing the ties in 1914.

Tests of Card treated ties ended in 1916, about the year the Waukegan plant, which supplied the ties, was abandoned. The railroad may have stopped using the Card treatment then.

(continued)

In 1923 the railroad was satisfied with $ZnCl_2$, getting 22 years out of its ties in some areas, and testing of $ZnCl_2$-treated ties continued through at least 1928. The existence of a special nail (Z-28) for zinc chloride treated ties in 1928 suggests that they were using creosote regularly by then. [WPN 7-23, 111] ['42, 315]

By 1932 treatments had changed. Now lines west of Mobridge, SD received creosote-fuel oil treated Douglas fir along with untreated fir and larch. Ties on lines east of Mobridge were treated with either $ZnCl_2$ or creosote & oil. Several species were used there. By 1935 the Milwaukee Road was using only treated ties. ['33, 264]['35, 217]

Other treatments were also tried. Zinc-creosoted ties were tested in 1902, and in 1907 49,000 ties creosoted by the Rueping process were laid in Iowa. Sometime before 1913 Lowry-treated hemlock ties were inserted in large numbers. A test of cresoil treated ties was established in 1915. By 1932 the railroad was regularly using Douglas fir ties treated by the Boulton process. ['16, 290, 323]['33, 264] Other processes and chemicals were probably tested, too.

Forest Products Laboratory tests, listed below after test sections, were conducted by the lab. They were not testing treatments specifically for the Milwaukee Road.

Treatment plants

The Milwaukee Road bought all their treated ties from commercial plants. They never operated a treatment plant themselves.

The plant which treated the ties with zinc chloride beginning 1902/03 is unknown.

The Milwaukee Road bought its Card treated ties from J. B. Card's Chicago Tie & Timber Co.'s Waukegan, IL plant. It was built in 1907 and had an annual capacity of 985,000 ties. It ceased to operate about 1917. ['10, 138, xii]['13, 454-455]

Because the Milwaukee Road had a treating inspector in Evansville, IN at least 1922-1924, we know that the Indiana Tie Co., which built a plant there in 1907, treated ties for the railroad. As of 1910 the plant used $ZnCl_2$, and in 1913 they switched to creosoting ties. It shut down sometime between 1930 and 1934. ['10, 139][12, 285]['13, 455]['22, 504]['23, 551]['24, 338]['30, 420]

In 1924 in Mt. Vernon, IL the CMStP&P had another treating inspector. The plant there was built in 1899 by the Chicago Tie Preserving Co. for treating Chicago & Eastern Illinois ties. T. J. Moss bought the plant in 1911, and it was probably not until then or later that it supplied ties to the Milwaukee Road. Moss was still operating the plant in 1952. As of 1912 the plant used the Burnett, Card, and staight creosote processes, and only creosote is listed for 1913. ['11, 212]['12, XIII, 285]['13, 455]['24, 339]['52, 398]

The T. J. Moss Tie Co.'s Granville, WI plant was built to treat Milwaukee Road ties with $ZnCl_2$. It was constructed in 1921, and was expanded or rebuilt in 1925 and 1927. It was still operating in 1952. [WPN 11-23, 174]['22, 483]['30, 421]['52, 398]

In the inspection party which examined some Milwaukee Road test sections in 1923 were officials from two treating works. One was J. S. Penney of T. J. Moss, and the other was A. R. Joyce of Joyce-Watkins. Joyce's presence suggests that his company had a contract with the Milwaukee Road. Joyce-Watkins' only plant was at Metropolis, IL. It was built in 1913 with one retort, and expanded in 1923 to two retorts. In the teens both the Rueping and Card processes were used there. The Metropolis plant also provided ties for the Erie and the CB&Q. [WPN 11-23, 175]['15, 476]['30, 421]

The St. Helens creosoting Co., which built a plant in St. Helens, OR in 1912, may have treated ties for western lines with $ZnCl_2$. ['13, 458] Between 1924 and 1930 the plant was taken over by the Chas. R. McCormick Lumber Co., and by 1940 it had changed owners again, to the Pope & Talbot Lumber Co., who were still operating it in 1952. ['24, 315]['30, 421]['34, 472]['40, 451]['52, 398] See the 1900 Washington state test below.

Common nails and record keeping—test sections

From a 1914 AWPA survey is the following information. "Common nails are also used to identify ties in test sections on the Chicago, Milwaukee & St. Paul." The position of the nail indicated the year laid. ['14, 405][DNC, 15] "Have installed 11 test sections." Method of identifying ties: "Common nails with complete record book." These records had been kept since 1903. [DNC, 289]

They had instituted many more than 11 test sections by 1914. Probably the common nails were used to date test ties on all railroad tests (not Forest Products Lab tests), at least through the teens.

(continued)

"Information on test tracks includes location, kind of treatment, number of ties, marks on ties and at boundaries of test section, ballast, curve or tangent, tie plate, weight of rail, date tie inserted, date removed and cause." [DNC, 289]

Test sections

- Rio, WI, 1899.
  One mile east of Rio 2,100 untreated longleaf pine ties were inserted. The last tie was removed in 1917. [DNC, 254]['16, 321]['17, 198]['20, 122]['22, 113]['23, 162]
- Washington state(?), 1900.
  On a predecessor line to the CMStP&P, $ZnCl_2$ treated shasta pine ties were laid. They were cut in May and June, 1900, treated, and laid in track the same year. All were removed by November, 1903. The failure was due to the facts that (a) the trees were cut in the season when sap is greatest, (b) the ties were treated green, (c) little preservative was used, and (d) some ties had begun to decay before treatment.

  The article reporting the test was read by Frank Beal of the St. Helens Creosoting Co., who wrote at one point "...we receive a very poor class of ties for treatment, fully 75% of the ties we have had to treat for the past three years have been of the Shasta Pine variety..." His use of the word "we", and their use of shasta pine, indicate that the St. Helens Creosoting Co. (which treated wood with both creosote and $ZnCl_2$), had a contract as of 1912 with the Milwaukee Road. ['12, 64-68]

  Neither the railroad, the location of the test, nor the number of ties is given in the article which documents this test. I have identified the railroad by a passage about the test from ['14, 286-287], in which enough details about the railroad are given to identify it as part of the Milwaukee Road in 1913. The test took place near "the Coast."
- Iowa, 1900.
  7,500 untreated yellow pine ties. ['16, 324]['20, 126] ['20] says 1890.
- Lyndon, WI, 1902.
  On the eastbound track just east of the Lyndon station 500 untreated cedar ties were installed. [DNC, 256]['16, 290]['17, 108]['20, 96]['25, 163]
- Washington, IA, 1902-1903.
  In 1902 50 zinc-creosoted shortleaf pine ties were laid. ['16, 323]['20, 124]
  In the Spring of 1903, 1 1/2 miles east of Washington, the following were laid:
  500 untreated white oak ties. [DNC, 256]['16, 312]['17, 188]['20, 118][WPN 7-23, 111]['25, 163]
  500 Burnett treated southern pine ties. ['16, 323]['17, 204]['19, 224]['20, 124][WPN 7-23, 111] [WPN 11-23, 174-175][WPN 1-24, 6]['25, 163]
  500 Wellhouse treated southern pine ties. ['15, T]['16, 324]['20, 124]
  Most sources mention only the 500 $ZnCl_2$-treated ties. These were treated at the Texas Tie & Lumber Preserving Co.'s Somerville, TX treating plant in 1902.
- Moristown, SD, 1906.
  1/4 mile west of the station 500 $ZnCl_2$-treated shortleaf pine ties were installed. [DNC, 256] ['16, 323]['19, 224]['25, 163]

  ['20, 125] says that in 1906 southern yellow pine, not shortleaf pine, ties were laid, and both ['20, 124] and ['17, 204] say that in 1907 500 $ZnCl_2$-treated shortleaf pine ties were laid here. It is not clear if there were two batches of 500 ties each, or one test whose records were muddled.
- Okaton, SD, 1906.
  One mile east of the station 496 $ZnCl_2$-treated southern yellow pine ties were laid. [DNC, 256] ['16, 317]['17, 208]['19, 224]['20, 125]['25, 163]
- McLaughlin, SD, 1906?
  At the tool house, 300 zinc treated red oak ties were laid. [DNC, 256]['16, 310]['17, 182]['19, 224] ['25, 163]['20, 115][WPN 7-23, 111][WPN 1-24, 6] There is some question about the year. ['16] says 1908, ['17] and ['20] say 1907, while [WPN] and ['25, 163] say 1906.

(continued)

- Iowa-Dakota, 1907.
  7,084 $ZnCl_2$-treated red oak ties were laid. ['16, 310]['20, 115]
- Iowa, 1907.
  49,000 creosoted shortleaf pine ties treated by the Rueping process. On the line between Cedar Rapids and Amana, IA, lead tags, approximately 1" × 3/4", and bearing the figures "R 07" have been found. They are probably from this test, "R" standing for "Rueping" and 07 for the date. The tags were secured to the ties by a single 8-penny nail through the center. [J-F '91, 4]['16, 323] ['20, 124]
- Hubbellton, WI, 1908.
  2 1/2 miles west of Hubbellton, 216 untreated longleaf pine ties were installed. They were completely removed by 1922. [DNC, 254]['20, 122]
- Deansville or Dunnville, WI, 1908.
  2 miles west of town 1,159 untreated longleaf pine ties were laid. [DNC, 256] says Deansville while ['20, 122] says Dunnville. ['25, 163] says Deansville, but 1,150 ties.
- Braymer, MO, 1908.
  One mile east of town, 596 Card treated ties were laid: 132 hemlock and 464 hard maple. [DNC, 256]['16, 303, 304]['17, 144, 162]['20, 106, 109]['25, 163] [DNC], which gives the exact location, says Bardwell, WI.
- Section 13, Davis, IL, 1908.
  320 Card treated hard maple ties were laid. [DNC, 256]['20, 109]
- Section 12, Kingston, IL, 1909.
  1,432 Card treated hard maple ties. [DNC, 256]['20, 109] ['20] says Genoa, IL.
- Section 9, Pingree Grove, IL, 1909.
  985 Card treated hard maple ties. [DNC, 256]['20, 109]
- Section 11, Genoa, IL, 1909.
  1,180 Card treated hard maple ties. [DNC, 256]['20, 109] ['20] says 1,189 ties.
- Tomah, WI, 1910.
  On the westbound track just east of the first crossing, east of the station at Tomah, 500 untreated hemlock ties were installed. [DNC, 256]['20, 105] ['25, 163] says Card treated hemlock.
- Fox Lake, IL, 1910.
  North of the station platform 139 $ZnCl_2$-treated chestnut ties were laid. [DNC, 256]['25, 163] ['20, 97] The latter source says Fox Lake, WI.
  Opposite north end of station platform, 149 Card treated Hemlock ties were installed. [DNC, 256]['20, 106]['25, 163]
- Between Adeline, IL and Leaf River, IL, 1910.
  In a rock cut 1,000 Card treated hemlock ties were inserted. [DNC, 256]['16, 300]['17, 144] ['25, 163]
- Between Elm Grove, WI and Wauwatosa, WI, 1910.
  13,340 Card treated hemlock ties were laid. [DNC, 256]['20, 106]
- Cowgill, MO, 1911.
  Three miles east of town, in a rock cut on a curve, 75 untreated white oak ties were laid. [DNC, 256]['16, 312]['17, 188]['20, 118]['25, 163]
- Monroe, WI, 1911.
  3 1/2 miles east of Monroe, 177 untreated cedar ties were installed. [DNC, 256]['16, 290]['17, 108] ['20, 96]['25, 163]
- Marquette (North McGregor), IA, 1911.
  On Track 4, opposite the east end of the station, 137 untreated douglas fir ties. [DNC, 256] ['16, 294]['17, 122]['20, 100]

(continued)

- Minneiska, MN, 1911.
  On the westbound track in front of the depot, 500 $ZnCl_2$-treated beech ties were laid. [DNC, 256] ['16, 288]['17, 102]['20, 95]['25, 163][WPN 7-23, 111-112][WPN 1-24, 6]
- Madison, WI, 1911.
  A mile east of Madison at the assembly grounds, 176 $ZnCl_2$-treated red oak ties were laid. ['17, 180]
- Bardwell, WI, 1911.
  One mile west (in cut) of Bardwell, 107 Card treated hemlock ties and 8 Card treated tamarack ties were laid. [DNC, 256]['16, 300, 328]['17, 144]['20, 106]['25, 163] [DNC], which gives the exact location, claims Braymer, MO.
  Three miles east of Braymer, just west of bridge #738, 280 untreated white oak ties were laid. The last was removed in 1922. [DNC, 253, 256]['16, 312]['17, 188]['20, 118]['25, table, 163]
- Lake, WI, 1912.
  On Track No. 4 east yard, 154 Card treated beech ties were laid. [DNC, 256]['16, 290]['17, 104] ['20, 95] ['16] says 244 ties while ['17] says 162 ties.
- Groton, SD, 1912.
  1/2 mile west of the station, 338 untreated douglas fir ties. [DNC, 256]['16, 294]['17, 124]['20, 100] ['25, 163] ['16] and ['17] say 500 ties.
- Milwaukee, WI, 1912.
  At the south end of Blue Mound Yard, 1,000 untreated cedar ties were laid, 500 on track 1 and 500 on track 2. [DNC, 256]['16, 290]['17, 108]['20, 96]['25, 163]
- Monroe, WI, 1913.
  Four miles east of town 97 untreated cedar ties were installed. [DNC, 256]['16, 290]['17, 108] ['20, 96]['25, 163]
- Byron, IL, 1913.
  Just west of CGW crossing, 806 $ZnCl_2$-treated red oak ties were laid. 373 were on the westbound track while 432 were on the eastbound track. [DNC, 256]['17, 182]['20, 115]['25, 163]
- Pine River, WI, 1914.
  Two miles west of town 1,000 untreated cedar ties were laid. [DNC, 256]['16, 290]['17, 108]['20, 96] ['25, 163] (['16], ['17], and ['20] say Merril, WI, which is a big town five miles from Pine River.)
- Cranmore, WI, 1914.
  East of town 1,000 untreated cedar ties were laid. [DNC, 256]['17, 108]['20, 96]['25, 163]
- Jefferson, SD, 1915.
  445 untreated cedar ties were installed one mile west of the station. [DNC, 256]['17, 110]['20, 96] ['17] says 1913.
- Lind, WA, 1915.
  Four miles west of Lind some cresoil treated ties were laid. At least some of them were green Douglas fir. This might be a Forest Products Laboratory test. ['21, 142-143]
- Rondout, IL, 1916.
  35 Card treated hard maple ties. ['20, 109]
- Atkins, IA, 1917.
  500 untreated longleaf pine ties were laid one mile east of town. [DNC, 256]['20, 123]
- Rapidan, MN, 1917.
  2 1/2 miles north of town, 225 $ZnCl_2$-treated red oak ties were placed in the track. [DNC, 256] ['20, 115]
- St. Louis Park, MN, 1927.
  503 $ZnCl_2$-treated soft maple. ['42, 315]
- Darien, WI, 1928.
  999 $ZnCl_2$-treated hemlock ties. ['42, 315]

(continued)

- Watertown, WI, 1935.
  400 incised hard maple ties, treated with 50-50 creosote-oil. ['42, 315]
- Delmar to Browns, IA, 1962.
  Two 1962 date nails held a brass tag to each tie. The tags are 2 1/4" × 1 3/8" ovals, and have indented numbers, staring with #1 and running consecutively to #150, and then starting over with #1 and so on through the section. Stamped on the back of each tag is the manufacturer "MEYER & WENTHE / CHICAGO". The test was about 4 1/2 miles long. [M-J '78, 1] [J-F '91, 5]

The 1911 Forest Products Laboratory test.

- Hartford, WI, 1911.
  About 1,700 ties, mostly maple and red oak, were laid near Hartford in October, 1911. This test was done in conjunction with the Forest Products Laboratory, in whose experimental retorts most of the ties were treated. Half the ties were laid with cut spikes and no tie plates, the other half with screw spikes and flat bottom tie plates (a small number of plates were ribbed). [WPN 7-23, 112][WPN 11-23, 173-174]['27, 171]['29, T]['34, 221-222]['44, 168-169]['48, 216-217] ['52, 262]

Treatment	Maple	Red Oak
Untreated	100	200
$ZnCl_2$	99	359
$ZnCl_2$-creosote—two movement	100	100
$ZnCl_2$-creosote—Card	100	100
Creosote—full cell	99	102
Creosote—Rueping	100	100
Semi-refined oil—full cell	99	99

In addition to these were 23 $ZnCl_2$-treated chestnut and 25 Kyanized spruce ties. The use of Kyanized (mercuric chloride treated) ties is anachronistic. Apart from the B&M's big use of the preservative in 1881-1891/92, mercuric chloride was out of favor with railroads by 1856. Maybe the Forest Products Lab just wanted accurate figures on the life of Kyanized ties.

Later Forest Products Laboratory tests.

"A cooperative agreement between the Chicago, Milwaukee, St. Paul & Pacific and the Forest Products Laboratory was arranged in 1915 for establishing a test track near Madison, Wis., to study the relative merits of wood preservatives and processes when used for railway crossties. The first test inaugurated under this agreement is known as the Fair-Grounds test track, located near the Dane County Fair Grounds, just south of Madison on the railroad's main line between Madison and Chicago.

"When this installation was completed the railroad designated another section of track, between Madison, Wis., and Prairie du Chien, for the installation of additional test ties. This section begins at Breese Terrace and extends westward past the Forest Products Laboratory for about 2 1/2 miles, and is known as the University-Avenue test track. The installation of ties in this track was begun in 1922, and continued annually up to and including 1929, a total of more than 3,800 ties having been inserted during that time. All ties were spotted in." "Cut spikes are used on all ties." ['35, 136]

"All the ties were air seasoned and then treated in an experimental retort at the Forest Products Laboratory, unless otherwise indicated..." The $ZnCl_2$-petroleum emulsion ties from 1925 were treated at the Santa Fe's Somerville plant. The natural brine treated ties from 1929 were treated and supplied by the Detroit & Mackinac. ['35, 137-141]

Naturally the ties were marked in some way, probably with date nails. The only mention in the literature is "...occasional loss of identification marks..." ['35, 137]

See also the Lind, WA 1915 test.

Sources for the statistics below are found in ['27, 170]['34, 220]['41, 276]['44, 164-167]['48, 212-215] ['52, 259-261]

(continued)

- Fair Grounds.

1916	185	$ZnCl_2$ treated red oak.
	99	25% creosote 75% gas oil treated red oak.
	98	10% creosote 90% gas oil treated red oak.
	95	untreated white oak.
1917	29	creosoted douglas fir.
	50	untreated douglas fir.
	44	untreated western larch.
	99	sodium fluoride treated red oak.
	100	water gas tar red oak.
	94	untreated white oak.
1919	105	$ZnCl_2$ treated douglas fir.
	95	$ZnCl_2$ treated western larch.
	62	50% coal-tar creosote, 50% wood-tar creosote treated red oak.
	25	50% coal tar, 50% wood tar creosote treated slippery elm.
	9	50% coal tar, 50% wood tar creosote treated butternut.
	1	50% coal tar, 50% wood tar creosote treated white oak.
	3	50% coal tar, 50% wood tar creosote treated cherry.
	100	wood-tar creosote treated red oak.
1921	100	low temperature coal-tar oil treated red oak.
	100	20% coal-tar, 80% low temp. coal-tar oil treated red oak.
	100	vertical retort coal tar creosote treated red oak.
	100	pintsch gas-tar treated red oak.
1927	381	$ZnCl_2$ treated jack pine.

- University Avenue.

1922	95	aczol treated red oak.
	87	high iron $ZnCl_2$ treated red oak.
1923	100	25% low temp. coal tar distillate, 75% mid-continent oil treated red oak.
	98	50% low temp. coal tar distillate, 50% mid-continent oil treated red oak.
1924	16	coal-tar creosoted red oak.
	85	low temp. coal tar distillate treated red oak
	99	10% low temp. coal tar distillate, 90% topped California oil treated red oak.
	100	25% low temp. coal tar distillate, 75% topped California oil treated red oak.
1925	49	basilit treated red oak.
	87	10% coal-tar creosote, 90% petroleum treated eastern hemlock.
	82	50% coal-tar creosote, 50% petroleum treated eastern hemlock.
	100	sodium fluoride treated red oak ties.
	50	triolith treated red oak.
	100	$ZnCl_2$ treated red oak.
	187	empty cell $ZnCl_2$-petroleum emulsion treated red oak.
1925-1927	284	coal-tar creosote treated hemlock.
1926	49	basilit treated red oak.
	44	basilit treated eastern hemlock.
	49	sodium fluoride treated eastern hemlock.
	50	triolith treated red oak.
	48	triolith treated eastern hemlock.
1927	199	borax treated red oak.
	112	$ZnCl_2$ treated eastern hemlock.
	129	$ZnCl_2$ treated yellow birch.
	78	$ZnCl_2$ treated corkbark fir.
	40	coal-tar creosote treated corkbark fir.
1927-1929	150	untreated corkbar fir.

(continued)

1928	194	arsenious acid treated red oak.
	21	coal-tar creosoted yellow birch.
	183	sodium dichromate treated red oak.
	208	zinc meta arsenite treated red oak.
1929	49	coal-tar creosoted English spruce.
	197	natural brine treated eastern hemlock.
	196	nickel chromate treated red oak.
	75	$ZnCl_2$ treated English spruce.
	83	empty cell $ZnCl_2$ coal-tar creosote treated English spruce.
1940	24	untreated blackjack oak.
	69	coal-tar creosoted blackjack oak.
	37	$ZnCl_2$ treated blackjack oak.

Date nails and record keeping—1906-1910.

F. S. Pooler's statements at the 1911 AWPA meeting are worth quoting in full:

> The nails we use have a small letter, showing the kind of treatment, and a figure indicating the year in which the tie was laid in track; but roadmasters tell me the men cannot read these figures, and in some cases probably do not take the pains to clean off the top of the nail. We have used tags, but they have not proved a success. I have thought if we had nails with heads of different shapes to show the different kinds of treatment, it would be a help. ['11, 136]

A few moments earlier he had said

> We have been using treated ties on our road since 1902, but it was not until 1906 that we began keeping a regular record. I think some of the first ties that were put in were not marked at all, but in 1906, we got up a book in which we are trying to show all of the treated ties of each kind placed in track each year, and number taken out, of each year's treatment.
>
> I have recently taken up the tie business on our road, and since then have been giving a good deal of attention to treated ties, and am not entirely satisfied with our treated tie records up to this time. We have met with the same difficulty which Mr. Angier spoke of; that the Section Foremen and others in charge of track, do not seem to be able to give us accurate records of treated ties taken out of track. We have been marking these ties with nails. At first we depended on trackmen to drive the nails at the time the ties were placed in track. Later on, and for the last two or three years, we have been having the nails driven into the ties at the treating works, which is a very much better plan. But I am convinced we will never get an accurate or satisfactory record until we take certain pieces of track and keep a record not only of the treated ties, but of the untreated ties. Last year we laid considerable second track with zinc treated red oak ties. It is my intention to start a record, of say, one mile of that track where the ties are laid "out of face;" that is, continuously, and keep an accurate record of the year the ties are taken out of track and cause of removal. ['11, 135]

From the quotes above, and tag and nail finds, it seems that from 1906 to 1908 the Milwaukee Road used tags to mark ties, and from 1908 to 1910 they used date nails. The letter indicates the treatment while the number(s) is the date.

Several people have thought that the stretches of track in Iowa on which the early nails are found are test sections. That is not true. The tags and nails were used in all treated ties. It may be that main lines were pretty much laid with nailless treated ties by 1907, after which the railroad concentrated on branch lines, where the nails have been found. The Milwaukee Road did have many test sections by 1911, but they were generally small, of a single wood and treatment. Common nails were used to identify these ties, and of the eleven 1908-1910 tests, none are locations where letter-number nails have been found.

(continued)

Lead tags held by common 8-penny nails and marked "R 07" and "08" have been found between Cedar Rapids and Amana, IA. The "R 07" stands for Rueping, 1907. See the 1907 Iowa test section above. The tag "08" stands for 1908, and the "R" on nails R08, R8, and R9 also stands for "Rueping". "Z" on the nails Z8, Z9, and Z10 stands for "Zinc". These nails are probably from ties treated with straight zinc chloride. The letters "A" and "X" remain undeciphered, though "A" might stand for "Allardyce", while "X" might stand for Card treatment.

Pooler said that the railroad upgraded much "second track" with zinc treated ties in 1910. This means that the railroad *did* use the nail Z10. This point was in question before.

In 1910 the Milwaukee Road, along with many other railroads, ceased to use date nails in every treated tie. They resumed the use of nails in 1927.

Pooler said in 1925 "I do not favor dating nails. The advantages obtained do not justify the expense." [AREA '26, 710][DNC, 330] But W. H. Penfield, in the same year, said "The practice [of using date nails] was discontinued because we...felt that it would be more satisfactory to depend upon records of our test track installations for information. I think that with our present organization, we could use dating nails to very good advantage, and keep up record of the information that would be obtained from them..."

From Larry Fister's article in [J-F '91, 3-5] comes much of the following information. The 4's were primarily found between Herndon and Clive, Iowa. They may have been used in an isolated experiment with date nails by the railroad in 1904, or there is a slight chance they are from ex-Santa Fe ties.

One stubby (01) 6:b was found in Ute, Iowa. This nail is not like the CB&Q 6. Because only one was found, it may not be a Milwaukee Road nail.

Larry Harvey found a single rnd I (07) 08:d in a can with other Milwaukee Road nails. It also might not belong to the set.

The R8's come with two head sizes. "The small head R8 is the size of a nickel and the large head R8 is the size of a quarter." [letter from Fister 11-30-96]

Letter-number tags and nails have been found in two general areas. The "A" nails, "R" nails, Z8, Z9, and Z-28 are from Iowa and southeastern South Dakota, while the "X" nails and the Z10 are from Wisconsin. Stretches of track include

Hudson – Sioux Falls, SD (A9, R8, R9)
Rockwell City – Spencer, IA (A8, Z9)
Herndon – Clive, IA (several nails)
Rockwell City – Storm Lake, IA (A8, R08, R8, R9, Z9, Z-28)
Cedar Rapids – Amana, IA (tags R 07, 08, nails R9)
purchased at auction in Galesville, WI (the unique X8)
Wausau line, Wisconsin (X9, X10)
near Madison, WI (Z10).

The Wisconsin nails are rare. [J-F '91, 3][S-O '96, 7-8][N-D '96, 8-9]

The letter-number nails are found about 6" inside the rail, except the X9, which is found in the center of dark brown, crinkled ties. The others are found in white hardwood except the Z9 which is found in a narrow, gray-colored tie. [J-F '91, 3]

Only one X8 is known. It surfaced in an eBay auction which closed August 29, 2000. Together with a handful of assorted common nails, it sold for $565.77!

Date nails and record keeping—later nails

When the Milwauke Road resumed the use of date nails in 1927 they decided to use small copper nails. The most interesting exception to this is the Z-28, used in $ZnCl_2$-treated ties in 1928.

The copper indent 27 to 30 "were installed more or less on Lines west, the Dakotas to the West Coast." "...the majority were located inside the rail." [J-F '91, 3-5]

Jerry Penry writes that north of Medford, MN, most nails 32-38 were found outside the east rail, with about 5% outside the west rail. Jerry found one 39 in the center of the tie north of Fairmont, MN. Many ties there were clock dated. [J-F '91, 3-5] Charles Johnson writes that in eastern Montana steel 31-34 are found outside the the east rail about 1"-2" from the tie plate. Copper nails 34-39 are found between the rails. [e-NN, 11-22-02] John Iacovino concurs: he finds copper nails between the rails and steel nails outside the rail in Wisconsin, Montana, and Washington. Rolland Meyers found round indent coppers from the late 20's outside the rail. [e-NN 12-18-02]

The copper thick shank (1/5") 34 may not be the only one of its kind. Maybe other dates came with two shank diameters.

(continued)

More than 50 of the 1/4" (06) 35's were pulled by Frazier Anderson in Wisconsin. Arn Kriegh & family found about 70 of them in the main line between Bowman, ND and Miles City, MT.

There are at least five different variations on the rnd R cop (60) 36 which are not listed. Variations also exist for 37, 38, 39, 46, and for the C-rim 40.

"The C-rim nails 38 through 42, were used in a white, poorer grade tie, and were never found on a main line." The letter "C" might stand for "Cedar". [J-F '91, 3-5]

All but one copper 49 were found in switch ties in Iowa. 50 and 51 are rare.

The 62's were found in the test section between Delmar and Browns, Iowa on the main line between Council Bluffs and Chicago. [J-F '91, 3-5]

Probably all code nails 0-9 come from bridges west of Madison, WI and east of Marquette, IA. The nails are very old.

The R and W were acquired by Mel Smith in a nail collection of a Milwaukee Road conductor. He got about two or three of each nail. They are the same style as the copper nails from the 1930's.

The copper PC and WC treatment nails, shown on pages 113 and 119 of Volume III, can be found in bridge timbers in the west. See Dave Parmalee's article in [M-J '82, 3-4].

It may be that the pole nails were driven by the treatment company, and not the railroad. Type (05) square nails are common in poles elsewhere.

The ex-CNS&M 37's were found in the middle of the tie on the Des Moines division, in second hand ties. Milwaukee Road nails are found outside the rail.

Curtis Deason reported, complete with drawings, three odd nails pulled from track jointly operated by the Milwaukee Road and Kansas City Southern. They appear in [N-D '77, 3] and are

2 1/2 × 3/16	rnd I gm	cop	( )	1,7
2 1/2 × 1/4	rnd R	stl	( )	4°

The measurements are guesses from Curt's drawing.

Articles: [Apr '73, 3], [S-O '78, 1], [S-O '87, 11], [S-O '88, 3], [M-J '89, 6], [J-F '90, 3-4], [J-F '91, 3-5], [S-O '96, 7-8], [N-D '96, 8-9].

Minneapolis & St. Louis

Probably many from second hand ties

2 1/2 × 1/4	rnd R	mi	(11)	29
2 1/2 × 1/4	rnd I	cop	(60)	29
2 1/2 × 1/4	rnd I	stl	(07)	30-34,34:b,44
2 1/2 × 1/4	rnd I	stl	(06)	38,43
2 1/2 × 1/4	rnd R	stl	(07)	39

The M&StL was taken over by the Chicago & Northwestern November 1, 1960.

The copper 29 and the rnd I (07) 30-34,34:b come from the Pittsburg, Shawmut & Northern. The 34:b has smaller numbers.

See [J-F '90, 6].

Minneapolis, Northfield and Southern

2 1/4 × 1/4	cut I	stl	(03)	26
2 1/2 × 1/4	rnd I	stl	(07)	27-29
1 1/4 × 3/16	rnd I gm	cop	(60)	29
2 1/2 × 1/4	rnd R	stl	(07)	30,33
2 1/2 × 1/4	rnd R	stl	(06)	31,32,34

The MN&S was created out of the Minneapolis, St. Paul, Rochester & Dubuque in May, 1918, and became part of Soo Line in October, 1985, having been owned by Soo for many years. It ran south out of Minneapolis and operated about 75 miles of track.

Minneapolis, St. Paul & Sault Ste. Marie

See Soo Line.

Minnesota Transfer

Probably from second hand ties

2	× 1/4	rnd R	stl (07)	25-30

Oddly, the location of the Walsh Tie Co. works is given as "Minnesota Transfer, St. Paul, Minn." in ['22, 485]. The plant was built in 1921 with two retorts. In 1923 it was taken over by the Northern Tie & Treating Co., and a retort was added in 1928. By 1930 it was called the National Pole & Treating Co., with its location given as Fridley, MN. It was still running in 1952. ['24, 314]['30, 421]['52, 398] This is one of the two plants which treated ties for the eastern portion of the Great Northern.

The nails are from second hand GN ties. If GN nails were driven at the plant, the nails listed above might be from ties acquired new by Minnesota Transfer from the Fridley plant.

Mississippi & Skuna Valley

2	× 1/4	rnd R	stl (06)	49-51
2 1/2	× 1/4	rnd I	stl (06)	54
2 1/2	× 1/4	sqr R	stl (05)	54
2 1/2	× 1/4	rnd R	stl (25)	58
2 1/2	× 1/4	rnd R	stl (09)	59,60,62

Mississippi Central

2 1/2	× 11/40	sqr R	stl (07)	20,21
2 1/2	× 1/4	sqr R	stl (07)	22-31,40
2 1/2	× 1/4	sqr R	stl (05)	30,32-44
2 1/2	× 1/4	rnd R	stl (06)	36
2 1/2	× 1/4	rnd R	stl (19)	37
2 1/2	× 1/4	rnd R	stl (09)	45,46,47:b,48-60

The Mississippi Central was taken over by the Illinois Central in April, 1967.

John Iacovino found 59's in the center of the tie, and 60's closer to the north rail.

Maybe other early (07) sqr R nails are 11/40". No sqr R (05) 31 has been found.

Mississippi River & Bonne Terre

2 1/2	× 1/4	rnd I	stl (01)	97,98,98:b,99,00,04-08
2 1/2	× 1/4	rnd I	stl (07)	08,09,9,10:b,11-13,15,17,18,20-24,28
2 1/2	× 1/4	rnd R	stl (07)	20
Code nails				
2 1/2	× 1/4	rnd I	stl (01)	B #11

This Missouri mining railroad was built by the St. Joseph Lead Co, and became part of the Missouri-Illinois in January, 1929.

The 97 is the oldest known date nail from North America. In fact, no other railroad on the continent is known to have used date nails before 1899.

In 1902 the MR&BT inserted 9,758 untreated white and post oak ties in a test section. 3,107 had been removed by 1910. [RAG 3-23-11, 638]['16, 312]

Bill Bunch wrote an article on the MR&BT which appears in [N-D '87, 2-3]. He wrote that three ties were found with both rnd R and rnd I (07) 20. Other rnd R 20's were found by Frank Schultz.

Missouri-Illinois

2 1/2 × 1/4	rnd R	stl (17)	35,36,43
2 1/2 × 1/4	rnd R	stl (09)	35
2 1/2 × 1/4	rnd R	stl (18C)	41
From bridge timbers			
2 1/2 × 1/4	rnd I	stl (06)	47

This railroad was owned by the Missouri Pacific, and became part of MoPac in November, 1978.

Missouri-Kansas-Texas

1 3/4 × 1/4	rnd I	stl (01)	07,11
2 1/2 × 1/4	rnd I	stl (01)	08-13,15
1 3/4 × 5/16	rnd I	stl (01)	09
2 × 1/4	rnd I	stl (01)	14,15
2 1/2 × 1/4	rnd I	stl (07)	08:c
2 1/2 × 1/4	rnd R	stl (07)	23
2 1/2 × 1/4	rnd R	stl (01)	27:b
2 1/2 × 1/4	rnd R	stl (17)	30,34,42
1 × 1/4	rnd R	stl (17)	31,31:b,32,35
1 × 1/4	rnd R	stl (06)	35-38

Corporate changes

The Beaumont & Great Northern, a short line which ran from Trinity to Livingston, TX, became part of the Missouri, Kansas & Texas in 1912, having been in operation since 1905.

In April, 1923 the M,K&T reorganized by casting off portions of its trackage and naming the remainder the Missouri-Kansas-Texas. The portions discarded by the M,K&T became indepentent railroads. These were the Oklahoma City-Ada-Atoka, the Waco, Beaumont, Trinity & Sabine, and the Louisiana Railway & Navigation Co. of Texas. The OC-A-A became part of the Santa Fe in April, 1965. The WBT&S, which was the Beaumont & Great Northern portion of the MK&T, operated until May, 1959, and was abandoned in September, 1975. The LR&NC of T became the Louisiana, Arkansas & Texas in April, 1930, and merged into the Louisiana & Arkansas in July, 1939. The Kansas City Southern owned the L&A beginning 1939 until the L&A became officially part of the KCS in July, 1992. See Kansas, Oklahoma & Gulf for info on the OC-A-A.

The MK&T used the pre-1923 nails, while the M-K-T used the post-1923 nails.

Treating plants

The MK&T built a three retort treating plant at Greenville, TX which went into operation in 1901. Pine and gum were treated there by the Wellhouse process (zinc tannin). [RG 3-8-01, 175][Goltra V, 55] In 1903 they switched to straight zinc chloride. ['16, 322, 323]['15, T]['20, 123]

On the night of February 8, 1909 the Greenville plant was destroyed by fire. A new four retort plant was constructed at Denison, TX that year. Ties were treated at Denison with creosote by the Rueping process. Between 1924 and 1930 ownership of the plant transfered to the J. W. Smith Wood Preserving Co., which still operated the works in 1952. As of 1968 this company was a subsidary of M-K-T. ['10, 52] ['11, 213]['13, 88][Goltra I, 47]['24, 314]['30, 423]

Record keeping and date nails

With the opening of the plant in 1901 the MK&T began using date nails. As of 1914 they also kept a record using a hammer stamped with the date. The hammer was probably used on untreated ties. In 1914 "Believe road might discontinue records as we know what life to expect from treated ties." ['14, table] [DNC, 290][Spring 2002, 1-4]

Charles Sebesta has Carson Frank's MKT nails, and the 07, 11, 14, and 15 in this set are 1 3/4".

Only about three stubby 09's are known. The 1" (17) 31:b has a script 3.

2 1/2" rnd I (01) 12's were found near Parsons, KS, and on a branch line to Joplin, MO.

Bill Bunch found one 2 × 1/4 rnd R stl (07) 31 at Fayette, MO.

Missouri Pacific

2 1/2 × 1/4	rnd I	stl (07)	11,20,24
2 1/2 × 1/4	dia R	stl (07)	22,23
2 1/2 × 1/4	rnd R	stl (07)	25,26,26:b,26:f,28
2 1/2 × 1/4	rnd R	stl (05)	27,28
2 1/2 × 1/4	rnd R	stl (10)	29
2 1/2 × 1/4	rnd R	stl (17)	30,30:b,31-33,35,36,36:b,37
2 1/2 × 1/4	rnd R	stl (04)	31,35
2 1/2 × 1/4	rnd R	stl (06)	31-33,36
2 1/2 × 1/4	rnd R	stl (18B)	31-33,35
2 1/2 × 1/4	rnd R	stl (09)	35
2 1/2 × 1/4	rnd R	stl (18C)	37
Code nails			
1 1/2 × 3/32	rnd I hs ss	stl ( )	CP #9
From bridge timbers			
2 1/2 × 1/4	rnd R	stl (06)	33
Code nails from fire caps on trestles			
2 1/2 × 1/4	rnd R	stl (07)	B #3,C #7,M #1,R #1,W #2,Y #1

Corporate info

The New Orleans, Texas & Mexico became independent of the Frisco in 1913. At that time, together with its subsidaries, the NOT&M became known as the Gulf Coast Lines. Of these subsidaries, the St. Louis, Brownsville & Mexico was the largest.

The International & Great Northern, which became the International – Great Northern in 1922, was bought by the New Orleans, Texas & Mexico in 1924, the same year the MoPac acquired the Gulf Coast Lines. All of these were formally incorporated into the Missouri Pacific in 1953.

Timber treating on the I&GN

The Shreveport Creosoting Company, a subsidary of the American Creosoting Co., built a two-retort treating plant at Shreveport, LA in 1910. The plant, which opened the same year, creosoted ties, piles, poles, and other timbers with creosote by the Lowry process for the Kansas City Southern, International & Great Northern, and Texas & Pacific. The plant was still operating in 1952. ['13, 89, 450]

The I&GN may be one railroad which stopped using creosote because of the wartime shortage in the late teens, because C. S. Kirkpatrick, chief engineer, stated that the I-GN began using creosoted ties in 1922. ['37, 230]

The I&GN had a treating inspector in Houston, TX in 1922 and 1924. There, in 1912, a four retort works was built by the National Lumber & Creosoting Co. Various types of lumber were treated with $ZnCl_2$ or creosote. The Rueping process was used, probably for ties. Three of the four retorts were replaced in 1935. About 1939 or 1940 the plant changed hands to Koppers, and it was still running in 1952. ['13, 452-453]['22, 502]['24, 334]['34, 473]['40, 453]['52, 397]

Timber treating on Gulf Coast Lines and I-GN

"The first installation of creosote-treated bridges on the Gulf Coast Lines was in 1909. These were open-deck bridges..." For some timbers, zinc chloride and Wolman salts were being used in 1937. ['37, 231]

In 1924, a branch line was constructed in the Rio Grande valley. 70,508 ties were treated with creosote by the Rueping process, while 23,002 ties received 50-50 creosote and crude oil. ['37, 231]

As of 1937, these lines were still using a mixture of creosote and crude oil, and straight creosote, treated by the Rueping method. ['37, 228ff]

Tie treating on the Missouri Pacific

Although the MP initiated a large test of creosoted ties in 1909, they did not begin using creosoted ties at that time. In 1911 they began the use of treated ties. These were treated by the Burnett process (straight zinc chloride), which they used through 1928. In 1922, a year after establishing extensive test

(continued)

sections, they began using creosoted ties regularly. See the article in [Fall 2001, 4-6] for a histogram of tie installations, and further info from the AWPA article in ['49, 252-259].

As of 1949 "Missouri Pacific treatment is performed at six commercial plants widely scattered over the railroad and owned and operated by three different companies." ['49, 255] Two of these can be identified. The MoPac had a supervisor of treatment in Leeds, MO, very close to Kansas City, at least in 1923-24. This is the location of a Koppers plant. (the other plant in Kansas City probably never supplied ties to the MP.) From at least 1922 through 1945 the MoPac had a supervisor of treatment in East St. Louis, IL, the location of a T. J. Moss treating plant. The plant was built in 1921 with two retorts, and was still operating in 1952. ['22, 483, 501]['23, 553]['24, 341]['34, 497]['40, 478]['45, 293]['52, 398]

Another supervisor of treatment resided in Bloomfield, IN, at least 1923 and 1924. I can't make sense of this, because there was no plant nearby there.

From January, 1914: "Installed 2 or 3 test sections on each division last spring." The MP had been keeping records for 6 months, and used dating nails. ['14, table][DNC, 290]

"Seven test sections were started in 1921, of about 7 1/2 miles each, in which test ties marked with dating nails are placed in the ordinary course of renewals. About 95,000 ties of various woods and treatments are now under test." [AREA '26, 975][DNC, 255]

Missouri Pacific test secions.

- Western Kansas, 1893.
  14,081 sawed and 3,950 hewed long leaf yellow pine ties, all untreated. [RA 3-24-05, 497]
- Horace, KS, year unknown.
  25,000 Lowry creosoted red oak. ['20, 113]
- Osawatomie, KS, 1909.
  90,000 Lowry creosoted red oak. ['20, 113]
- Marianna, AR, 1912.
  117,740 untreated white oak. ['20, 119]
- Neuhardt, AR, 1912.
  12,800 Burnett treated red oak. ['20, 116]
- McPherson, KS, 1913.
  197 Burnett treated red oak. ['20, 116]
- Wichita, KS, 1913.
  64 Burnett treated red oak. ['20, 116]
- Haven, KS, 1913.
  3,262 Burnett treated red oak. ['20, 116]
- Prosser branch, KS, 1913.
  8,000 Burnett treated red oak. ['20, 116]
- Madison branch, KS, 1913.
  4,100 Lowry creosoted red oak. ['20, 113]
- Cornell branch, KS, 1913.
  1,000 Lowry creosoted red oak. ['20, 113]
- Ordway, CO, 1914.
  3,500 Lowry creosoted red oak. ['20, 113]
- Western, KS, 1915.
  400 untreated red oak. ['20, 114]
- Council Grove, KS, 1915.
  100 Lowry creosoted red oak. ['20, 113]

Date nails

From 1925: "Our experience with dating nails is limited..." [AREA '26, 711][DNC, 331]

The letter nails were used to nail fire caps to trestles. They seem to have been only used as fasteners, and are identical to Soo Line nails. Also, Charles Sebesta wrote about the dia 22 and 23 "By the wear at the top of the shank, it would appear that they were used to hold flashing down."

(continued)

On each of four timbers at the ends of a bridge west of Corning, KS, were four rnd R (06) 33's holding down a sheet of tin. They may have been used only to hold the tin, not date the timbers. They were found by Jerry Penry.

The CP is found in bridge ties.

On display in the MP St. Louis general office in 1975 was a set of nails, and among them a brass or bronze rnd R (11) 10 with a raised rim. The nails have since disappeared.

The rnd R (05) 28 is a tough nail to find.

Bill Bunch found a rnd R (04) 32 at Bismark, Missouri, and Rick Higdon found several in Louisiana. These may be from second hand Cotton Belt ties.

The (17) 36:b, not pictured in Volume III, has numbers identical to the 2" 36 on page 44 of Volume III. It is rare.

See [M-A '86, 17], [S-O '89, 10], [J-A '90, 3-4], and [M-J '91, 11] for nail hunts.

Monon Route (Chicago, Indianapolis & Louisville)

2 1/2 × 1/4	rnd I	stl (07)	08:c,9,10:c
From the Lafayette test section			
2 1/2 × 1/4	rnd I	stl (07)	12
From second hand NC&StL ties			
2 1/2 × 1/4	rnd R	stl (04)	44

In January, 1956 the CI&L became officially the Monon, and on July 31, 1971 they became part of the L&N.

The Indiana Creosoting Co., a subsidary of the Federal Creosoting Co., built a two retort treating plant at Bloomington, IN in 1907 for treating Monon ties by the Lowry process. The railroad had a treating inspector in Bloomington at least 1915 and 1922-24. The plant was reduced to one retort in 1913, and was still operating in 1952. ['11, 213] ['13, 89, 454][HWP, 54]['22, 506]['23, 552]['24, 340]['52, 396]

The Monon began using date nails when the treating plant opened in 1907, and they stopped in 1910. Their big CB&Q-style test section was established in 1914. [DNC, 289]

Test section

- Lafayette, IN, 1914.

  North of the Lafayette shops, between mileposts 117.9 and 117.1. At least 1,347 ties treated by the Lowry process were inserted in June, 1914. The majority, if not all, were treated in July, 1913. Absorption ranged from 7.0 lb/ft^3 for sawed beech up to 11.3 lb/ft^3 for hewed beech.

396	beech ['17, 100]['20, 94]
6	cherry ['17, 110]['20, 96]
200	white elm ['17, 118]['20, 98]
397	red oak ['17, 172]['20, 113]
131	white oak ['17, 186]['20, 117]
196	scrub pine ['17, 200]['20, 123]
15	sassafras ['17, 216]['20, 127]
4	black walnut ['17, 228]['20, 129]
2	mulberry

  A record of the entire test is found in ['21, 156] and ['25, 162].

  "Both treated and untreated ties installed in experimental section. All treated ties were weighed before and after treatment and tagged for identification." [DNC, 289]

  Dave Parmalee looked for date nails here in the 1970's and remembers finding two or three ties with 1912 nails holding tags. The nails may have been leftovers used just to hold the tags to the ties.

Sometimes L&N nails can be found in second hand ties on the Monon. These were re-used by the L&N after the L&N takeover.

Montpelier & Barre, Montpelier & Wells River

See Barre & Chelsea.

Moshassuck Valley

From second hand ties

2 1/2 × 1/4	rnd R	stl	(07)	24-26,27:b,28,30-34
2 1/2 × 3/16	rnd R gm	stl	(07)	29:b
2 × 1/4	rnd R	stl	(05)	36-38
2 × 1/4	rnd R	stl	(06)	39
2 × 1/4	rnd R	stl	(07)	41

Code nails from second hand ties

2 1/2 × 1/4	rnd R	stl	(07)	C #5

The MV, a 2 mile railroad in Rhode Island, became part of the Providence & Worcester in September, 1981.

Mount Beacon Incline

From second hand ties

2 1/2 × 1/4	sqr I	stl	(07)	28

This old cable funicular ran up a mountain near Beacon, NY. The nail is from an ex-NYC tie. Russ Hallock pulled it.

Munising, Marquette & Southeastern

2 1/2 × 1/4	rnd I	stl	( )	3
2 1/2 × 1/4	rnd I	stl	(01)	4,5,8
2 1/2 × 1/4	rnd I GM	stl	(07)	09,10:b,10:c
2 1/2 × 1/4	rnd I	stl	(07)	11-14,16,17,18:b,19:b,20-25
2 1/2 × 1/4	rnd I	stl	(14)	15
2 1/2 × 1/4	rnd R	stl	(07)	15,16,20

The Munising RR and the Marquette & Southeastern RR merged in July, 1911 to form the Munising, Marquette & Southeastern, which became part of the Lake Superior & Ishpeming in January, 1924. The early dates were used by the Munising RR. Is the 25 a LS&I nail, or did tie replacement take a couple years to centralize?

The (01) 4 and 5 may be from ties treated by the Chicago Tie Preserving Company. See Chicago & Eastern Illinois.

Narragansett Pier

2 1/2 × 1/4	rnd I	stl	(03)	29,30
2 1/4 × 1/4	cut I	stl	(03)	30,31
2 1/2 × 1/4	cut R	stl	(03)	32-34,37-40,42
2 1/2 × 1/4	rnd I	stl	(07)	41

In October, 1979 the NP, an 8 mile Rhode Island railroad, "temporarily discontinued" operations.

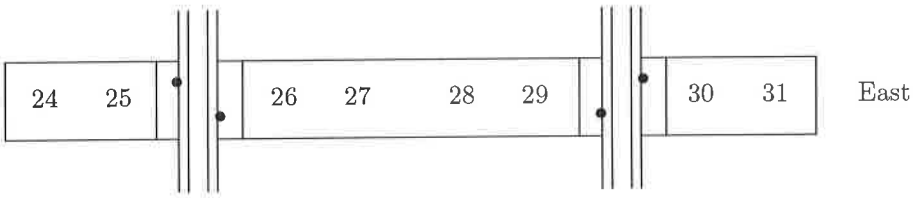
Nashville, Chattanooga & St. Louis

1 1/4 × 3/16	rnd R	mi	(11)	25
2 × 3/16	rnd R	mi	(11)	26-31
2 1/2 × 1/4	rnd R	mi	(11)	29
2 × 1/5	rnd R	stl	(04)	32:b,33-35,35:b,36-40,41:b,42
2 1/2 × 1/4	rnd R	stl	(04)	44,45
2 1/2 × 1/4	rnd R	stl	(19)	46,47

The NC&StL came under the control of the Louisville & Nashville in 1880, and finally merged into the L&N August 30, 1957.

In 1925 Hunter McDonald, Chief Engineer, thought that nails were not worth the cost. [AREA '26, 711][DNC, 331]

Dave Parmalee described this set in [M-A '79, 1]. From observing the locations of nails in ties, he created the pictured below, which shows the positions for dates 24-31. In 1932 nails were placed in the 1924 position, and the same pattern was followed through 1939. It was again repeated for 1940-1947. For 1943 a roofing nail was placed in the proper position.



Because the diagram is orientation-dependent, the nails must have been driven when the ties were inserted in the track. "No date nail was used in 1943. However, a plain roofing nail was driven in the correct position to "date" the tie".

The 24, if it exists, has not yet been found. Some people have wrongly included the B&M 24 in their NC&StL sets. Dave Parmalee bought the only known 25's at a shop in Lebanon, TN. He found six or eight of them mixed with other NC&StL nails. [J-A '98, 3]

Given that no one has found a 24 on the NC&StL, one has to ask whether they actually used nails that year. Parmalee's diagram above certainly suggests so, but they may have begun using nails in 1925, and the decision to stagger the dates across the tie may have been made the next year, so that the first cycle of positions only covered 25-31. Note also that Chief Engineer McDonald was opposed to nails in 1925.

The 2 1/2" 29 is identical to the DL&W 29, and actually has a thinner shank than 1/4". The 2 1/2" 30 might belong, also.

The 44-47 have also been found on the CSS&SB and the Michigan Central, probably in ex-NC&StL ties.

The post-1957 L&N switch codes are found on the NC&StL.

Second hand ties which originated on the NC&StL have turned up on the Arcade & Attica, the Lehigh & Hudson River, and Lowville & Beaver River in New York State.

National Railways of Mexico (Ferrocarriles Nacionales de Mexico)

2 1/2 × 1/4	rnd R	stl (32)	27 27 ″ ‴
1 1/2 × 1/4	rnd R	stl (32)	27 28 28 28 28 29 29 29 30 33 33 34 34 34 34 :b, 35 ‴ ′ ′ ″ ‴ ″ ″ ‴ IV ′ ′ ″ ‴ ′ ′ ″ ‴ ‴
2 1/2 × 1/4	rnd R	stl (07)	28
2 1/2 × 1/4	rnd I	stl (07)	28
2 × 1/4	rnd I	stl (07)	28
2 1/2 × 1/4	rnd R	stl (06)	58,59
Code nails			
2 1/2 × 1/4	rnd R	stl (31)	D #3,M #2,P #3,T #1

See Mexico for general comments. In particular, many nails listed under Mexican Pacific might be from National Railways of Mexico.

The Mexican Central RR was acquired by the National Railways of Mexico in 1909, so I include MC information here.

The Mexican Central built a two-retort treating plant in 1901 at Aguas Calientes, Mexico, for treating ties with zinc chloride. As of January, 1906 the three-step Wellhouse process was in use, though J. E. Phillipi, head of the plant, believed at the time that the Burnett process would serve them better. The plant ceased to operate sometime before 1930. ['06, 50-51][RA 2-3-05, 151]

In [RG 4-17-03, 282] Hermann von Schrenk wrote "We are now testing several new processes, notably a recent French process, and I have just made arrangements to place large numbers of test ties on a line of the Mexican Central Railroad, where we expect to obtain results in a very short period of time."

His test may not be related to the following test section.

- Mexican Central RR, Tampico branch, 1905, 1907.

  292 ties of two species were laid in June, 1905. They included

7	Giussani creosoted red oak
10	Burnett $ZnCl_2$-treated red oak
10	Carbolineum treated pine
28	Creosoted pine
146	Rueping creosoted pine
43	Burnett $ZnCl_2$-treated pine
29	Giussani creosoted pine.
19	Giussani $ZnCl_2$-creosoted pine. ['16, 307, 310, 315, 317, 319]['20, 113, 116, 120] [AREA '12, Appendix B]

  A. A. Robinson of the Santa Fe was residing in Mexico in 1905, and the presence of Rueping treated ties in this test tell us that he is likely responsible for the Tampico test as much as von Schrenk.

  In June, 1907 198 Bakersfield crude oil treated ties were laid here. [AREA '09, 474] [AREA '12, Appendix B]

  Tampico was selcted for this test because untreated ties last only about a year there—it is worse than Pelican, TX. ['16, 37]

There were two treatment plants of the National Railways of Mexico. The first was built at Durango City, Dgo. in 1927, with one retort. The second plant was built at Acambaro, Gto. in 1928 with three retorts. Two of these cylinders had been scrapped when a new retort was added in 1934. [30, 424]['44, 434]

Nevada Northern

2 1/2 × 1/4	rnd R	stl (07)	15
2 × 3/16	rnd R	mi (11)	20:b,21
2 1/2 × 1/8+	rnd R gm	stl (18B)	22-27
2 1/2 × 1/4	sqr R	stl (18)	24
2 1/2 × 1/8+	rnd R	stl (18A)	28,29
2 1/2 × 1/8+	rnd R	stl (18B)	30-36
2 1/2 × 1/8+	rnd R	stl (18C)	37-42

From V. Arnold Smith's article in [J-A '78, 3] (reprinted [M-A '86, 18]) comes the following. The NN was incorporated in 1905. "The nails on the NN were placed half way between the rail and the end of the tie on the west side of the track." From rarest to commonest, the nails are 21, 15, 20, 22, 23, sqr R 24, 26, 27-30, with the 31-42 about equal.

Larry Meeker ranks the nails from rarest to commonest as 21, 15, sqr 24, 22-23, 26-33, 34-38, 20, 40, 42, 24-25, 39, 41.

After 1942 the date was stamped in the end of the tie. [J-A '78, 3]

Jerry Gibby wrote about NN nail trips in [S-O '78, 4] and [S-O '79, 2-3]. In the second article he announced the finding of two octagon (11) 20's by Larry Meeker. These 20's are from a nail factory mix-up. They were intended for the Illinois Central. The entire NN set is pictured.

Also in this article the 20's are broken down into three minor variations. The most common has a tall 2 with a thin foot or base, and the 0 drops below the 2 (20:b). The second has round numbers, the 2 hooks inward, and the 2 and 0 are connected. The third has fat numbers, and is squat and heavy.

New Jersey Central

See Central RR of New Jersey.

New Orleans Great Northern

The NOGN became part of the Gulf, Mobile & Northern in 1933, which in turn became part of the Gulf, Mobile & Ohio in 1940.

The Colonial Creosoting Co., a subsidary of the Federal Creosoting Co., built a plant for the NOGN at Bogalusa, LA in 1912 for treating ties, piles, and other timbers by the Lowry process. ['13, 89]

New York & Long Branch

2 1/2 × 1/4	rnd R	stl (07)	37-42

From DNC's list. These may be from second hand Lehigh & New England ties.

New York Central

2 1/2 × 1/4	rnd I	stl	(07)	10:c,11,13
2 1/2 × 1/4	sqr I	stl	(07)	11-13,19,19:b,20,20:b,22,23,26-30
2 1/2 × 1/4	sqr I	stl	(05)	14,14:b,15,21,23-25,25:b,26,26:b,27,28,31,31:d,32:b
2 1/2 × 1/4	rnd I	stl	(05)	14
2 1/2 × 1/4	rnd I	stl	(14)	15
2 1/2 × 1/4	sqr R rs	mi	(11)	16,17
2 1/2 × 1/4	rnd I	mi	(11)	16
2 1/2 × 1/4	sqr R	stl	(07)	17,18
2 1/2 × 1/4	rnd R	stl	(07)	17,25
2 1/2 × 1/4	sqr R	stl	(05)	24,25,25:b
From second hand ties				
1 3/4 × 5/16	rnd I	stl	(01)	12,13,15
2 1/2 × 1/4	rnd I	stl	(01)	15
2 1/2 × 1/4	rnd I	stl	(07)	16,17,25,52
1 3/4 × 5/16	rnd I	stl	(05)	17
2 1/2 × 1/4	rnd R	stl	(07)	19
2 1/2 × 1/4	rnd R	stl	(05)	26:b,27
2 1/2 × 1/4	sqr I	stl	(05)	30
2 1/2 × 1/4	sqr R	stl	(24)	31
2 1/2 × 1/4	sqr R	stl	(07)	33
From poles				
2 1/2 × 1/4	sqr I	stl	(07)	12,29
2 1/2 × 1/4	sqr I	stl	(05)	28

The New York Central System

The New York Central System consisted primarily of the following railroads.

Railroad	Absorbed into NYCS	Began stamping ties	Treatment plant opened	Stopped using date nails
Big Four Route	Feb. 1930	1892/93	1905	1932
Lake Shore & Michigan Southern RR	Dec. 1914	1893	1910	?
Michigan Central RR	Feb. 1930	1893	1910	1931
New Your Central RR			1911	1932
Boston & Albany RR	July 1900		1911?	1931
Pittsburgh & Lake Erie			1899	1931

(The P&LE was owned by NYC since 1894, but was never merged.)

Very few railroads were stamping the date into ties in the 1890's, so it is clear that the decision to do so on the first three railroads listed above was made at the system level. The nail sets for each railroad are distinct, but the decisions as to whether or not to use nails, and which treatement ties should receive, were also made at the system level. At least four of the six railroads (Big Four, LS&MS, MC, NYC) leased treating plants of the Federal Creosoting Co., which creosoted ties by the Lowry process. These four railroads began using nails about the time their treatment plant opened. All six lines stopped using date nails in 1931-32. Railroads continued to used distinct nails even after being absorbed into the NYC.

The LS&MC did use nails, and if any are extant they are misidentified as NYC. Also, I have no definite information on the treatment of B&A ties.

The distribution of second hand ties was conducted system-wide. Nails from the Michigan Central and Boston & Albany have been found on the NYC. NYC and B&A nails have turned up on the Big Four.

Early tests of treated ties

The first test of treated ties on the NYC occurred in 1849, when a few thousand hemlock ties, treated with mercuric chloride, were placed in the main line. Later, in 1869, the Hudson River RR tested

(continued)

P. H. Dudley of the NYC wrote an article in [RG 9-6-01, 614ff] titled "A Study of the Life of Cross Ties." What is remarkable about the article is its concentration on results from European railroads. Even when considering zinc chloride, U. S. railroads are only briefly mentioned before he spends two paragraphs writing of $ZnCl_2$ tests in Russia at St. Petersburg! His eyes are focused across the Atlantic, and his is the earliest article in which the East/West or creosote/zinc chloride controversy is evident. The information which follows was extracted mainly from Dudley's article.

On the NYC "Yellow pine is a difficult wood to impregnate with creosote, though a large number of cross ties have been treated and are still good after 16 to 18 years' service." If he meant that some of these ties had been in track 18 years, then the NYC's first experiment with creosoted ties dates no later than 1883. [RG 9-6-01, 616]

"Mr. W. J. Wilgus, Chief Engineer of the New York Central & Hudson River Railroad, now estimates for the entire system that less than 5 per cent. of the cross ties are removed for causes otherwise than decay." [RG 9-6-01, 616]

From a 1903 news item comes the following quote: "Tests [of creosoted ties] are being made...under the direction of Mr. P. H. Dudley upon beech, maple and birch for crossties." [RA 7-10-03, 47]

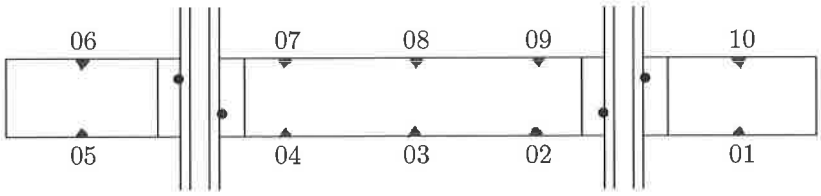
By 1901 only 1 1/2% of ties on the NYC were treated. [AREA '01, Form 1]

Test sections

- Main line, 1849.
  Hewed hemlock ties, steeped in mercuric chloride, were laid somewhere on the main line. After four years, 2,000 of them were removed and placed in the branch line at Oriskany Station. The ties there were serving well as of 1859. [ASCE 7-85, 253, 255]
- Tunnel at New Hamburg, NY, 1869.
  The Hudson River RR tested 1,000 sap pine ties treated with a mixture of iron sulphate and copper sulphate by the Hamar process. The treatment, which took place in the South, was considered too tedious for general use. [ASCE 7-85, 279, 280]
- New York, 1876.
  Ties treated by Webb's process were laid. The test was a failure. This might not have been on the NYC. [ASCE 7-85, 268]
- Hoboken, 1878.
  Steamed ties were tested. This might not have been on the NYC. [ASCE 7-85, 268]
- New York State, 1903.
  14,688 untreated yellow pine ties. ['16, 324]['20, 127]
- Grand Central Yard, 1884.
  "Some yellow pine cross ties creosoted in 1884, which I had put down in the Grand Central yard..." were taken out in 1900, and "the wood seemed as sound and elastic as when put into service." [RG 9-6-01, 616]['16, 324]['20, 126]

Later tie treating and dating

"Mr. W. J. Wilgus furnishes the following sketch illustrating the standard method of notching for determining the life of ties in use on the New York Central & Hudson River Railroad." It is not stated if these were used in treated or untreated ties. [AREA '04, 101][DNC, 10]



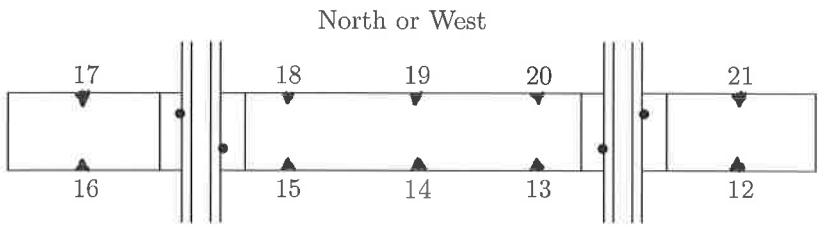
No orientation was given with this drawing. Without it, for instance, a 1906 tie cannot be distinguished from a 1901 tie. Thus the ties must have been oriented in the track with respect to a "line rail".

Here is another diagram used by the NYC locating notches for dating. [DNC, 14]['14, 405]

(continued)

No orientation was given with this drawing. Without it, for instance, a 1906 tie cannot be distinguished from a 1901 tie. Thus the ties must have been oriented in the track with respect to a "line rail".

Here is another diagram used by the NYC locating notches for dating. [DNC, 14]['14, 405]



If the first diagram is for untreated ties, the gap in years (1911) needs to be accounted for. Perhaps the first diagram was appended with another notch in one end of the tie corresponding to 1911.

The Federal Creosoting Co. built a two-retort treatment plant in 1910 at Rome, NY for treating ties only. The plant went into operation in 1911, creosoting cross- and switch-ties by the Lowry process for the NYC. ['11, 212]['12, 285]['13, 448]

From 1911 until at least 1917 the NYC used both round and square nails. "In some instances the shape of the nail head possesses a special significance. On the New York Central & Hudson River nails with square heads indicate ties treated in the railroad treating plant [at Rome, NY], while those with circular heads indicate ties treated elsewhere." The round 12 has yet to be discovered. ['14, table][DNC, 37]

Naturally these nails would have been driven before the ties reached the track, a policy which continued past 1917. A 32 was found in a fencepost that had never been used in the track, and on the Erie two once-used ties were found each with a NYC 29 and the stamp "NYC 37" in the end.

"The New York Central & Hudson River drives the dating nails 14 in. inside the base of the rail." Occasionally nails will be found outside the rail. ['14, 406]

From the 1914 AWPA report, compiled in 1913: "Keep record of every tie" using "notches and two kinds of nails." Records had been kept for twelve years (since 1901). Also in use were experimental test sections. [DNC, 290]['14, table]

In a notoriously inaccurate table published in WPN, the NYC's Eastern lines are said to have begun recording average annual tie renewal statistics in 1901 (the diagram showing the locations of notches backs this up), and that extensive use of treated timbers throughout the NYC began in 1911. At least for NYC, the dates in this table are right. [WPN Feb '24, 21][RAG '25, 367]

The following list contains nails from Larry Harvey's NYC list which probably do not belong. Steve Worboys and I have never found any of them. They are shown below under the railroad which may have originally used them.

Big Four Route
2 1/2 × 1/4 sqr I stl (07) 16,18,25
The 25 was also used by the Nickel Plate Road
2 1/2 × 1/4 sqr R stl (07) 25
2 1/2 × 1/4 sqr I stl (05) 29,30
The 30 might be Boston & Albany

Michigan Central
2 1/2 × 1/4 rnd R stl (07) 24

Nickel Plate Road
2 1/2 × 1/4 sqr I stl (07) 25,26:b
The 25 was also used by the Big Four Route

It is common to find NYC nails in second hand ties on the NYC. I did not list them in the *Second hand* section above. Second hand ties, NYC or not, were reinserted both face down and face up.

(continued)

The nails

Only one 10 has been found. The rnd 11 is more common than the sqr 11, but for 13-17 the square nails are more common. The rnd (14) 15 has thick numbers, like the sqr I (05) 15 shown in Volume III. The square 15 comes with both thick and thin numbers.

The (11) 17 is not a factory sample as DNC states. This variety has been pulled from NYC ties in the Adirondack mountains by Paul Siebach. [M-A '89, 1]

Sqr R 24's are rarer than sqr I 24's. The raised 24's have been found primarily in sidings.

By far the most common 25 is the sqr R (05) 25. The sqr I (05) 25 and sqr R (05) 25:b are rarer, but still turn up frequently. The sqr I (05) 25:b has been found only on the Putnam division in the Bronx, NY, and the rnd R (07) 25's might be from second hand Michigan Central ties, though several have been found. The (07) 26 is scarce.

Russ Hallock found some rnd I (05) 28's in the Avis, PA yard. They may be from a factory mix-up. 32's are rare.

Probably other nails can be found in poles.

Nail hunts: [M-A '89, 9], [J-A '89, 12-13], [J-A '92, 4], [S-O '92, 6], [J-F '94, 1-2].

Sources for second hand nails

Big Four Route or Boston & Albany

2 1/2 × 1/4	sqr I	stl (05)	30

Boston & Albany

2 1/2 × 1/4	sqr R	stl (24)	31

Lehigh Valley

2 1/2 × 1/4	rnd I	stl (01)	15

Michigan Central

2 1/2 × 1/4	rnd I	stl (07)	17
2 1/2 × 1/4	rnd R	stl (05)	26:b,27

Shadow sets

Stubby shadow set

1 3/4 × 5/16	rnd I	stl (01)	12,13,15
1 3/4 × 5/16	rnd I	stl (05)	17

and possibly

2 1/2 × 1/4	rnd R	stl (07)	19

New York, Chicago & St. Louis

See Nickel Plate Road.

New York City Transit Authority

2 × 1/4	rnd R	stl (07)	57

In 1883 on the Metropolitan Ry some vulcanized ties were tested. The ties became too soft to hold spikes. [ASCE 6-01, 531]['16, 329]

In 1887 on "Electric conduit" some creosoted pine ties were laid in New York City. The ties received 15 lb/ft^3. ['16, 321]

Glenn Wiswell wrote in his 1979 flyer "...the New York subway system is about half underground (subway) and half above the streets (elevated or "EL"). The front car has a window and I've ridden most of the system to see if I could locate any date nails. I finally spotted some on the "EL" Jamaica line going through Brooklyn into Queens. After some effort, I located a Signal Maintenance man who agreed to pull them for me (at a fee!) — it's all hot third rail and heavy traffic and I wasn't about to pull them myself. Anyway, he got a handful, which was all I saw, and all the same." [Wiswell 79]

New York, New Haven & Hartford

2 1/2 × 1/4	rnd I	stl	(07)	07-09,09:b,10,10:c,15:b,16,18:b,19:b,23
2 1/2 × 1/4	rnd I	mi	(11)	10,11,13,15
2 1/2 × 1/4	rnd I	stl	(01)	12:b,13-15
2 1/2 × 1/4	rnd I	stl	(05)	14,22
2 1/2 × 1/4	rnd R	stl	(07)	14,25,25:b,26:b,26:c,27:b,28,28:b,29,29:b,30-38,44:b
2 × 1/4	rnd I	stl	(07)	24
2 1/2 × 1/4	cut R	stl	(07)	34
2 1/2 × 1/4	cut R	stl	(03)	35,36
2 1/2 × 1/4	rnd R	stl	(05)	39
2 1/2 × 1/4	rnd R	stl	(03)	42
2 1/2 × 1/4	rnd R	stl	(25)	43
Possibly from a nail factory mix-up				
2 1/2 × 1/4	rnd I	stl	(07)	Z10
From second hand ties				
2 1/2 × 1/4	sqr I	stl	(07)	27,29
2 1/2 × 1/4	sqr I	stl	(05)	31
2 1/2 × 1/4	rnd I	stl	(07)	48,51,52,64
2 1/2 × 1/4	rnd R	stl	(07)	56,57,59,61

Early treating experiments

The Boston & Providence, a NYNH&H predecessor, tested some ties in 1844 treated with iron sulfate. The result was unfavorable. [ASCE 7-85, 282]

In 1845 the Old Colony RR, a predecessor of the New Haven, tested some Kyanized ties. The process was tried again in 1847 on ties of the Providence & Worcester, another predecessor. The Boston & Providence tested some Kyanized ties in 1856. [ASCE 7-85, 253]['16, 328]

The Old Colony erected creosoting works at Somerset, MA in 1865. There bridge piles were treated by the Bethell process for protection against the teredo. The first wood treated were the 700 piles used in the bridge over the Taunton River, and despite trimming after treatment, it was considered a success. The works still operated as of 1885, but had been abandoned by 1901. This was the first use of the Bethell process (or of creosote, for that matter) in North America. [ASCE 7-85, 267-269]['16, 289]

The Boston & Providence tested ties creosoted by the Hayford process in Boston in 1878. The B&P was absorbed into the Old Colony in 1888.

Tie treating in the 20th century

The New Haven conducted a variety of tie tests before settling on full-cell creosoting in 1906/07. The earliest date nail found is from 1907. The treatment plant which supplied ties through 1922 is unknown, but nail finds indicate that the use of treated ties dropped off sharply in the second half of the teens. Dates 15 through 19 are very rare, and dates 20 and 21 are not common. The drop could reflect either the shortage of creosote due to the war, or to the more economical solution of using untreated pine from the South. In any case, the railroad probably continued to use large numbers of untreated ties cut locally.

The American Creosoting Co. built a two retort treating plant at Cedar Hill, near New Haven, CT in 1922 for treating NYNH&H ties. The Lowry process was used. The plant was the first of its kind in New England, and was still operating in 1952. [RAG 12-23-22, 1179]['30, 419]['52, 394]

The reason the B&M and the NYNH&H began treatment at this time is found in ['23, 216-217]: "The shift in source of supply which follows changes in transportation costs is exemplified in recent developments in the New England States. Most of you probably know that the Boston and Maine Railroad and the New York, New Haven and Hartford Railroad have undertaken to give preservative treatment to their ties and timbers. They immediately turned to local sources of supply of woods they had not heretofore been using. They did not treat them before because the cost of pine ties shipped from the South Atlantic States had not been high enough to justify the use of local woods with the price of preservative added."

(continued)

A completely different reason is given in a document titled "Standing Data NHRTI 10.1.1" from 1970: "The plant was built because of the approaching extinction by a blight of the chestnut tree, the principal source of the tie supply and the consequent necessity of substituting non-durable woods, principally mixed oaks. Whereas chestnut untreated would last 8 to 10 years in the ground, the latter species rotted in three to four years." This paper also locates the plant in Montowese, CT. It was probably situated between Montowese and Cedar Hill. [NH]

New Haven date nails are scarce through 22. 23's are not common, but from 24 up they are plentiful.

From the 1914 AWPA report: "Keep record of every treated tie" The NYNH&H used dating nails, and records had been kept since 1907. [DNC, 290]

For the fiscal year July, 1912 to June, 1913 the New Haven laid 1,983,296 ties. All 123,672 ties inserted on the main track west of New Haven were creosoted. Screw spikes were also used. [RAG 8-22-13, 343] Compare this with the 225,000 crossties treated at the Cedar Hill plant in 1952. [NH]

According to [RAG '27, 653], the NYNH&H had been keeping tie records since 1922. This date reflects to new, possibly more detailed, records resulting from the new treatment plant.

Test sections

- Boston, MA, 1878 (Boston & Providence RR).

  52 ties were laid December 12 and 13 beginning 775 feet west of the Tremont St. crossing. They were:

  Untreated
  3 American Larch
  9 white oak
  6 European larch grown in Massachusetts
  6 western catalpa
  6 ailanthus

  Creosoted by the Hayford process
  6 black spruce
  2 Southern hard pine
  2 white elm
  6 hemlock
  6 canoe birch [RG 6-11-86, 397]

- Medway, MA, 1880.

  400 creosoted hemlock ties were laid in June. ['15, table]['16, 299]['20, 105]['22, 110]['23, 165] [AREA '12, Appendix B]

- Wallingford, CT, 1881.

  1,006 copper sulfate & barium chloride treated white pine ties, treated by the Thilmany process were laid in June, 1881. ['15, table]['16, 324]['20, 126][AREA '12, Appendix B]

- Somerset, MA, 1888.

  In June some creosoted Hemlock ties were laid. [AREA '12, Appendix B]

- Fair Haven Tunnel, CT, 1894, 1906, 1907.

  In July, 1894, 6,000 southern yellow pine ties, treated with dead oil of coal tar creosote, were laid. The ties received 10 lb/ft^3. ['15, table]['16, 315, 324]['17, 206]['20, 124][AREA '12, Appendix B]
  1906: 500 full cell creosoted southern yellow pine. ['16, 325]['17, 206]['20, 125]['23, 166]
  1907: 200 full cell creosoted southern yellow pine. ['17, 206]['20, 125]['23, 166]

- Rowayton, CT, 1901.

  In October, 206 zinc-chloride treated longleaf pine ties were laid. ['15, table]['16, 322]['17, 200] ['20, 123]['23, 162][DNC, 254][AREA '12, Appendix B] [AREA '12] says 300 ties, confusing this with the next test.

- ?, CT, 1901.

  300 $ZnCl_2$-treated pine. This is not the same test as Rowayton. ['16, 317]['20, 120]

(continued)

- Greenwich, CT, 1907.
  3,202 full cell creosoted shortleaf pine ties. Screw spikes were used. All ties were removed by 1922. ['20, 122]['24, table][DNC, 254] (['20] says 3,200 ties.)

Nails were driven in the center of the tie. Very rarely nails can be found between the rails, closer to one rail.

Thomas Coyne found the only known 07. [J-A '98, 2] Apart from this nail, and the (11) 13 and 15, all have been found by John Iacovino. John pulled several of each early date with the following exceptions. He found only five 08's, and one each of (07) 15:b, 16, 18:b, and 19:b. Russ Hallock found the 10:a, (11) 11, 13, (01) 12:b-14, (07) 15:b, and one 18:b. Only one (11) 15 is known. It was in Keith Austin's collection in the 1970's, and is now owned by Charles Sebesta. It might not be a NYNH&H nail. Keith also had other early NYNH&H dates.

The most common early date is the rnd I (01) 13. For Iacovino, the rnd R 14 is more common than the (01) 14. Also, he found two 2" (01) 13's, which were probably cut short at the nail factory by mistake.

Iacovino found a Z10 in a once-used tie. It may be the result of a nail factory mix-up, in which case it was intended for the Milwaukee Road.

Thomas Coyne acquired 800 unused rnd I (07) 18:b's "from a man who lived in Boston. He said his grandfather had them in the cellar for many years. He thought they were intended for the Boston & Maine but has no record of it." They were probably not bound for the B&M. One Idea is that the nails were ordered by the New Haven, but due to the creosote shortage (or some other cause) few treated ties were inserted that year, and the nails were never used.

One cut (07) 35 was pulled from a track near Springfield mixed with the (03) 35's. It may be a NYNH&N nail.

Some 43's and 44:b's were found in Putnam, CT. The 44's were in switch ties.

Article: [M-J '90, 9].

Sources for second hand nails

Bangor & Aroostook or Maine Central

2 1/2 × 1/4	rnd R	stl	(07)	56,57,59,61

Boston & Albany

2 1/2 × 1/4	rnd R ss	stl	(24)	30

Pennsylvania

2 1/2 × 1/4	rnd I	stl	(07)	64

New York, Ontario & Western

From poles

2 1/2 × 1/4	sqr I		stl	(05)	25:b,28,30,32
2 1/2 × 1/4	sqr I		stl	(07)	26:b,31
2 1/2 × 1/4	sqr R		stl	(07)	29
2 × 1/4	rnd R		stl	(07)	34-36
2 1/2 × 1/4	rnd R		stl	(06)	53

From second hand ties

2 1/2 × 1/4	rnd I		stl	(07)	12,14,17,19-21,26-35,37,41,43,46,50,52,54
2 1/2 × 1/4	rnd I		stl	(01)	15
2 1/2 × 1/4	rnd I		stl	(05)	19
2 1/2 × 1/4	rnd R		stl	(07)	19,26:d,28-31,42-44,46-49,53
1 1/4 × 3/16	rnd I	gm	cop	(60)	23:b,24
1 1/2 × 1/4	rnd I		stl	(03)	30,31
2 1/2 × 1/4	rnd R		mi	(11)	30,32
2 1/2 × 1/4	sqr I		stl	(05)	32:b
2 × 1/4	rnd R		stl	(07)	34:b
2 × 1/4	cut R		stl	(03)	34:b,35-37
2 1/2 × 1/4	cut R		stl	(03)	35,36
2 1/2 × 1/4	cut R		stl	(07)	35
2 1/2 × 1/4	rnd I		stl	(06)	36,52,55
2 1/2 × 1/4	rnd I		stl	(21)	42

The NYO&W stopped operating March 29, 1957, and was officially abandoned that October.

The Federal Creosoting Co. built a treating plant at Livingston Manor, NY in 1921. The one retort plant may have been built for the NYO&W, which was the only railroad which served the town. The plant was abandoned sometime between 1934 and 1940, and another plant was built at Sidney, NY in 1939/40 by the same company. It may be that the Livingston Manor plant was moved to Sidney in 1940. Sidney was served by the NYO&W and the Delaware & Hudson, and the plant there supplied ties to the D&H. Probably the Livingston Manor plant served either the NYO&W or the D&H. ['22, 483]['34, 471] ['40, 449]['44, 430][Shaw, 35-36]

Test sections

- Carbondale, PA, 1912.
  4,500 creosoted longleaf pine ties. ['20, 122]

See [J-A '89, 4-5]. Rumors of other nails from this line are common. They are probably all from second hand ties.

John Iacovino pulled the pole nails. John, Russ Hallock, Steve Worboys and I pulled the tie nails.

Sources for second hand nails

The rnd I (07) nails may come from the D&H, Erie, L&HR, or LV, depending on the date. The 26 is 26:a, so is not a L&HR nail.

Delaware, Lackawanna & Western

2 1/2 × 1/4	rnd R		mi	(11)	30,32
2 1/2 × 1/4	sqr I		stl	(05)	32:b
2 × 1/4	rnd R		stl	(07)	34:b

Lehigh & Hudson River or Lehigh Valley

2 1/2 × 1/4	rnd I		stl	(01)	15
2 1/2 × 1/4	rnd I		stl	(07)	17,19-21

These were all pulled from a wye track in the Middletown yard.

(continued)

Lehigh Valley

2 1/2 × 1/4	rnd I	stl	(07)	12

Found outside the rail, and the shanks match LV.

2 1/2 × 1/4	rnd I	stl	(21)	42

New York Central

2 1/2 × 1/4	sqr I	stl	(05)	32:b

New York, New Haven & Hartford

2 1/2 × 1/4	cut R	stl	(03)	35,36

Shadow sets

M&NJ shadow set

1 1/4 × 3/16	rnd I gm	cop	(60)	23:b,24
1 1/2 × 1/4	rnd I	stl	(03)	30,31
2 × 1/4	cut R	stl	(03)	34:b,35-37

These were pulled near Norwich, NY.

New York, Susquehanna & Western

Most are from second hand ties

2 1/2 × 1/4	rnd R	stl	(05)	12
2 1/2 × 1/4	rnd I	stl	(07)	13,17,20-39
2 × 1/4	rnd I	stl	(07)	24
2 × 1/4	rnd R	stl	(07)	25
2 1/2 × 1/4	rnd R	mi	(11)	25,26,27,30:b,32
2 1/2 × 1/4	rnd R	stl	(01)	27:b,28:b
2 1/2 × 1/4	rnd R	stl	(07)	31,40,42,44,45,52-54,57
2 1/2 × 1/4	sqr R	stl	(07)	41

This line was owned by the Erie until 1940. Until then it seems that the Erie was responsible for tie replacement, since most of the nails do not seem to be from second hand ties, and many were used by the Erie. The (01) 27:b's are common here, and several rnd R (05) 12's have been found.

The rnd R nails from 40 up are not common.

Sources for second hand nails

The rnd R (07) nails may be from the D&H, the DL&W, and/or L&NE.

Delaware, Lackawanna & Western

2 1/2 × 1/4	rnd R	mi	(11)	25,26,27,30:b,32
2 1/2 × 1/4	sqr R	stl	(07)	41

Lehigh & Hudson River

2 1/2 × 1/4	rnd I	stl	(07)	36

And possibly some other rnd I (07) nails.

Rutland (tentative attribution)

2 1/2 × 1/4	rnd R	stl	(01)	27:b,28:b
2 1/2 × 1/4	rnd R	stl	(07)	31

Nickel Plate Road (New York, Chicago & St. Louis)

2 1/2 × 1/4	sqr	R	stl	(07)	22,23,27-34,37-40
2 1/2 × 1/4	sqr	I	stl	(07)	24,25,26:b
2 × 3/16	rnd	R	mi	(11)	26
2 1/2 × 1/4	rnd	R	stl	(01)	28
2 1/2 × 1/4	rnd	R	stl	(07)	33
2 1/2 × 1/4	sqr	R	stl	(04)	39
2 1/2 × 1/4	irr	R ss	stl	(25)	41

The Toledo, St. Louis & Western became part of the Nickel Plate in June, 1923. The Wheeling & Lake Erie was leased by the Nickel Plate on December 1, 1949. The Nickel Plate in turn was taken over by the N&W October 16, 1964.

The Toledo, St. Louis & Western installed 500,000 Burnett treated ties beginning 1905, and ending no later than November, 1908. They probably continued to use $ZnCl_2$ after 1908, which is the date of the statistic. [AREA '09, 619]['16, 329]

In response to a circular issued by the AREA and dated August 6, 1907, B. A. Worthington, First Vice-President of the W&LE, wrote "We have used red oak ties treated by the zinc process for only one year..." [AREA '08, 701]

W&LE test sections

- Bedford, OH, 1915.
  250 Rueping treated red oak ties. ['20, 113]
- Monroeville, OH, 1915.
  500 Rueping treated red oak ties. ['20, 113]
- Lodi, OH, 1915.
  248 Rueping treated red oak ties. ['20, 113]
- East Cadiz, OH, 1915.
  251 Rueping treated red oak ties. ['20, 113]

The Nickel Plate

Because International Creosoting 22's and 23's have been found in Nickel Plate ties, we know that IC&C treated their ties. As of 1922 the treatment company had plants in Beaumont, TX, Galveston, TX, and Texarkana, AR. ['22, 483]

In 1945 the Nickel Plate had a treating inspector in Edwardsville, IL. The Kettle River Co. built a one retort plant in Edwardsville in 1925. They still operated the plant in 1952. ['30, 421]['45, 292]['52, 397]

One (07) 26:b was pulled from the end of a tie re-used as a fencepost in Indianapolis. Otherwise the nails are found between the rails.

Mel Smith ([M-A '85, 1]) and John Hoffman say that no 35 or 36 was used. Merle Denney said he found sqr R 35 and 36 in northern Indiana. Mel also said that they used rnd I (07) 28 and 33.

Nail hunts: [M-A '87, 5-6], [N-D '88, 6-7], [J-F '89, 5, 9], [S-O '91, 1].

Norfolk & Western

2 1/2 × 1/4	sqr R	stl (07)	21-24
2 1/2 × 1/4	rnd R	stl (10)	24,25
2 1/4 × 9/32	sqr R	stl (07)	25,26,26:b,27,28
2 1/4 × 9/32	sqr R	stl (10)	27-32
2 1/4 × 9/32	sqr R	stl (05)	30
2 1/2 × 1/4	cut R	stl (07)	32-42,42:b,43
2 1/2 × 1/4	cut R	stl (05)	43-53
2 1/2 × 1/4	rnd R	stl (07)	53-59
From poles			
2 1/4 × 9/32	sqr R	stl (10)	29-32
2 1/2 × 1/4	cut R	stl (07)	32-36,39-42,42:b
From bridge timbers			
2 1/2 × 1/4	sqr R	stl (07)	23
2 1/2 × 1/4	rnd R	stl (10)	25
2 1/4 × 9/32	sqr R	stl (07)	25,26
2 1/4 × 9/32	sqr R	stl (10)	28-30,32
2 1/2 × 1/4	cut R	stl (07)	33,35,37,39,40,42,42:b
2 1/2 × 1/4	cut R	stl (05)	44,47,50,53
From second hand ties			
2 1/2 × 1/4	rnd R	stl (05)	48
From second hand bridge timbers			
2 1/2 × 1/4	rnd R	stl (05)	42,43,46

In [RAG 12-10-21] is an article on the N&W's new tie treatment plant in East Radford, VA "between the present tracks and the bank of the New River." "Heretofore this road had used no treated ties." The plant began operating in December, 1921.

The nails from second hand ties were originally Virginian. The N&W took over the Virginian in 1959. Dave Parmalee described the set in [J-F '80, 1]. He called the sqr R (05) 30 a type (07). This nail and the (10) 27 are scarce, and the 21 is even rarer. Nails can also be found in the poles along the right of way, and (so far) dates back to 1923 have been found in bridge timbers. The above list of nails from poles and timbers is incomplete.

Rumor states that the only 59's come from bridges near Richmond, and that rnd R (07) 60's were ordered and never used. Supposedly in the 1970's someone saved many 60's and has traded them off sparingly. This rumor was given more credibility when I heard from Abram Burnett, a Norfolk Southern employee: "Okay, this comes from two basic sources. First was Okla ("Okie") F. Bowman, an early 1940's conductor at Roanoke, who got into date nail collecting when it first became something remarkable (around 1965-67). I worked with Okie a great deal.

"The other source was a friend of my father's, a gent who ran the Roanoke Roadway Material Yard in the 1960s, Paul Blankenship. He was also a 1940s type railroad guy...my father's generation, not mine. This gentleman was frequently at our home when I was a young fellow.

"The *opinio receptus*, amongst those who believed such topics worthy of discussion, was as follows:

(1) that the N&W had dated ties from 1921 to 1959;
(2) that they had installed some 1959 nails, but either desisted from the dating practice in mid-year, or else installed a very small number of new ties in 1959 – which accounted for the exceedingly small number of '59 nails found even in the 1960s; and
(3) that kegs of '60 nails had been ordered for installation in 1960, but were never installed.

"One day (around 1968), I was working as a brakeman for Okie on a daylight local, and while he was in his locker before our trip began, he reached into a tin can on the top shelf and handed me a new '60 nail. He said that it had been obtained from a small supply at the West Roanoke Roadway Material Yard. [Winter 2000, 15]

Larry Fister got a 60 in trade from a man in Pennsylvania who claimed to have pulled 60's from ties on a N&W spur at the Pocahontas Co. coal mine near Pulaski, VA. They may be second hand RF&P.

(continued)

See [J-A '84, 1-3] and [N-D '89, 8-10] for articles.

Norfolk Southern

1 1/2 × 1/4	rnd R	stl (05)	44,44:b,45,46
1 1/2 × 1/5	rnd R	stl (07)	64,65

Test sections

- Norfolk Division, 1897.

  In May of 1897, between mileposts 6 and 7, the folowing ties were inserted by the Norfolk & Southern, the main predecessor to the NS.

  250 zinc-tannin treated gum ties. ['15, T]['16, 298]['17, 134]['20, 103]
  250 zinc-tannin southern yellow pine ties. ['17, 208]['20, 125]
  150 $ZnCl_2$-treated pine ties. ['16, 317]
  25 $ZnCl_2$-treated red oak ties. ['16, 310]['20, 116]
  100 creosoted (full cell) juniper ties. ['16, 302]['17, 152]['20, 107]
  250 vulcanized gum ties. ['16, 298]['20, 103]
  196 vulcanized southern yellow pine ties. ['16, 317]
  200 untreated gum ties. [DNC, 252]
  1,095 untreated juniper ties. ['16, 302]['17, 152]['20, 108]
  300 untreated white oak ties. ['20, 119]
  200 untreated southern yellow pine ties. [DNC, 254]

  [AREA '12, Appendix B]['22, 110-114]['23, 162-166][DNC, 252-254]

Northern Pacific

2 1/2 × 1/4	rnd I	stl (07)	07,8,08,09:b,10,10:c,11-14,15:b,15:c,16,18:b,20
2 1/2 × 1/4	rnd I	stl (05)	13,13:b
2 1/2 × 1/4	rnd I	stl (14)	15
2 1/2 × 1/4	rnd I	stl (40)	17,17:b,17:c,17:d
2 1/2 × 1/4	rnd R	stl (07)	20,21
From poles			
2 1/2 × 1/4	sqr I	stl (05)	24,25,27-31,31:c,35-44,46-56
2 1/2 × 1/4	sqr I rs	stl ( )	32,33
2 1/2 × 1/4	rnd I	stl (07)	33
2 1/2 × 1/4	rnd I	stl (06)	34
2 1/2 × 1/4	sqr I	stl (07)	35-42
2 1/2 × 1/4	rnd R	stl (06)	53

Tie treating

"The Northern Pacific Railway Company in the year 1907 decided to treat all of their cross-ties, switch ties, and other miscellaneous timbers, and in order to accomplish this work as economically as possible, constructed two treating plants, one located at Brainerd, Minn., and the other at Paradise, Mont." "The Brainerd plant was the first completed and commenced operating in October, 1907." "The Paradise plant was completed and commenced operating in April, 1908." [WPN Mar '29, 41]

Ties were treated by the Lowry process. As of 1910, judging by test sections, they received an 80-20 mixture of creosote and coal tar. These were the only plants of the time to use the Lowry process apart from Federal Creosoting Co. (and subsidary) plants. Beginning 1920 a mixture of creosote, coal tar and petroleum was used. ['10, 139][GRB, 104]

In the list of test sections in [AREA '09, 619] (reported 9-5-08) and ['16, 328] there is mention of 94,694 creosoted ties of various species laid in 1907 between St. Paul and Billings. That might be the year's total for the Brainerd plant.

(continued)

Record keeping and date nails

When the two treatment plants opened, date nails were driven into every treated tie. In 1911: "the practice, however, I understand, is to be stopped, and sections over the different divisions in the system will have the dating nails placed in the treated ties and the record kept in small sections, such as Mr. Angier described on the Burlington." ['11, 138]

But the NP continued to use date nails. They used them through 1918, and in 1919 they began a system-wide collection of test sections. Nails from 1920 and 1921 are known from the NP, and they may be from test sections. [DNC, 290]

From 1925: "We found that practical use was not being made of the dating nails, and tabulating nearly two million ties annually renewed is out of the question. We also found that ties were being removed account of age, whether they were ripe or not." [DNC, 332][AREA '26, 712]

There are several other variations of the (40) 17. They were not hand struck.

Parmalee, in [J-F '78, 1] and [M-J '78, 1], said that no 19 had been found yet, and nails in the teens are common. See also Warren Ventsch's article in [J-A '89, 1]. Kyle Schaefer pulled rnd I (07) 19:b's, which probably do not belong to the set. Probably no 19's were used by the NP because they were thinking of concentrating their records in their new test sections only.

The pole nails may not have been used by the NP, but they are found along the railroad. See Charles and Cheryl Johnson's piece in [Spring 2003, 13].

Articles: [J-A '85, 3], [J-A '88, 11], [J-F '90, 6-7].

Forest Service test sections.

The following tests were designed by the U.S. Department of Agriculture's Forest Service. It may be that the 1911 Seattle test, listed below under "Railroad tests", should be included here also.

From the 1948 AWPA *Proceedings*: "Thirty-five years ago the Forest Service entered into a cooperative study of cross ties with the Northern Pacific Railway. The investigation consisted of three separate experiments: First, tests to determine the green weight and rate of seasoning of timbers cut in different months; second, tests to determine the absorptive power of seasoned timber cut in different months; third, tests to determine the comparative durability of green, of seasoned, and of treated timbers when laid under similar conditions with various tie plates and rail fastenings in a test track." ['48, 207]

- Maywood, WA, 1906.

  2,280 ties were laid. They included

  1,635 untreated Douglas fir ['16, 293-294]['17, 124-126]['20, 102][DNC, 252]
  442 full cell creosoted Douglas fir ['15, table]['17, 122]['20, 100]['22, 109-110]['23, 161, 165]
  203 untreated western hemlock ['16, 301]['20, 107][DNC, 252]

- Plains, MT, 1907.

  In the Spring of 1907 near Plains 2,650 ties were placed. The zinc chloride treated ties received about .8 lb/ft^3.

  1,141 untreated Douglas fir ['16, 293-294]['17, 130]['20, 102]['22, 110]['23, 165][DNC, 252]
  197 $ZnCl_2$-treated Douglas fir ['16, 294]['17, 130-132]['19, 224, 225]['20, 102][AREA '30, Table]
  1,119 untreated western larch ['16, 302]['17, 154]['20, 108]['22, 111]['23, 163][DNC, 253]
  193 $ZnCl_2$-treated western larch ['16, 303]['17, 154-156]['20, 108][AREA '30, Table]

  "The principal purpose of this test was to determine the durability of green, seasoned, and treated ties cut at different seasons of the year. However, it was also desired to compare the effect of three forms of tie plates in reducing abrasion and to test the value of screw spikes compared with ordinary cut spikes." ['42, 322-323]['48, 207-208]

- Missoula, MT, 1910.

  Between MP 120 and MP 121-2350 on the westward main line, at the west end of the Missoula Yard. 1,800 ties were laid in February, 1910, 400 ties east and 1,400 ties west of Cemetery Crossing. In each tie was a 1910 date nail. All ties were treated with an 80-20 mixture of creosote and refined tar by the Lowry process at 6.8 lb/ft^3 at the Paradise plant in February, 1910. The purpose of this test was "to determine the serviceability of treated western hemlock crossties." ['42, 325-326]

(continued)

The ties received 6.75 lb/ft^3. ['48, 205-206]

1,072 hemlock
436 western larch
166 Douglas fir
102 true fir
18 spruce
2 white pine
3 western yellow pine
1 aspen [WPN 3-29, 45]['33, 236-237]['37, 181]

- Thompson Falls, MT, 1915.

  1,675 ties were laid near Thompson Falls in October, 1915. "The purpose was to determine the comparative durability of creosoted Douglas fir, white fir, ponderosa pine, and western larch ties. In addition, it was desired to compare the value of Vignoles rail chairs with standard Northern Pacific plates in reducing mechanical damage and splitting." ['42, 323-325]['48, 206-207]

  395 Bethell creosoted Douglas fir (steaming). 6.2 lb/ft^3. ['17, 128]['20, 101]
  50 untreated Douglas fir ['17, 130][DNC, 252]
  200 Lowry creosoted white fir. 9.1 lb/ft^3. ['17, 132]['20, 103]
  372 Bethell creosoted western larch (steaming). 9 lb/ft^3. ['17, 152-154]['20, 108]
  50 untreated western larch ['17, 154]['20, 108][DNC, 253]
  199 Lowry creosoted lodgepole pine. 8.6 lb/ft^3. ['17, 196]['20, 121-122]
  409 Lowry creosoted western yellow pine. 7.3 lb/ft^3. ['17, 210]['20, 126]

Railroad test sections.

These tests were conducted by the NP.

- Sumner, WA, 1908.

  The following ties, treated by the Lowry process, were inserted.

  44 ash ['17, 98]['20, 94]
  49 birch ['17, 106]['20, 96]
  53 elm ['17, 174]['20, 98]
  46 red oak ['17, 116]['20, 113]
  45 jack pine ['17, 190]['20, 120]

- Lolo, MT, 1910.

  261 Lowry treated cottonwood ties were laid. They were treated with an 80-20 mixture of creosote and refined tar, at 8 lb/ft^3. ['17, 112]['20, 97]['42, 326-328]['48, 208-209][WPN 3-29, 45]

- Marshall Jct., WA, 1910.

  554 Lowry treated cottonwood ties, treated with an 80-20 creosote-tar mixture. [WPN Mar '29, 45]

- Seattle, WA, 1911.

  The following 3,288 ties were inserted. This may be a Forest Products Laboratory test.

  527 creosoted (boiling) Douglas fir ['17, 122]['20, 100]
  519 creosoted (Rueping) Douglas fir ['17, 122]['20, 100]
  156 80-20 creosote-crude oil treated Douglas fir ['17, 122]['20, 100]
  525 creosoted (boiling) spruce ['17, 216]['20, 127]
  310 creosoted (Rueping) spruce ['17, 216]['20, 127]
  57 80-20 creosote-crude oil (full cell) treated spruce ['17, 216]['20, 127]
  486 creosoted (boiling) tamarack ['17, 220]['20, 128]
  504 creosoted (Rueping) tamarack ['17, 220]['20, 128]
  204 80-20 creosote-crude oil (full cell) treated tamarack ['17, 220]['20, 128]

(continued)

The 1919 test sections.

"There are eighteen record test tracks on the Northern Pacific Railway, located along the line from St. Paul and Duluth to Portland, Oregon. These tracks were established in 1919, and while established at this late date there were ties of all species, treated and untreated, in the tracks, and the record of service was obtained from the date nails in the ties, which showed treated ties as far back as 1908, untreated white oak ties as far back as 1905, and other species, such as tamarack, 1912. An annual inpection is made of these tracks each year. There were 3,130 untreated ties in 1919 and 82.4 per cent were removed account of decay in 1928.

"There were 8,761 treated ties, the majority of which was placed prior to 1912 and of this number 10.9 per cent were removed mostly on account of damage..." [WPN Mar '29, 42]

Though these renewal tests were initiated in 1919, it wasn't until the 1920's that they were fully established. In 1923 there were seventeen test sections. By 1929, eighteen. The locations of these test sections are unknown.

In addition to the renewal test sections, the NP initiated special tests of ties laid out of face. These were numbered, and six of them are listed below. [WPN 3-29, 45]

"There are 66,000 ties in test tracks. These include cottonwood and hemlock ties laid in 1910, and tamarack ties laid in 1917" [AREA '26, 975][DNC, 255] The number refers to ties in all tests.

- # 1-A. Rice, MN to Gregory, MN, 1917.

  From MP 89 near Rice, to MP 103.5, near Gregory, in the Eastward Main Track on the St. Paul Division 44,159 tamarack ties were laid. They were treated by the Lowry process with an 80-20 creosote-coal tar mixture in December, 1916 at the Brainerd plant.

  They were set in the track in the spring of 1917. This stretch of track was declared a test section on January 10, 1922, becoming "Record test track No. 1-A." [WPN 3-29, 45]['33, 237-238] ['37, 180-181]

- # 2-A. Near Duluth, MN, 1922.

  "Record Test Track Number 2A near Grassy Point Bridge, West Superior Branch. Established, June, 1922" Beginning at Station M. P. 2+3267.5 and extending to Station M. P. 2+4490.1 between Duluth and Superior, in the following order were laid:

Number of ties	Wood	Treatment
98	Birch	Straight creosote
101	Maple	Straight creosote
100	Red Oak	Straight creosote
100	Maple	50% creosote, 50% oil
101	Birch	50% creosote, 50% oil
100	Red Oak	50% creosote, 50% oil
100	White Oak	Untreated

  "Each tie has a copper plate fastened with galvanized nails, eight inches from rail base, on inside of track, north rail. Numbers run consecutively as above." The galvanized nails were probably not date nails. [WPN 5-23, 78-79]['48, 205]

- # 8-A. Near Paradise, MT, 1921.

  198 Dougals fir ties, after seasoning over two years, were treated by the Lowry process with straight creosote, 8 lb/ft^3, at Paradise in December, 1919. They were piled near MP 1 and were placed in the track in August, 1921.

  In addition, the following ties were seasoned for 13 months, treated by the Lowry process with a 50-50 creosote-petroleum mixture (8 lb.) at Paradise in June, 1920. They also were inserted in the test track in August, 1921.

(continued)

24 Montana western yellow pine ties,
24 Montana Douglas fir ties,
24 Montana hemlock ties,
24 Montana cottonwood ties,
24 Montana tamarack ties,
24 Coast Douglas fir ties. ['48, 204]

- #9. Near Cle Elum, WA, 1930.
  The location is "Roslyn Branch, Tacoma Division, near Cle Elum, Wash. Line to N. W. I. Co. No. 9 Mine." 1,000 No. 4 Coast hemlock ties, treated at Seattle, WA, were placed in the track. [AREA '51, 316]
- #6. Seven miles east of Cle Elum, WA, 1944.
  "Bristol Line Change, Tacoma Division M. P. 16+00 to M. P. 16+1700." 1,000 No. 5 Coast Douglas fir ties, treated at Seattle, were laid. They were treated with a 50-50 creosote-petroleum solution. The West Coast Wood Preserving Co. had a plant in Seattle. [AREA '51, 316]
- #4. 18 miles east of Forsyth, MT, 1946.
  "Joppa Line Change, Yellowstone Division between M. P. 106 and 107". 1,000 No. 5 hardwood ties, treated at Brainerd, were laid. They were treated with a 50-50 creosote-petroleum solution. [AREA '51, 316]
- #3. 35 miles west of Dickinson, ND, 1946.
  "Scoria Line Change, Yellowstone Division between M. P. 146 and 147". 644 No. 5 Coast Douglas fir and hemlock ties, treated at Hillyard, WA, were laid. They were treated with a 50-50 creosote-petroleum solution. The tie plates were lagged to the ties. The National Pole & Treating Co. ran the Hillyard plant. [AREA '51, 316]

Norwood & St. Lawrence

From second hand ties

2 1/2 × 1/4	rnd I	stl	(07)	16,23,27
1 3/4 × 5/16	rnd I	stl	(05)	16,17
2 1/2 × 1/4	sqr R rs	mi	(11)	16
2 1/2 × 1/4	sqr I	stl	(07)	18,22,23,26:b
2 1/2 × 1/4	rnd I	stl	(64)	18
2 1/2 × 1/4	rnd I	stl	(05)	22
2 1/2 × 1/4	rnd R	stl	(07)	24-26,26:b,27:b,28,29,31,33,37
2 × 1/4	rnd I	stl	(07)	24
2 1/2 × 1/4	sqr I	stl	(05)	24,26,28
2 1/2 × 1/4	sqr R	stl	(05)	25
2 × 1/4	rnd R	stl	(07)	25
2 1/2 × 1/4	rnd R	stl	(01)	28

The N&StL is a northern New York short line. They inserted second hand ties face down, so it is rare to find a nail in the track. Also, there are few discarded ties along the roadbed, so nails are generally found on the torn-out (northern) section of the railroad.

The (05) 22 was found with a rnd R (07) 28. Two ties had 2 1/2" rnd R 25 and 28 between the rails.

See Steve Worboys' article in [S-O '92, 6].

Sources for second hand nails

New York Central

2 1/2 × 1/4	sqr R rs	mi	(11)	16
2 1/2 × 1/4	sqr I	stl	(07)	22,23
2 1/2 × 1/4	sqr I	stl	(05)	24,26,28
2 1/2 × 1/4	sqr R	stl	(05)	25

(continued)

New York, New Haven & Hartford

2 1/2 × 1/4	rnd I	stl	(05)	22
2 1/2 × 1/4	rnd R	stl	(07)	25,26:b,27:b,28,29,31,33,37

Maybe some of these are not from the New Haven, but most probably are.

Nickel Plate Road

2 1/2 × 1/4	sqr I	stl	(07)	26:b

Rutland

2 1/2 × 1/4	rnd R	stl	(01)	28

Schenectady

2 1/2 × 1/4	rnd I	stl	(07)	16

Shadow sets

Enigma set

2 1/2 × 1/4	rnd I	stl	(64)	18

Stubby shadow set

1 3/4 × 5/16	rnd I	stl	(05)	16,17
2 1/2 × 1/4	sqr I	stl	(07)	18

Ontario Northland

1 1/2 × 1/4	rnd R ts	stl	(37)	78,80,82

This railroad runs from North Bay, ON to Moosonee, ON with branch lines.
Probably other dates can be found.

Oregon & Northwestern

From second hand ties

2 1/2 × 1/4	rnd R	stl	(18B)	26
2 × 1/4	rnd R	stl	(17)	30,32
2 × 1/4	rnd R	stl	(07)	34,36
2 × 1/4	rnd R	stl	(18B)	35

The O&NW was incorporated January 16, 1934 to acquire a logging railroad built in 1928-29.

The 26 is from an ex-SP&S tie while the others are from used UP ties. The 34 might be any one of 34, 34:b or 34:c.

See [S-O '83, 1].

Oregon, Pacific & Eastern

2 × 1/4	rnd I	stl	(18C)	52,53

Oregon Short Line

2 1/2 × 1/4	rnd I	stl (07)	05,5,06,07,7,8,09:b,9,10,10:b,11,13,16,17	
2 1/2 × 1/4	rnd I	stl (01)	05,5,07	
2 1/2 × 1/4	rnd I	stl (18B)	6	
2 1/2 × 1/4	rnd I	stl (18A)	08	
2 1/2 × 1/4	rnd R GM	stl (07)	12-15,19	
2 1/2 × 1/4	sqr I	stl (07)	15,16,19:b	
2 1/2 × 3/16	rnd R	stl (07)	16,17	
2 1/2 × 3/16	rnd R gm	stl (07)	18-20	
1 1/2 × 1/4	rnd R	stl (07)	19	
1 1/2 × 1/4	sqr R	stl (07)	19	
2 1/2 × 1/4	sqr R	stl (07)	20	
2 1/2 × 1/4	rnd R	stl (07)	20	
2 × 1/4	rnd I	stl (07)	21	
Code nails				
2 1/2 × 1/4	rnd R gm	stl (07)	2-4	(Set #15)
2 1/2 × 3/16	rnd R gm	stl (07)	0,6,7,8	(Set #31)

This list of nails is taken mainly from the photo of Steve Lowry's collection in [S-O '80, 4]. The accompanying article is by DeVon Mich'l. Probably many nails are UP, not OSL, and many true OSL nails are missing. It is impossible to determine the OSL set with any accuracy. See Union Pacific for a full explanation.

Corporate information

The Oregon-Washington RR & Navigation Co. was created in 1910 from the Oregon RR & Navigation Co., the Oregon & Washington, the Idaho Northern, and the Ilwaco. All were owned by OSL.

OSL was owned by UP before 1900. Trackage rights were granted to the UP July 1, 1909, and the OSL completely merged into the UP in July 23, 1936.

Tie treatment

Up to 1921-1923 the OSL controlled its own tie policy. In the period 1921-1923 the UP consolidated track maintenance and record keeping on its subsidaries. Date nails on OSL and UP become identical in 1921, and the operation of OSL treating plants was transferred to UP in 1923. See UP for a more detailed discussion of this.

The OSL had two treating plants:

— Wyeth, OR, 1903. This was the Oregon RR & Navigation Co.'s two-retort portable plant which treated ties with $ZnCl_2$. Judging from test sections, the plant opened in 1903. [AREA '09, 619] In 1905 two cylinders were added for treating ties (and maybe other timbers) by "Creosote (Boiling)," ['12, 285] The UP moved the plant to The Dalles, OR when they assumed control in 1923. [WPN 8-51, 97-98] [AREA '04, 75]

— Pocatello, ID, 1921-1922. This OSL plant was built with one retort in 1921 and was enlarged to two the following year. It became a UP plant in 1923. ['22, 484][WPN 8-51, 98]

Beginning 1906, and ending no later than July, 1908, the Wyeth plant produced 1,395,975 creosoted (full cell) Douglas fir ties at 8-10 lb/ft^3 which were used on the ORy&NCo. It is possible that they continued to treat ties with creosote up to 1921/23. In any case, as of 1915 the plant was still using both zinc chloride and creosote. [AREA '09, 619]

In 1909 David Allerton, who ran the Wyeth plant, said "No ties in the West have been treated with creosote at all, except for experimental purposes." ['09, 23] So the creosoted ties on the OSL were considered to be experimental.

(continued)

Date nails

Nails from 1921 up found on the OSL are identical to Union Pacific, with the exception of variations on the rnd R 29 ((18B) or (17)?). That difference is insignificant. See the UP list for the post-1921 nails. Because of the corporate connection and the fact that nail collectors have for years lumped OSL and Salt Lake Route nails under UP, it is impossible to separate the pre-1922 nails of OSL and UP. Our list derives mainly from DeVon Mich'l's article in [S-O '80, 1-4]. After 1936 the UP probably used second hand OSL ties on the UP, and vice versa, and it is possible that once in a while the UP supplied some ties to the OSL in a pinch (UP inserted date nails at the treating plant), or that the OSL occasionally treated ties for the UP. Mel Smith found a 2 × 1/4 rnd I (07) 21 here.

Nails listed above which are not in the UP set are rnd I (01) 05, 07; rnd I (18B) 6; 3/16" rnd R gm (07) 18-20 (the UP nails have no gm); and sqr I (07) 19:b (the UP used the 19:a). Only the pre-1910 nails among these seem to be significant. The others are either regional variations or are misidentified.

All nails are found outside the rail. See Mel Smith's article in [N-D '88, 9-10]. Other articles are in [M-J '89, 1-2] and [M-A '90, 4].

The code nails are found on OSL and UP, so they may have been used in 1921 or later.

The 3/16" 8 may be from code Set #32.

Test sections

- Great Salt Lake, UT, 1899.
  150,000 salt treated (22.5% solids) Oregon fir ties were laid, and fared no better than untreated ties. ['16, 295]
- Nevada, 1903.
  In two stretches of track of 45 and 36 miles, Burnett treated Oregon fir ties were set. ['15, table] ['16, 295]['17, 126] (['17] wrongly says this and the next five tests are Southern Pacific.)
- Utah, 1903.
  18 miles of Burnett treated Oregon fir ties. ['16, 295]['17, 126] (['15, table] says 93 miles, the total of all Utah tests listed here.)
- Beppo, UT, 1903.
  20 miles of Burnett treated Oregon fir ties. ['16, 295]['17, 126]['19, 226]
- Loy, UT, 1903.
  6 miles of Burnett treated Oregon fir ties. ['16, 295]['17, 126]
- Hogup, UT, 1903.
  46 miles of Burnett treated Oregon fir ties. ['16, 295]['17, 126]['19, 226]
- Ogden, UT, 1903.
  3 miles of Burnett treated Oregon fir ties. ['16, 295]['17, 126]['19, 226]
- Dodson, OR, 1908-1909 (ORy&NCo).
  The following Oregon fir ties were laid from Station 1945-42 to Station 1810-13 in August, 1908.
  300 open tank carbolineum treated ties.
  1,000 8.0 lb/ft^3 creosoted ties.
  3,921 1/4 lb/ft^3 $ZnCl_2$ treated ties.
  2,013 untreated ties.
  Extending from Station 1810-13, the following were laid in June, 1909.
  250 Spaulding treated Douglas fir ties.
  ['16, 294, 295]['17, 120-126]['20, 99-101]['24, 251]['25, 166]['31, 35][AREA '12, Appendix B]

Pacific (Ferrocarril del Pacifico)

2 1/2 × 1/4	rnd R	stl	(32)	66,68,68:b,69,70,74,74:b,76,76:b
2 1/2 × 1/4	rnd I	stl	(12)	71
Code nails				
2 1/2 × 1/4	rnd R	stl	(32)	$\frac{2}{A}$,$\frac{2}{A}$:b

(continued)

See Mexico for general comments.

The Pacific RR was created when the Southern Pacific sold the SP of Mexico to the Mexican government in 1951. Sometime in the period 1966–1971 the Pacific RR acquired the Nacozari RR in Sonora.

Max Jones pulled these nails on the ex-Nacozari branch. He found many other nails, among them some SP Western Lines nails. The 76's are really 2 3/4" long, but were probably intended to be 2 1/2".

There are two different shank markings for each of 76 and 76:b.

The (12) 71 may be from a second hand Sonora-Baja tie. Only one has been found.

Two variations on the $\frac{2}{A}$ have been found. They may not be the :a and :b variaties, and they may be older than the Pacific RR.

Panama

Code nails from second hand ties

2 1/2 × 1/4	rnd R		stl	(09)	CROC / SN MAT CA / LEAS

This "leased tie" nail was originally used by Illinois Central Gulf. See ICG for an explanation of the use of these nails.

Patapsco & Back Rivers

1 1/4 × 3/16	rnd I	gm	cop	(60)	36,37,40,41,46

The P&BR is a Maryland switching railroad. The 36 is in Russ Hallock's collection, and the 37-46 are from Harvey's list.

Pennsylvania

1 3/4 × 5/16	rnd I		stl	(01)	R 09
2 × 3/16	rnd I		mi	(13)	R 09, G 10, H 10, P 10, R 10, G 11, H 11, P 11, R 11
2 1/2 × 1/4	rnd R		mi	(11)	10
2 1/2 × 5/16	rnd I	cp	mi	(13)	11
2 1/2 × 1/4	rnd I		stl	(07)	24,29,49,49:b,50,56-65,65:b
2 1/2 × 1/4	rnd I		stl	(05)	25:b,25:c,50-52
2 × 1/4	rnd I		stl	(07)	44
2 × 1/4	rnd R		stl	(07)	44
2 × 1/4	rnd I		stl	(05)	45,47
2 1/2 × 1/4	rnd I		stl	(06)	55
2 1/2 × 1/4	rnd R		stl	(09)	56
2 1/2 × 1/4	rnd R		stl	(06)	57
2 1/2 × 1/4	rnd R		stl	(07)	57,59,63

Code nails

2 × 1/4	rnd I		stl	(05)	A #6,A #7,AD #8,B #8,B #9,BD #18,C #4,C #5, D #4,T #3
2 1/2 × 1/4	rnd R		stl	(25)	C #8,V #1
2 1/2 × 1/4	rnd I		stl	(07)	E #6,X #5
2 1/2 × 1/4	sqr R		stl	(05)	T #6
1 1/4 × 3/16	rnd I	gm	cop	(60)	0,1,2,4,5 (Set #38)
1 1/4 × 3/16	rnd R	gm	cop	(60)	1,3,9

(continued)

Early treating

North of Baltimore in 1838 the Northern Central RR inserted a mile of mercuric chloride treated ties. The woods were chestnut and oak. The treatment was too toxic for the men and too costly to be adopted for gerneral use. The Northern Central came under Pennsy control in 1900, and became part of the PRR in 1914. [ASCE 7-85, 252-254]['15, table]

The Philadelphia & Columbia RR, a PRR predecessor, tested some pine stringers in 1840 which had been subjected to a lime bath. The test was a failure. [ASCE 7-85, 282]

In 1850 the Belvedere Deleware RR tested some hemlock track sills treated with salt in evenly spaced holes which were plugged after treatment. The method was too costly. [ASCE 7-85, 282-283]

In 1863 the Philadelphia, Wilmington & Baltimore (later owned by PRR) began Burnettized ties and bridge timbers which they treated at their own works. The solution was too strong, making the wood brittle. [ASCE 7-85, 258, 262][WSE 4-00, 118]

In 1879 on the former Cleveland & Pittsburgh RR, the PRR tested some ties treated with copper sulfate by the Thilmany process. It was a failure. [ASCE 7-85, 279]

Tie preservation and marking to 1910.

It may have been the well-publicized 1892 Hanna-Kosciusko test of zinc-tannin treated ties which initiated the Pennsylvania's decade-long experiment with tie treatment. Judging by the test sections, the PRR used large numbers of $ZnCl_2$- and zinc tannin-treated ties in the period 1892-1901. Nearly 127,000 zinc tannin treated ties are listed for 1897 alone, and the total number of ties in zinc chloride tests is 94,548. In addition, over 9,000 wood tar creosoted ties were used in the same period.

From 1897 to 1902 the Chicago Tie Preserving Co. treated some 190,160 ties with $ZnCl_2$ by the Wellhouse process for the Southwest System of the Pennsylvania. The species were black oak, red oak, beech, hemlock, and tamarack. [AREA '05, 777][AREA '07, 488]

Even though all these ties add up to a little over 100 miles of track, they are significant for the time. Apart from the B&M's stint with kyanized ties 1881-1891/92, no railroad east of the Mississippi used so many treated ties before 1899.

After 1901 I have records of only a few tests, all of creosote. Beginning 1905 the Rueping process was tried. The 1907 and 1910 tests at Scio and Wooster may have been designed as much to test screw spikes as to determine the lives of creosoted ties.

In a September 12, 1903 letter Octave Chanute listed the Pennsylvania RR as currently using date nails. They were not included in a similar list Chanute wrote up December 17, 1902. These lists were not meant to be comprehensive, but Chanute was in charge of treating the railroad's ties. So it seems likely that they began using date nails in 1903. [Spring 2002, 1-4][Fall 2002, 18-19]

In early 1906 or late 1905 a PRR person wrote "Until within a year ago the dating nails used by this company were made of copper. It was found that these copper nails were being pulled out of the ties by boys and others, presumably on account of their intrinsic value, and we have for the last year, or year and a half, been using galvanized wire for our dating nails." [AREA '06, 30-31][DNC, 26] "Until within a year ago" implies they used copper nails to 1905, while "for the last year, or year and a half" implies that use of steel nails began in 1904 or 1905. Maybe steel and copper were both used in 1905.

Where were these nails used? Certainly nail use did not begin until 1899 or later, and nails were probably not used in untreated ties. Probably all test sections had date nails, as was the case with the Scio test of 1907. There steel rnd I (01) 07's were used, along with nails CR, SL, and RO.

Tie preservation from 1909.

In 1908 the PRR decided to treat all ties in their main tracks. For this they built two treating plants. The first went into operation at Mt. Union, PA in 1909. Originally "various treatments" were used, but by 1913 only creosote was listed. The Rueping process was employed at this one-retort plant. It was still operating in 1952. [RAG 12-4-08, 1504]['10, 139]['13, 449]['52, 398]

The second plant was constructed in 1910 at Greenwich, PA, near Philadelphia. It had one retort and its treatment methods were probably the same as the Mt. Union plant's. It shut down sometime between 1930 and 1934. ['13, 448]['30, 422]

The PRR had a plant at Philadelphia prior to 1909. It was a non-pressure creosoting plant, so it probably did not treat ties. It may have been on the same site as the future Greenwich plant. ['10, 139]

(continued)

The Mt. Union and Greenwich plants had a combined capacity of about 1,500,000 ties annually, which was not nearly enough for the Pennsy's needs. From the early 1920's on the railroad also purchased large numbers of ties from commercial plants.

At least 1923-24 the PRR had treating inspectors in St. Louis, MO, Orrville, OH, and Louisville, KY. There was no treating plant at St. Louis, which was the western terminus of the railroad. ['23, 545, 548] ['24, 329, 330, 334]

The Ohio Wood Preserving Co. built a plant at Orrville in 1912 which originally treated ties with creosote (Rueping process) and $ZnCl_2$. The Rueping process was used there as early as 1913. A second retort was added in 1921 and a third in 1924. In 1929 the 1912 treating cylinder was replaced by two new retorts. Between 1930 and 1934 the plant was acquired by the Century Wood Preserving Co., which in turn was taken over by Koppers by 1940. Koppers still ran the plant in 1952. ['13, 453]['24, 314]['30, 422] ['34, 471]['40, 453]['52, 397]

The PRR inspector at Louisville worked at the Producer's Wood Preserving Co. plant which was built in 1922 with two retorts. A third retort was added in 1924. In 1930 the company was controlled jointly by Ayer & Lord and Bond Brothers. By 1934 its owner was given as Bond Brothers, and it was still in operation in 1952. ['24, 314]['30, 422]['34, 170]['52, 395]

From the test sections we know that lines west of Pittsburgh received ties treated with both $ZnCl_2$ and creosote at least through 1917. Eastern lines received only creosoted ties. The Rueping process was probably the standard method of creosoting as soon as the Pennsy's treating plants opened.

Sometime between 1914 and 1920 the railroad experimented with water gas tar treated ties. ['21, 118]

Tie records and date nails.

According to [WPN Feb '24, 21], the PRR began to keep tie renewal statistics in 1901. More reasonable is the statement that records had been kept "Intermittently since 1898." ['14, table][DNC, 290]

"The Pennsylvania started using dating nails in 1909 but discontinued their use in 1911, due to differences of opinion between the nailers at the treating plants and the section foremen regarding the side of the tie to go up in the track." ['14, 406] It seems unlikely that this was the *main* reason nails were abandoned. In 1910-1911 many railroads followed the lead of the CB&Q in stopping nail use because if poor records obtained from them.

At the 1911 AWPA meeting E. A. Sterling of the PRR mentioned date nails on his railroad:

> Speaking first of untreated ties, it was the practice for a short time to put dating nails in practically all ties, but it was found that this was unnecessary and did not give definite results. The present policy with untreated ties is to use dating nails only on selected stretches of track. When we began treating [1909] it was decided to put dating nails in all treated ties, for the first few years, at least, and this has been done up to the present time. In this connection we went a bit further than is customary, and are marking the nails with the species as well as the year; that is, for gum the nail is stamped "G-11"; for red oak, "R-11." etc. That is mainly to save the trouble of cutting the end of the tie to see what it is. After being in the track for some years you know how difficult it is to tell the specie owing to the creosote and accumulation of dirt and cinders. ['11, 138]

The 1909-1911 nails are not all from test sections. At least through 1910 the date nails were driven into all treated ties, and in untreated ties in test tracks.

The letters on the 1909-1911 nails stand for the following:

'G' = Gum, 'R' = Red oak, 'H' = Hickory and 'P' = Pine.

We know the 'H' is not Hemlock, because as of 1913 the list of woods treated by the PRR included Hickory, and no other wood beginning with 'H'. ['13, 449]

Sterling also said at the 1911 meeting "...we arranged, in order to be on the safe side, to have our nails double galvanized." But with the exception of some R09's, all PRR letter-number nails were made from ungalvanized malleable iron. ['11, 139]

Dave Parmalee reveived a photo of some PRR nails belinging to a Pennsylvania collector. In the set were cast indent (11) 9, $\underline{09}$, and $\frac{W}{12}$ along with the other standard nails. If these are really PRR nails, the "W" probably stands for "White Oak".

(continued)

In 1914 "Expect to select short stretches of test track." ['14, table][DNC, 290]

From [AREA '26, 975]: "Service tests are being made on several divisions, in 1000-tie stretches, on which ties are being renewed in the usual way, the new ties being numbered and marked with dating nails, and accurate records kept of each tie. These tests were started in 1919, and no ties have been removed to date, except some untreated sap white-oak ties, which gave only four years' life."

In 1925 the PRR System's Central Region Chief Engineer believed that nails were justifiable in test sections. The Eastern Engineer did not think the nails worth while. [DNC, 332][AREA '26, 712]

Dave Parmalee described the PRR letter nails in [M-A '78, 1]. The 2" (05) letter nails may have been used in the later 1940's, judging by their dimensions and type. Likewise, the 2 1/2" (05) letter nails might be from 1950-52.

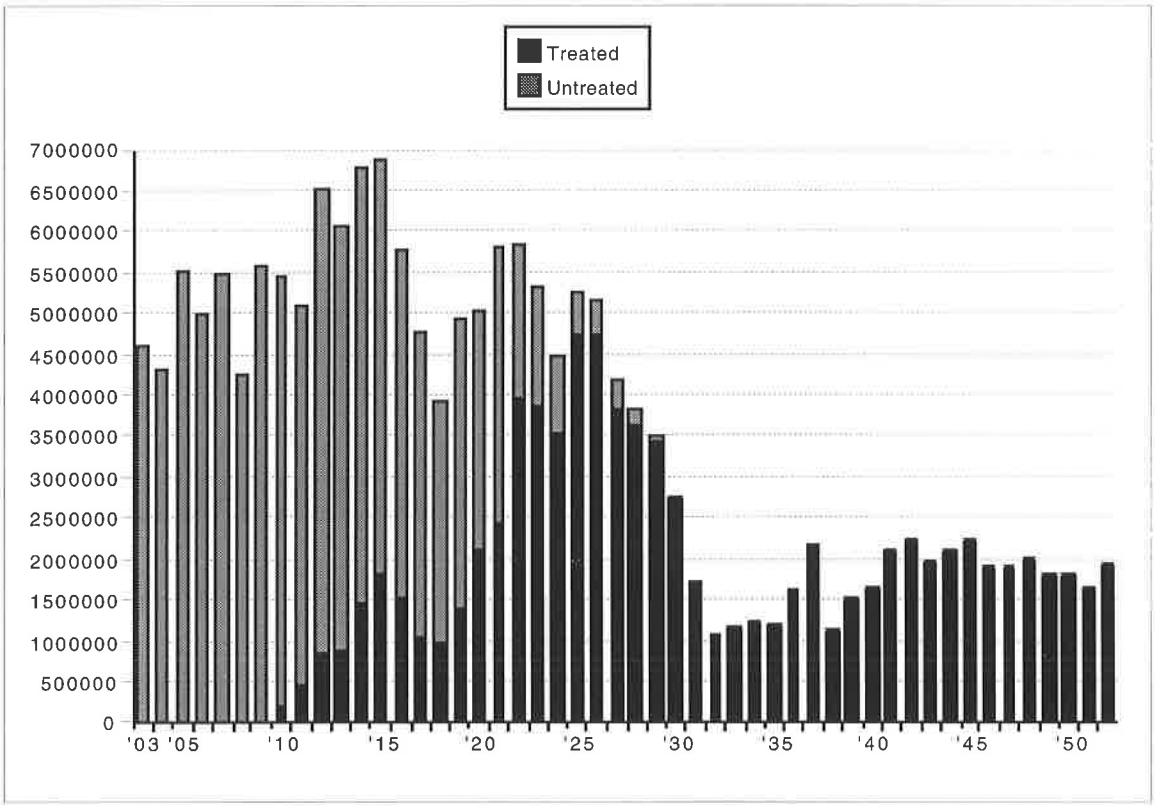
There is also an aluminum Hubbard "X" #435 shown in [DNC].

See Akron, Canton & Youngstown for a code (CL) 8 which was found in a tie at the PRR/AC&Y interchange.

In New York State, and probably other places in the east, about half the time nails from the 40's to the 60's are found in the bottom of the tie. If a tie has a nail at all, it was driven at the treatment plant, and the section crew paid no attention to the nails. There are exceptions to this, like the miles of rnd R (09) 56's found between Seneca Castle and Newark, NY.

Bill Kerns has found some strange nails in Maryland. He pulled rnd R (11) 28-32 on main track and on branch lines. The nails are found centered in the tie, the same position used by the DL&W and PRR. They are not found near curves, bridges, or grade crossings. He has also pulled rnd R (05) 48, rnd R (07) 51, 52, and rnd R (??) 41, 42, 45, 47, 49, and 50.

Ties used in renewals



Treated ties were first used in 1909, when 554 were laid. Given the number of $\frac{\text{R}}{09}$'s which have been found, this number seems extremely low. Maybe many of these nails are from untreated ties. 1942 was the last year for untreated ties. ['54, 234]

(continued)

"I have also located a number of copper disks. They are about as round as a quarter, with a cast shank 1 inch long. Each has an indent number 0, 1/4, 1/2, 3/4. They are only found in main, straight track." Jerry Penry explains that these "are probably milepost indicators since most railroads marked every 1/4 mile either with a sign or with a band on the pole. The C&NW starts out with the milepost sign, then one band around the pole at 1/4 mile, then two bands on the pole at 1/2 mile, and three bands at the 3/4 mile mark. The UP has this or has signs showing 1/4, 1/2, and 3/4 along the side of the track."

The code rnd R copper 9 may be a 6, and was unique as of 1978. It was found in Pennsylvania. The rnd R 1 and 3 were pulled by Earl Litell and John Stalder. [Wiswell 78]

An illustration of the brands (stamps) used by the PRR is shown in [W-P Apr-Jun '15, 27]. The species of wood and grade are indicated, along with whether or not the tie is treated.

See [J-A '90, 2] for a nail article on the PRR.

Zinc-tannin tests, 1891-1903. (See also the table in [AREA '02, 97].)

- Pittsburgh, PA, 1891.
  On the Fort Wayne and Pittsburgh 200 tamarack ties were laid. ['16, 300, 328]['20, 106, 129]
- ?, 1896.
  63,187 ties of various species. The total might include ties from other years. [AREA '09, 618]
- Indiana, 1897.
  7,631 hemlock ties. ['23,160]['26, 214]
- South Chicago & Southern, 1897.
  The SC&S was owned by the PRR, and was merged in 1921. In 1897 1,287 hemlock ties were laid here. ['16, 300]['20, 107][AREA '09, 469]
- 1897.
  126,973 ties of various species. The total may reflect several years of zinc tannin ties, not just those put in in 1897. [AREA '09, 619]['16, 329]
- Indiana, 1899-1903.
  67,372 beech ties. ['26, 214]
- Illinois, 1899-1903.
  18,287 beech ties. ['23, 160]['26, 214]

Wood tar creosote (woodiline) open tank tests, mainly 1892-1898

The sites probably represent divisions, not exact locations.

- Williamsport, PA, 1889.
  1 pitch pine tie. ['16, 322]['20, 123]
- New York & Philadelphia, 1892-1898. ['15, table]['16, 309, 312, 313]['20, 114, 119]['22, 111, 112] ['23, 163, 164]

1892	104 white oak. These were treated October, 1892 and were laid at Beverly, NJ. [RR 9-12-96, 510]
1894	2 white oak, dipped.
1895	500 red oak, dipped.
	70 white oak, dipped cold.
1896/7	348 white oak, dipped hot.
1897/8	475 white oak, dipped.

- Altoona, PA, 1894.
  2 chestnut ties, dipped 1 hour. ['16, 289]['20, 97]
  2 white oak ties, dipped. ['20, 124]
  1 chestnut oak tie. ['16, 306]['20, 111]
- Newark, DE, 1894.
  32 chestnut ties. ['16, 289]['20, 97]

(continued)

- Camden & Trenton, 1894-1897. ['16, 313]['20, 119]['22, 112]['23, 164]
  1894/5 551 white oak, brushed.
  1896/7 600 white oak ties, dipped hot.
  1897 86 white oak ties, dipped hot.
- Harrisburg & Williamsport, 1895.
  250 red oak ties. ['16, 309]['20, 114]['22, 111]['23, 163]
- Camden, NJ, 1895-1896. ['15, table]['16, 309]['20, 114]['22, 111-112]['23, 163-164]
  1895 180 red oak ties.
  1896 3,798 red oak, dipped.
- Baltimore, MD, 1896-1898. ['15, table]['16, 309, 313, 324]['20, 114, 119, 120]['22, 111, 112]['23, 163, 164]
  1896 98 red oak ties.
  1897 96 Georgia yellow pine ties.
  590 white oak, brushed.
  1897/8 1,138 white oak ties, brushed.
  1898 304 white oak ties, brushed.
  42 Georgia yellow pine, brushed.
  72 white oak, brushed.

Zinc chloride tests, 1892-1902

Most tests were conducted 1896-1902.

- Western division, 1896-1902. ['15, table]['16, 288, 299, 300, 310]['20, 95, 105, 106, 116]['22, 109-111] ['23, 161, 164, 165][AREA '09, 469]
  For some of these tests, Pittsburgh Division is named.
  1896/7 11,393 hemlock ties.
  1897 5,909 hemlock ties.
  1897 135 red oak ties.
  1898 713+438 hemlock ties.
  1899 2,048 hemlock ties.
  1900 521 hemlock ties.
  1901 9,937 beech ties.
  5,309 red oak ties.
  1902 13,835 beech.
- Chicago division, 1896-1899. ['16, 300]['20, 105, 106]['22, 110]['23, 165][AREA '09, 469]
  1896 688 hemlock ties.
  1897 3,499 hemlock ties.
  1898 275 hemlock ties.
  1899 1,000 hemlock ties.
- Indiana (probably western division), 1892-1901. ['23, 160]['26, 214]
  1892 14,875 hemlock ties.
  1892 200 tamarack ties.
  1897 5,444 red oak ties. (['26] says 1901.)
  1901 23,772 beech ties. These are the same as the 9,937 ties from 1901 plus the 13,835 ties from 1902 listed above under Western division.

Untreated ties, 1897-1909.

- Pennsylvania, 1897.
  5,760 chestnut ties. ['20, 97]
- Pennsylvania, 1903.
  2,816 chestnut ties. ['20, 97]
- Urbana, OH, 1907.
  122 catalpa ties. ['17,108]['20, 96]

(continued)

- Ohio, 1907.
  45,500 white oak ties. ['23, 160]['26, 214]
- St. Paris, OH, 1909.
  495 catalpa ties. ['17, 108]['20, 96]['23, 160]['26, 214] The latter two sources combine the Urbana and St. Paris tests.

Pre-1911 individual tests.

- Hanna and Kosciusko, IN, 1892.
  At Hanna, 200 zinc-tannin hemlock and 200 untreated white oak ties in rock ballast.
  At Kosciusko, 200 zinc-tannin tamarack and 200 untreated white oak ties in gravel ballast.
  The hemlock and tamarack ties were treated by the Chicago Tie Preserving Co. [AREA '02, 97] [AREA '05, 768][RA 2-3-05, 151][RA 3-24-05, 496-497]
- Coal tar creosote, creo-resinate process, 1901.
  Pittsburgh, PA, 250 southern yellow pine ties.
  Altoona, PA, 500 southern yellow pine ties.
  Seaside, NJ, 250 southern yellow pine ties.
  Jamesburg, NJ, 250 southern yellow pine ties. ['15, table]['22, 113]['23, 162]
- Philadelphia & Chester, 1902.
  18 gum, 18 pin oak, 18 bull pine, and 17 poplar ties treated with wood tar creosote. ['16, 296, 307, 319, 325]['20, 103, 111, 123, 127]
- Western division, 1905.
  16 creosoted beech, and 9 creosoted red oak. At least the red oak were treated by the Rueping process. ['20, 95, 112]
- Scio, OH, 1907.
  On the eastbound track between mileposts 76 and 78 west of Scio, OH, the following were laid:
  3,789 creosoted red oak,
  2,497 creosoted short leaf pine, and
  1,900 untreated white oak ties.
  Each treated tie bore three nails. The red oak ties had

2 1/2 × 1/4	rnd I	stl (01)	07
2 1/2 × 1/4	rnd I	stl (07)	CR,RO

  while the pine ties bore

2 1/2 × 1/4	rnd I	stl (01)	07
2 1/2 × 1/4	rnd I	stl (07)	CR,SL

  CR stood for "creosoted" (Rueping process). The RO, because of its early date, may not be the same style as the BR&P RO. It is unusual for an article on a test section to give the dimensions and manufacturers of the nails used, but in this case the article names the American Steel & Wire Co. and the C.C. & E.P. Townsend Co. Screw spikes were used in this test and proved unsatisfactory. I walked this stretch of track in 1985 and found nothing. [AREA '14, 291]['16, 307, 323] ['17, 176, 184, 202]['20, 112, 114, 124]['22, 111]['23, 160, 163]['26, 214]
- Wooster, OH, 1910.
  3,850 mixed oak, and 2,743 loblolly pine ties, creosoted full-cell. The ties received between 7 and 11 lb/ft^3. Screw and cut spikes were used. [AREA '12, Appendix B]['16, 306, 320]['17, 166, 190] ['20, 110, 111]['22, 112]['23, 164]

(continued)

...**Pennsylvania**

1910-1917 tests.

- Western division, 1913-1917.

	Untreated	$ZnCl_2$	Creosote
1913	14,034 white oak ['20, 119]	441 red oak ['20, 116]['23, 160]	534 beech ['23, 160]
1914	14,306 white oak ['20, 118]	411 red oak ['20, 116]	357 red oak ['20, 112]
1915	3,563 white oak ['20, 118]	50 red oak ['20, 116]	517 red oak ['20, 112]
1916	3,235 white oak ['20, 118]	1,736 red oak ['20, 116]	
1917	2,695 white oak ['20, 118]	113 red oak ['20, 116]	574 red oak ['20, 112]
		290 beech ['20, 95]	550 beech ['20, 95]

- Chicago division, 1910-1913.

	Untreated	$ZnCl_2$	Creosote
1910		21,640 red oak ['20, 116]	
1911		279 red oak ['20, 116]	
1912		3,615 red oak ['20, 116]	
1913		13,568 red oak ['20, 116]	

- Toledo division, 1913-1917.

	Untreated	$ZnCl_2$	Creosote
1913	7,721 white oak ['20, 118]	6,324 red oak ['20, 116]	
1914	5,155 white oak ['20, 118]	383 red oak ['20, 116]	1,339 Sou. yellow pine ['20, 125]
		114 beech ['20, 95]	
		208 chestnut ['20, 97]	
1915	795 white oak ['20, 118]	4,121 red oak ['20, 116]	637 Sou. yellow pine ['20, 125]
		239 maple ['20, 109]	
1916	3,213 white oak ['20, 118]	1,702 red oak ['20, 116]	
1917	2,979 white oak ['20, 119]	2,979 red oak ['20, 116]	

- Zanesville, OH division, 1914-1917.

	Untreated	$ZnCl_2$	Creosote
1914	2,244 red oak ['20, 114]	1,572 red oak ['20, 116]	
1915	1,630 red oak ['20, 114]	1,914 red oak ['20, 116]	
1916	1,543 red oak ['20, 114]	1,549 red oak ['20, 116]	
1917	3,218 red oak ['20, 114]	647 red oak ['20, 116]	

- Cleveland division, 1910-1913.

	Untreated	$ZnCl_2$	Creosote
1910		35,965 red oak ['20, 116]	
1911		58,688 red oak ['20, 116]	
1912		64,592 red oak ['20, 116]	
1913		33,211 red oak ['20, 116]	

- Eastern division, 1911-1917.

	Untreated	$ZnCl_2$	Creosote
1911		2,969 Sou. yellow pine ['20, 125]	
1913	19,450 white oak ['20, 118]		7,862 beech ['20, 95]
			1,024 maple ['20, 108]
			1,077 red oak ['20, 112]
			1,239 Sou. yellow pine ['20, 125]
1914	36,540 white oak ['20, 118]		5,270 beech ['20, 94]
			613 maple ['20, 108]
			5,120 red oak ['20, 112]
			1,763 Sou. yellow pine ['20, 125]

(continued)

1915	17,949 white oak ['20, 118]	2,940 beech ['20, 94]
		622 maple ['20, 109]
		2,590 red oak ['20, 112]
1916	26,117 white oak ['20, 118]	497 beech ['20, 94]
		12 maple ['20, 109]
		3,860 red oak ['20, 112]
1917	7,340 white oak ['20, 118]	2,511 beech ['20, 94]
		900 maple ['20, 109]
		8,404 red oak ['20, 112]

The 1919 tests.

I have no more information on these tests than what is written above. On several divisions test sections of 1,000 ties each were installed beginning 1919. Date nails were used in these test ties. [AREA '26, 975]

Peoria & Eastern

The P&E was part of the Big Four and did not use their own nails.

Peoria & Pekin Union

2 1/2 × 1/4	rnd I	stl (07)	25-29
2 1/2 × 1/4	rnd I	stl (03)	30,30:b,31,31:b,32
2 1/2 × 1/4	rnd R	stl (09)	33,34,34:b,35-42,47-51,53-65,67

The P&PU is a switching railroad in Illinois.

The 53 in [Lewis, 108] is not like any in DNC. Lewis' nail may be wrong.

Pere Marquette

2 1/2 × 1/4	rnd R	stl (05)	43,44:b,45,46
2 1/2 × 1/4	rnd R	stl (17)	47
2 1/2 × 1/4	rnd R	stl (06)	48

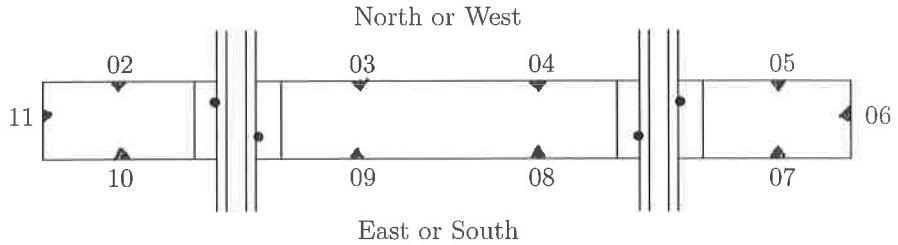
And aluminum date tags 25, 26, 28-43, 47-53 (see below)

The PM was merged into the Chesapeake & Ohio on June 6, 1947. The C&O had controlled the line for many years.

F. H. Alfred of the Pere Marquette wrote in 1903 "I do not fully concur with the plan [of using date nails] for the following reasons: First, it is not desirable to place a record on the track ties which can be read by the public; second, the cost of nails, while but a small detail, would amount to a considerable sum on a system putting in from half a million to a million ties per annum; third, the notch is more easily read by those having the key.

"Previous to this year there was no systematic attempt made to keep a record of this kind, but all ties put in during 1902 have been notched as shown on the accompanying sketch; ties put in hereafter will be marked as shown in the sketch...

"The notching is done by the section foreman..."



[AREA '04, 102][DNC, 10-11].

(continued)

These notches were not cut in treated ties. As of 1908 the PM had no treated ties in its tracks. [AREA '08, 700]

In 1922 the railroad had treating inspectors in Joppa, IL and Metropolis, IL. At Joppa the Indiana Tie Co. constructed a plant in 1909. It went into operation in 1910, and originally Burnettized ties. In 1913 they began to treat ties also with creosote. Between 1930 and 1934 the plant was abandoned (it disappears from the lists). By 1940 it was operated by the Republic Creosoting Co., which may have purchased it in 1939 when a second retort was added. The plant was abandoned between 1944 and 1952. ['10, 139]['13, 455]['24, 337]['40, 451]['44, 432]

The Metropolis plant was built by Joyce-Watkins in 1913 with one retort. This company was also known as the Watkins Creosoting Co. A second retort was added in 1921. Between 1934 and 1940 it was acquired by the Wyoming Tie & Timber Co. ['15, 466]['18, 246]['34, 472]['40, 453]

Note that all PM nails were also used by the Wabash. Are they from second hand ties? The 47 is also listed under Manistee & Northeastern.

Both Jerry Penry and Ray Canole have acquired from Russ Olsen some round aluminum date tags found on this railroad, and others were pulled by the father of railroadiana dealer Edgar Struble. They are 1 1/8" in diameter, and were secured by a galvanized nail 7/8" long resembling a small roofing nail. Each tag has a factory stamped, raised, two-digit number which represents the year. 25, 26, 28-43, 47-53 are known. At least seven 38's are known, and there are multiples of many others. The number style is very much like the 2 1/2 × 1/4 rnd I alm (61) 65-69 shown on page 68 of Volume III. The tags are about .0665" in thickness, and they have a 1/4" hole for the nail below the date. [Winter 2001, 10] [Winter 2002, 5]

Phelps Dodge

2	× 1/4	rnd I	stl	(18C)	49,50	
Code nails						
2	× 1/4	rnd I	stl	(18C)	1-12	(Set #47)

Many of these nails were found around the track operated by Phelps Dodge at their copper mine in Ajo, AZ. [Winter 2003, 4-5]

Philadelphia & Reading

See Reading.

Philadelphia Suburban Transportation

2 1/2	× 1/4	sqr I	stl	(05)	50
1 1/2	× 1/4	rnd R	stl	(07)	57,59
2	× 1/4	rnd R	stl	(07)	61
2	× 1/4	rnd I	stl	(07)	64
1 1/2	× 1/4	rnd I	alm	(61)	70
2	× 1/4	rnd R	stl	(06)	72

Also known as the Red Arrow Line, this electric interurban is now owned by SEPTA.

Picatinny Arsenal

This railroad was operated by the army base of the same name.

Test section

- Dover, NJ, 1910.

The following ties, treated full cell with low pressure, were installed.

278 fuel oil treated chestnut. ['16, 289]['17, 112]['20, 97]
331 fuel oil treated red oak. ['16, 308]['17, 178]['20, 114]
32 creosoted chestnut. ['16, 289]['20, 97]
65 creosoted red oak. ['16, 307]['20, 112]

Piedmont & Northern

2 1/2 × 1/4	rnd R		stl	(17)	37-39
2 × 1/4	rnd R		stl	(19)	39,41,42
2 1/2 × 1/4	rnd R		stl	(19)	46

This North & South Carolina electric railroad was reclassified as steam in January, 1956, and became part of SCL on July 1, 1969.

The (17) nails might really be (19). Also one collector has a (19) 36 in the set. Can anyone help straighten this out? [Summer 2002, 8]

Pittsburgh & Lake Erie

1 1/2 × 3/16	rnd I	gm	cop	(07)	11,12,15,16
1 1/2 × 3/16	rnd I	gm	cop	( )	13,14
2 1/2 × 1/4	rnd I		stl	(07)	23,24
2 1/2 × 1/4	rnd R		mi	(11)	25,28-31
2 1/2 × 1/4	sqr I		stl	(05)	26
2 1/2 × 1/4	sqr R		stl	(07)	27

The P&LE was owned by the Lake Shore & Michigan Southern / NYC / PC until 1976.

Edwin F. Wendt of the P&LE spoke at the 1905 AREA meeting:

> We began to mark all ties placed in the track in the year 1899, and it is probable that the form referred to may be changed somewhat after the system for marking ties has been in effect long enough to mark all ties in all tracks. We mark every tie whether in main or side tracks.
>
> Regarding the specifications for tie dating nails, page 73, Bulletin 60, the Pittsburgh & Lake Erie Railroad used galvanized steel nails in 1899, 1900, 1901 and 1902. The nails used in the first three years were manufactured with raised figures and the nails used in 1902 had depressed or sunken figures. We found that the raised figures became almost obliterated where the nails were in ties located in tracks in the Pittsburgh yard, and in order that we would not lose the benefit of accurate records of the life of ties, copper nails were purchased in 1903, 1904 and 1905. [AREA '05, 779][DNC, 20]

Another article gives the location of the 99's as "Pittsburg Terminal yard at McKees Rocks." [AREA '05, 767][RA 3-24-05, 496][RG 3-24-05, 281]

The railroad had a treating inspector in Adelaide, PA in 1915, one in Broadford Jct., PA in 1922 and in Dickerson Run, PA 1923-24. Adelaide and Dickerson Run are very close to Broadford Jct. The Pittsburg Wood Preserving Co. built a one retort plant in Broadford Jct. in 1911, treating wood by various methods. In 1913 the Rueping and Card processes were in use in addition to straight $ZnCl_2$, and by 1915 only creosote was listed, with ties treated by the Rueping process. The plant became Koppers' first between 1930 and 1934, and was still operating in 1952. ['12, 286]['13, 448-449]['15, 21, 471]['34, 474]['52, 397]

(continued)

Copper dates 7 and 9 have also been found on the P&LE. See [M-J '79, 2]. The 11-16 have the cup-shaped heads like Long Island RR nails.

Pittsburgh & West Virginia

2 1/2 × 1/4	sqr I	stl (05)	25,28,30,31
2 1/2 × 1/4	sqr I	stl (07)	29
2 1/2 × 1/4	rnd I	stl (07)	30,31
2 1/2 × 1/4	rnd R	stl (07)	44

The P&WV was leased by the N&W October 16, 1964.

Pittsburg, Shawmut & Northern

2 1/2 × 1/4	rnd I	cop (60)	29
2 1/2 × 1/4	rnd I	stl (07)	30:c,31-34,34:b

The PS&N was dismantled in 1947, its last run being April 1 that year. The Pittsburg & Shawmut was created out of part of the PS&N in Pennsylvania and still operates.

The 34:b has smaller numbers than 34:a.

Test sections

- Pennsylvaniua, 1902. [RAG 3-12-11, 638]
  20,219 untreated yellow pine and white oak ties. ['16, 312]['17, 186]['20, 119]
- New York, 1902.
  65,725 untreated yellow pine and white oak ties. ['16, 312]['17, 186]['20, 119]['22, 112]['23, 164]
- New York, 1909.
  32,256 untreated yellow pine and white oak ties. ['16, 312]['17, 212]['20, 126]

Nails have been found only in the north end of the line, and there only sporadically. Nails are found between the rails, closer (sometimes much closer) to one rail. Only one 34:a has been found.

Second hand ties with PS&N nails have turned up on the Interstate, the Jamestown, Westfield & Northwestern, the Lowville & Beaver River, the Minneapolis & St. Louis, and the Unadilla Valley. See [M-J '89, 9].

Russ Hallock pulled one each rnd I (07) 28, 29, 31, and 37 in Swain, NY where the PS&N crossed over the Erie. Except possibly the 31, they seem to be from second hand Erie ties, but they may turn out to be from the PS&N.

Port Huron & Detroit

2 1/2 × 1/4	rnd R	stl (07)	27-29
2 1/2 × 1/4	rnd R	stl (03)	30-32
Possibly from second hand ties			
1 1/4 × 3/16	rnd R gm	cop (60)	34:b,35,35:c,36:b,37,38:b,39

Larry Akers claims that the copper nails were driven at the treating plant, but there is still the possibility that they are from second hand Milwaukee Road ties. Where in the ties were they found?

Port Townsend

2 1/2 × 1/4	sqr I	stl (05)	51

This railroad became part of the Milwaukee Road in 1975. It operated 12 miles of track between Discovery Jct. and Port Townsend, WA.

John Iacovino found six 51's. Four were found in the same tie. The nails were found between the rails.

Prattsburgh

From second hand ties

2 1/2 × 1/4	rnd R	mi	(11)	15,18,22-24
2 1/2 × 1/4	rnd I	stl	(07)	20,24,27-29,30:b,31,31:b
2 1/2 × 1/4	rnd R	stl	(07)	29:b,31
2 1/2 × 1/4	rnd I	stl	(05)	36:b

In April, 1917 the Kanona & Prattsburgh, an 11.4 mile line in upstate NY, became the Prattsburgh RR. It was abandoned in 1961.

The second hand nails mainly come from the DL&W and Erie.

Prescott & Northwestern

2 × 1/4	rnd R	stl	(07)	$\frac{K}{40}, \frac{K}{41}$
2 1/2 × 1/4	rnd R	stl	(06)	$\frac{K}{42}, \frac{K}{43}$
2 1/2 × 1/4	rnd R	stl	(07)	$\frac{K}{44}, \frac{K}{45}, \frac{K}{47}$
2 1/2 × 1/4	rnd R	stl	(07)	46
2 1/2 × 1/4	rnd I	stl	(06)	46,48-50,52,53,60
2 × 3/16	rnd I	alm	(61)	54,55
2 1/2 × 1/4	sqr R	stl	(05)	56,57,59
2 1/2 × 1/4	rnd R	stl	(05)	58
2 1/2 × 1/4	rnd R	stl	(17)	61,62
2 1/2 × 1/4	rnd I	stl	(05)	63
2 1/2 × 1/4	rnd R	stl	(09)	65

The P&NW operates over 30 miles of track in Arkansas, and connects with the Missouri Pacific.

The "K" nails were probably not inserted by the treatment company. See FJ&G. Often two or three identical "K" nails are found in a single tie. Joe Lewis wrote "These nails are often found in multiples in the same tie, indicating an addition year for each extra nail. Example—Three 41's indicate 1943." [Lewis I, 55] I do not know if this explanation is just a theory, or if Joe found out through a source within the railroad.

Public Service Railway Company of New Jersey

1 3/4 × 5/16	rnd I	stl	(01)	11-15
1 3/4 × 5/16	rnd I	stl	(05)	16,17
2 1/2 × 1/4	sqr I	stl	(07)	18

This electric interurban line was the first railroad to test ties treated with water gas tar, in 1911. "The Public Service Company [began] using straight water-gas tar oil in treating a majority of their ties, beginning in 1911. For the first year their ties were treated by a commercial plant, but since that date some of them have been treated at the plant of the United Gas Improvement Company, Philadelphia, PA." [AREA '17, 1271]

"The treatment received by all these ties was a full-cell treatment of ten pounds per cubic foot." "Each tie has a dating nail showing the year of treatment." [AREA '17, 1274-1277] There are photos of sections of two ties in [AREA '17] which clearly show date nails. One is a stubby 11, and the other is an 11, certainly also a stubby. It is the information in this article, plus the photos, which allow us to conclude that the Public Service Co. is the railroad which used the nails in the stubby shadow set (see page 349 of this volume).

As of 1921 they had inserted about 500,000 ties treated this way. They had records for 24,000 from 1911 through 1914. ['21, 118-119]

See my article in [Spring 2000, 13-15] where I link the nails to the railroad.

Rahway Valley

2 1/2 × 1/4	sqr I	stl (07)	30
2 1/2 × 1/4	rnd R	stl (01)	31
2 1/2 × 1/4	sqr R	stl (07)	31-36,36:b,36:c,37-40:b,41
2 1/2 × 1/4	rnd R	stl (07)	35:b

From second hand ties

1 3/4 × 5/16	rnd I	stl (01)	11,13
2 1/2 × 1/4	rnd I	stl (07)	26,32,36-40,43,44,50
2 1/2 × 1/4	rnd R	stl (01)	27
2 1/2 × 1/4	rnd R	stl (07)	28,30,32-35,47
2 1/2 × 1/4	rnd I	stl (21)	40,41

Code nails from second hand ties

2 1/2 × 1/4 rnd I
M Maple stl (07) #5

The RV was a 10 mile short line in New Jersey.

Probably all nails except some 36's (36:b & 36:c) were placed between the rails. 36:b and 36:c are generally found outside the rail.

The sqr R 38-41 and the (01) 31 are rare on this line. [Wiswell 77]

Most nails from second hand ties are found in the track, the tie having been re-inserted face up.

Sources for second hand nails

Buffalo, Rochester & Pittsburgh

2 1/2 × 1/4 rnd I
M Maple stl (07) #5

The tie from which this nail was pulled may have made its way to the RV from the BR&P treatment plant without ever having been used on the BR&P. No date nail was found with it.

Lehigh Valley

2 1/2 × 1/4 rnd I stl (21) 40,41

Rutland

2 1/2 × 1/4 rnd R stl (01) 27

Many of the rnd I and rnd R nails may be Erie or L&HR.

Shadow sets

Stubby shadow set

1 3/4 × 5/16 rnd I stl (01) 11,13

Reading

Code nails

2 1/2 × 1/4 rnd R mi (11) B,F,H,O,P,R,T,W

The Reading RR was formed in January, 1924 when the Philadelphia & Reading formally absorbed several subsidary lines, among them the People's RR and the Rupert & Bloomsburg. In January, 1929 other subsidary lines were absorbed, including the Philadelphia, Newton & New York, the Pickering Valley, the Philadelphia & Chester Valley, and the Reading & Columbia. The Atlantic City became formally a part of the Reading in July, 1933.

They tested some Kyanized pine bridge timbers in 1850. [HWP, 7]

Philadelphia & Reading test sections

- ?, 1851.

  Some mercuric chloride treated ties were laid. The test was unsuccessful. [AREA '09, 618] ['16, 328]

(continued)

- ?, 1852.
  Some tar treated ties were laid. They suffered for dry rot. [AREA '09, 618]['16, 329]
- ?, 1854.
  About 70,000 ties treated with coal tar (no pressure) were laid. The test was a failure. [ASCE 7-85, 267-268][HWP, 7]
- ?, 1867.
  305,107 ties treated with $ZnCl_2$ were laid. The solution was too strong, making the ties brittle. The ties were treated at the railroad's works at Pottstown, PA. [ASCE 7-85, 258, 262] [AREA '09, 618]['13, 196]['16, 329][HWP, 8]
- Bound Brook, NJ, 1878.
  10,000 pine ties creosoted by the Hayford process were laid. [ASCE 7-85, 268, 276]['16, 324] ['20, 126]
- Pennsylvania, 1897.
  5,760 untreated chestnut, oak and yellow pine ties. ['16, 289]
- Pennsylvania, 1901.
  16,915 untreated white oak ties. ['16, 312]['20, 119]
  21,805 untreated white oak and yellow pine ties. ['16, 324]['20, 126]
- Pennsylvania, 1903.
  2,816 untreated chestnut ties. ['16, 289]

The Philadelphia & Reading Caol and Iron Co. erected a non-pressure plant at New Philadelphia (Pottstown), PA in 1908. This plant treated timbers, not ties. [AREA '10, 762]['10, 139]

In 1912 the Philadelphia & Reading and the Central Railroad of New Jersey built a two retort treating plant at Port Reading, NJ which creosoted ties by the Bethell process. ['13, 448][RAG 7-19-12, 115] Ties were adzed and stamped before treatment, the stamps indicating the ownership and weight of rail. ['14, 406] The plant was operating as of 1952, still jointly run by the Reading and the CRR of NJ. ['52, 399]

C. M. Taylor, superintendent of the treating plant, said in 1925 "The Baltimore & Ohio owed us some ties under Federal control and they shipped us some fir ties. We are very glad we got them because really I think they are turning out better than our old "heart" pines did. We have put a lot of those fir ties in test tracks..." ['25, 173] Those test tracks were on either the Reading or the CRRNJ.

The code nails were driven two to a tie in test sections in Pennsylvania and Tuckahoe, NJ (on the Atlantic City RR). [Lewis, 114] says they were installed 1920-1925. The T was found on the Atlantic City, and the W was not found in Tuckahoe. [M-J '79, 1][Wiswell 78]

John Evans recalls the location of code nails in PA as being on a line about 40 miles north of Maryland, possibly south of Manheim, PA. The nails were in a track near a big plant (steel?).

There exists a (11) D, which may be a Reading nail. Also, there may only be one T known.

Richmond, Fredericksburg & Potomac

2 1/2 × 1/4	rnd R	stl	(07)	36-40,40:b,41-47,49-66
2 1/2 × 1/4+	rnd R	stl	(19)	67
2 1/2 × 1/4	rnd R	stl	(06)	68:b
From second hand ties				
2 1/2 × 1/4	rnd R	stl	(19)	46
2 1/2 × 1/4	cut R	stl	(05)	49,51,52
2 1/2 × 1/4	rnd R	stl	(09)	51,53
2 1/2 × 1/4	rnd R	stl	(05)	52

This heavily used, heavily posted line is difficult to nail. The RF&P did not use nails in sidings or yards, making it difficult to locate nails as recent as the 40's.

Nails through 1954 are found in the tops of ties, between the rails, closer to the west rail. Nails from 1955 up were driven into the side of the tie between the rails. See Dave Parmalee's article in [J-F '82, 1], reprinted [M-A '88, 9].

(continued)

The second hand cut nails are from the N&W, and the rnd R (09) and (05) nails are from the Virginian. See Jim Cullen's article in [J-A '90, 9].

The 1/4+" 67 is about .262" under the galvanizing, and about .272" with galvanizing. This matches well No. 2 gauge wire, which is .2625".

Nail hunt: [M-J '79, 1].

Rio Grande, Sierra Madre & Pacific

This Mexican railroad ran southwest from the border at El Paso, TX. In a December 17, 1902 letter to E. B. Cushing, Octave Chanute listed the Rio Grande, Sierra Madre & Pacific among those railroads using date nails. The only treating plant in Mexico at the time was the Mexican Central's 1901 plant, far south in Aguas Calientes. The RGSM&P might have purchased treated ties there, or from a U.S. plant, if the dated ties were treated at all. [Spring 2002, 1-4]

Rochester, Syracuse & Eastern

This electric railroad served upstate New York, and is a likely source for the stubby shadow set.

Construction was finished in 1906, and the line was torn out in 1931. "Originally the crossties were untreated long-leaf yellow pine." [RS&E,12]

"For many years, the RS&E maintenance standards were on a par with those of first class steam roads." "For some years the Company's tie replacement program included a generous portion of creosoted ties since their life was considered to be much longer than the untreated ones. Later on, most replacements were made of the latter variety so that by 1931, only a quarter of the ties in the track were treated." [RS&E, 20]

"Approximately 15,000 creosoted ties have already been installed and about 50 per cent of the replacements are of this type. The ties are of long-leaf yellow pine, sound and square-edge quality, impregnated to the heart with creosote oil of the best quality and at the rate of 10 lb. per cu. ft." The ties were cut in Georgia and Florida, so a southern treatment plant likely creosoted the ties. [ERJ 7-21-13, 70]

Rock Island Lines (Chicago, Rock Island & Pacific)

2 1/2 × 1/4	rnd R	stl	(07)	05,07-25,26:e,27-30
2 1/2 × 1/4	rnd I	stl	(07)	06-08,08:b,09,09:b,09:c,10,10:b,10:c,10:e,11-16, 17:b,18-24
2 1/2 × 1/4	dia I	stl	(07)	08:b,08:c,09,10:b,10:c
2 1/2 × 1/4	sqr I	stl	(07)	10-13
2 1/2 × 1/4	dia R rs	stl	(07)	10,12,14-21
2 1/2 × 1/4	sqr R	stl	(07)	10,12-20
2 1/2 × 1/4	dia R	stl	(07)	13
2 1/2 × 1/4	rnd R	stl	(06)	31-49,50:b,51:b,52-56,56:b,57-62
2 1/2 × 1/4	rnd R	stl	(17)	43
2 1/2 × 1/4	rnd R	stl	(09)	47,47:b
2 1/2 × 1/4	rnd I	stl	(06)	63,64
Code nails				
2 1/2 × 1/4	rnd R	stl	(18C)	R #5
Burlington, Cedar Rapids & Northern				
1 1/2 × 1/4-	rnd I	stl	(07)	4-7

See [Jan '87, 2-8] and [M-J '87, 4] for a Rock Island history. This is mostly reprinted from the history which appeared in the [J-A '81] through [J-F '82] issues.

Early treatment

The Rock Island's first experience with wood preservation was in 1860, when they built a Howe truss bridge of timbers treated with $ZnCl_2$. As of 1882, it was still sound. [ASCE 7-85, 258, 259][WPN 2-38, 18]

In 1866 they tested 2,000 Burnettized ties, and in 1872 followed the CB&Q in trying the Seeley process of creosoting, which turned out to be worthless.

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Wellhouse tie treatment, beginning 1886

"In 1886 the Chicago, Rock Island & Pacific Railway contracted with Card & Chanute, (since organized as the Chicago Tie Preserving Company,) to erect works at Chicago and to treat 100,000 to 200,000 ties annually for five years. At the end of that time the contract was extended for three years, and the quantity increased to 300,000 ties a year. Upon its expiration this contract was renewed for ten years more for an output of 400,000 to 500,000 annually, to be treated by the zinc-tannin process." [WSE 4-00, 102] The ties were primarily hemlock, and also some tamarack.

From 1886 to the termination of the final contract in 1903, the Chicago Tie Preserving Co. supplied 5,641,731 ties to the Rock Island. Up to 1896 they were treated by the standard two-step Wellhouse process, and beginning 1896 Chanute's modified three-step method was used. [WSE 4-00, 103][RG 7-31-91, 536] [AREA '05, 776][RA 2-3-05, 151]

"Another contract was made in 1900 with Edward Ayer covering treatment of 200,000 Texas pine ties per year for 10 years, using the zinc glue tannin process." The Texas Tie & Lumber Preserving Co. plant at Somerville, TX is referred to here. It was built in 1897 by Ayer & Lord, and was purchased in January, 1905 by the Santa Fe. [WPN 2-38, 19]['10, 139][S-O '96, 5] Incidentally, the people at the Somervile plant were planning on creosoting piling and bridge timbers for the Rock Island as of September, 1898 [R&ER 9-10-98, 500]

Up through 1903 the Rock Island had procured 1,948,542 Wellhouse treated ties from Somerville, TX and Carbondale, IL. The Carbondale plant was built by Ayer & Lord in 1903. Probably in 1903 the Rock Island switched to the Burnett process. ['10, 138]

Contradicting figures of tie installations are common. Here are the numbers of Samuel Rowe (from [Rowe, 186]) and Octave Chanute (letter Feb. 10, 1893).

Table of treated ties installed

	Rowe	Chanute
1886	101,164	148,823
1887	262,317	254,188
1888	196,569	209,734
1889	204,519	210,196
1890	225,974	253,267
1891	315,142	340,431
1892	310,613	325,736
1893	305,267	
1894	320,314	
1895	142,961	
1896	83,639	
1897	100,583	
1898	55,164	
1899	168,474	
1900	163,172	
1901	215,989	

Record keeping 1886-1907

In a 1902 letter Octave Chanute wrote that in 1889 and 1893 he endeavored to get the Rock Island to begin using date nails, but the railroad balked at the expense. [Spring 2002, 1] In 1895 the treating company began stamping the date of treatment into Rock Island ties. [RG 3-21-02, 203] But record keeping was soon to become a big problem. Chanute wrote in 1905

> At first [beginning 1886] the records were started all right. Each roadmaster was furnished with a record book in which he was instructed to enter each lot of ties received, on what section laid and when removed. This was done for four years, but when 6 or 8 years had passed and the ties began to come out there was trouble. Some of the roadmasters had been changed, some section foremen had gone, and even the limits of some of the sections had been changed. Presently the records were found in such utter confusion that a circular was issued to each section foreman asking him what his opinion was as to the life of the treated ties in the track. The answers made confusion worse confounded. Some foremen stated the life to be 20 years and

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> some estimated the average life at but three years, while the other opinions straggled along between these two extremes. Then, in August, 1898, the officers of the road resorted to the heroic measure of having all ties counted and inspected in the track; 12,000,000 of them. From this count it clearly appeared that the treated ties averaged a life of at least 9 years, and subsequent returns and reports have since demonstrated that this life is really 10 2/3 years. [AREA '05, 776-777]

This was the crisis which was pivotal for the introduction of date nails to U.S. railroads. In 1900 Chanute wrote from Chicago on the marking of ties

> It is not sufficient to do this with the stamping hammer. That is what we are doing at the works here, but at our new works at Mt. Vernon [C&EI] we are not only stamping the tie with a hammer, but we are furnishing at our own expense a galvanized nail for the purpose of dating the tie, in order to be dead sure to be able to identify it 10 or 15 years hence. We do that because we found that upon one of the railroads here the records as to where the ties had been laid had got into such condition that there was no telling what was the age of those in the track, and the report went out among the men that our ties were giving out in three or four years, and, at the maximum, in seven years. The question was only settled by the heroic measure of having the ties counted in the track, twelve millions of them, whereupon it appeared that the statements that had become prevalent upon the road were not correct, and that, knowing the number that had been furnished and the number that was still in the track, it was proved that they were lasting, instead of five or six or seven years, an average of nine or ten years—although that, I think, is not enough; we want to do better. So in order to preclude the possibility of any such questions coming up hereafter, we have undertaken, in new contracts, to furnish the nails at our own expense, so that there shall be no question as to the age of the ties. [RG 7-27-00, 507]

By "new contracts" he means the contract in 1899 to treat and date ties on the Chicago & Eastern Illinois. The Rock Island's last contract with Chanute's firm was made in 1894.

Three letters Chanute wrote in the early 1900's tell us that as of September, 1903 the Rock Island *still* had not begun to use date nails. the first was written December 17, 1902 to E. B. Cushing of the Southern Pacific. In it Chanute mentions that he had tried to get the Rock Island to take up nail use, and he lists the railroads he knew which were then using date nails. The Rock Island is not among them. The second letter, from May 26, 1903, is three pages long and is addressed to S. F. Forbes, Purchasing Agent of the Rock Island. In it Chanute explains the Rock Island's tie statistics, and in the end sends some sample date nails: "I hand you also a few of the marking nails which we furnish to the Chicago & Eastern Illinois Railroad. We have found this to be the best way of ensuring accurate records." The third letter, to an engineer in Jamaica, dates from September 12, 1903. This note contains another list of the railroads using date nails, and again the Rock Island is missing. Because of his close association with the Rock Island's tie treating, as well as its record keeping, we are safe in concluding that the railroad was not yet using date nails at the time the third letter was written. See [Spring 2002, 1-4] and [Fall 2002, 3-5, 18-19] for my articles on this. So Rock Island probably began using date nails in 1904 or 1905.

The Burlington, Cedar Rapids & Northern

The Rock Island acquired this 1,368-mile railroad in June, 1902. The tie requirements of this line added about 65% to the total tie consumption of the Rock Island system. Since no new tie contracts were made by the Rock Island at the time, it appears that the BCR&N maintenance structure was left in place for some time (for more details, see my article in [Fall 2002, 3-5]). Dick Kyras pulled a 1 1/2" 4 on ex-BCR&N track in Iowa. The short 4-7 are not consistent with other Rock Island nails, so it is a good guess that they should be classified as BCR&N. With the introduction of creosote and the new contracts with Lowry's company in 1907-8, tie treating and dating could be consolidated, ending the short span of the BCR&N set.

The introduction of creosote, 1907-1908

"The results obtained from these tie insertions, together with the growing information on the subject generally, resulted in the Rock Island beginning the use of creosoted ties in 1908. At that time the track consisted of zinc treated red oak, hemlock, and southern pine, untreated white cedar and white oak, and a small percentage of untreated longleaf yellow pine..." [WPN Feb '38, 19]

C. B. Lowry's American Creosoting Co. constructed two plants in 1907 for treating Rock Island ties. These were located in Kansas City, MO and Marion, IL. The railroad acquired some Lowry treated ties at

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the end in 1907, but for the most part these plants began operating in 1908. Both were still operating in 1952. [AREA '09, 619]['52, 394] Each plant was built with two retorts. Between 1924 and 1930 the Marion plant was reduced to one retort. ['24, 312]['30, 419] See Frisco lines for the tie treating relationship between Rock Island, Frisco and the C&EI at this time.

Judging by the test sections, it seems that the Kansas City and Marion plants supplied ties to lines in and north of Colorado, Kansas, and Missouri. ['11, 21][RAG 6-21-12, 1569]['23, 548]['24, 334]['34, 502]

Southern lines, in Oklahoma, Texas and Arkansas, received ties treated at Ayer & Lord's Argenta, AR plant. Built in 1907, this four-retort facility went into operation in 1908 treating ties with both creosote (Rueping process) and zinc chloride. $ZnCl_2$ was used at Argenta at least through 1915, though maybe not for Rock Island ties. ['10, 138]['13, 454]['15, 474]

In 1925 the plant was rebuilt with five retorts, and a sixth was added in 1929. In 1939 Ayer & Lord was taken over by Koppers, who was still running the plant in 1952. ['30, 419]['52, 397] The Rock Island had a treating inspector at the Argenta plant at least 1915 through 1945. ['15, 20]['22, 503]['23, 550-551]['24, 336] ['34, 501]['40, 483]['45, 290]

In [RAG 6-21-12, 1569] is an article on Rock Island tie treating with a map of the railroad which indicates which types of woods and treatments were used on which branches. For example, the line from Gowrite, IA to Watertown, SD employed untreated hardwood ties. The line from Dallas to Salina, KS consisted of treated softwood. From Peoria to Rock Island, treated and untreated hard woods were used on curves, while treated softwoods were used on tangents.

Judging from test sections, the Rock Island cut back on creosoted ties in the Southern regions, and used many zinc chloride treated ties in the period 1914-1921. Also, the railroad stopped using nails with different shaped heads in 1921, so there is good good reason to claim that they stopped experimenting with different treatments that year in favor of empty-cell creosoting.

Record keeping from 1908

Beginning with the opening of the creosoting plants in 1908, the Rock Island began using diamond-headed date nails, and square nails were introduced probably no later than 1910. The shape of the head of the nail indicated the type of treatment. This system was in effect from 1908 until at least 1921. It is difficult to determine which shape corresponded to which treatment. Probably round nails were driven into Lowry (and possibly Rueping) treated ties beginning 1908, and maybe diamond nails were used in zinc chloride treated ties. Untreated ties in the test sections would also have received date nails, and their shape is unknown, also. ['14, 405][DNC, 289]

The fact that a nail had raised or indented figures probably held some significance, such as hardwood vs. softwood, or maybe Kansas City treatment plant vs. Argenta treatment plant.

After the creosoting plants opened, the railroad continued to put date nails into all treated ties. In 1913 they decided to follow the lead of the CB&Q in abandoning the date nail and comprehensive records in favor of a few test sections. On January 1, 1914 nineteen test sections were established, and from then on dating nails were used only in these experimental stretches of track. ['14, 403][DNC, 289]

"Our experience in attempting to have all ties marked with dating nails in the field proved unsatisfactory, due to the failure on the part of the trackmen to apply dating nails." [AREA '26, 712][DNC, 332]

Rock Island nails are found outside the north rail.

dia I rs (07) 11,12 have been reported.

A sqr R (07) 10 was purchased at a yard sale by Bill Bunch, and probably belongs to the set. The existence of the sqr R 11 can then be inferred.

Curt Deason found many nails in second hand ties. These include sqr I 16, 18, 19, 22, 25, 27 and dia I 8, 9, 10 along with many nails originally from the C&NW, UP, and MoPac.

Outside of the Rock Island diesel shop in Lincoln, NE someone dumped a bunch of unused sqr I (05) T's (#11), which were picked up by Kenley German. It is not known if these were ever used, or whether they were intended for ties or poles or other timbers.

The rnd R "R" was found by Russ Hallock in the early 1980's at Blue Island, IL, near Chicago. It has also been found on Chicago Transit Authority, and may be a treatment company nail.

For the early rnd R nails, see Mel Smith's nail hunt in [M-A '86, 3] and Larry Harvey's run down in [S-O '93, 3-5]. Other nail hunts appear in [J-A '77, 2-3], [Jan '87, 11] (Eldon, MO), [S-O '87, 1], and [M-J '93, 9].

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Early test sections

- Englewood, IL, 1866. In November, 2,000 Burnettized ties were laid in the main track just west of Englewood. The woods were hemlock, pine, tamarack, and cedar. Most were hemlock. In 1882, 75% were still in use. [ASCE 7-85, 258][Trat II, 235]['13, 196]['15, table]['16, 300]['20, 105][WPN Feb '38, 18]
- Chicago, IL, 1872. 5,000 creosoted hemlock ties "were laid in the second main track just east of Washington Heights (103rd Street), Chicago." These were treated by the Seeley process, and were a failure because not enough creosote was used, and the ties were treated green. [ASCE 7-85, 268]['16, 299] ['20, 105][WPN Feb '38, 19] ([ASCE] says 1868.)
- Just west of the Missouri River, 1886. 21,850 Wellhouse treated hemlock and about 50,000 untreated white oak ties. [RG 3-29-01, 222][AREA '02, 96][RG 3-21-02, 203][RA 2-3-05, 151]['15, table] ['16, 300]['20, 106]
- Vinton, IA, 1898. 2,001 untreated cedar ties. None remained in 1917. ['17, 110]['20, 96]['22, 109]['23, 161] [DNC, 252]
- Sibley, IA, 1900. 16,197 zinc-chloride treated hemlock and 11,516 untreated cedar ties in (between?) Plessis and Sibley. None of the hemlock remained in 1923. ['17, 110, 144]['20, 96, 106][DNC, 252]

The 1914 tests

The railroad selected nineteen test sections which they began to monitor in January, 1914. Along with new insertions, ties which had been installed earlier in these areas were kept track of. Test sections began about two miles from a terminal and ran three to five miles. At least through 1914, the treatments differed between northern and southern lines, so I cover the nothern lines first. These include tests in Illinois, Iowa, Nebraska, Kansas, and Missouri. Ties placed here were treated for the most part by the Lowry process at the Kansas City plant. At least from 1908 to 1925 a 60-40 creosote-tar mixture was used. Sorces for these tests are mainly ['21, 158-164], ['26, 215-216], ['30, table], ['31, 36-39], and ['37, 186-190]. Other sources are indicated.

- Tiskilwa, IL.

		Red oak	Pine	Gum
1908	Lowry	642		80
1909	Lowry	1,529		58
1910	Lowry	3,293		
1911	Lowry	1,262	91	
1912	Lowry	211		741
1913	Lowry	61		892
1914	Lowry	1,256		1,415

- Altoona, IA.

		Red oak	Pine	Gum	Elm
1908	Lowry	477			64
1909	Lowry	1,445		63	64
1910	Lowry	594			
1911	Lowry	791		306	148
1912	Lowry	770			
1913	Lowry	728			
1914	Lowry	2,075			

Rnd I 08-14, sqr R 12-18, and dia R 12-21 have been found here.

- Princeton, MO.

		Red oak	Pine	Gum	Elm
1908	Lowry	216			
1909	Lowry	479			
1910	Lowry	1,002			
1911	Lowry	1,914		739	
1912	Lowry	331			
1913	Lowry	1,028			
1914	Lowry	632			127

(continued)

- Ely, IA.

		Red oak	Pine	Gum	Elm
1908	Lowry	1,195		391	
1909	Lowry	976	214	126	
1910	Lowry	2,355	108	159	
1911	Lowry	2,256		344	
1912	Lowry	465	345	1,238	146
1913	Lowry	1,600	80	126	
1914	Lowry	2,038			

Nails from 08 up into the 1940's were found here. These include rnd R 08, 12, and dia R 18. Between Burlington and Cedar Rapids, IA rnd R 09, 12-14 have been found. They may be from this test.

- Clarksville, IA.

		Red oak	Pine	Gum	Elm
1907	Lowry	345		99	
1908	Lowry	1,647		96	101
1909	Lowry	1,592			
1910	Lowry	1,481			
1911	Lowry		1,015		
1912	Lowry		1,045		
1913	Lowry	262	724		
1914	Lowry		635	409	

Nails from 08 up into the 1940's were found here. These include rnd I 08-10, 12.

- West Bend, IA.

		Red oak	Pine	Gum	Elm
1908	Lowry	149		887	238
1909	Lowry			539	
1910	Lowry		69	279	
1911	Lowry	89	821		
1912	Lowry		711		

		Red oak	Cedar	Tamarack	
1915	Untreated		336		['35, 113]
1918	Untreated		75	73	['30, 292]
1925	Lowry	1,042			['53, 193]

Rnd R 07 and sqr R 15 were found here. One collector reported that in northern Iowa rnd I 17, sqr R 17, and dia R 21 were found. They might be from West Bend, but it is possible they are from Clarksville.

- Fairbury, NE.

		Red oak	Pine	Gum
1908	Lowry	508		114
1909	Lowry	321		
1910	Lowry	1,749	233	
1911	Lowry	52	1,502	71
1912	Lowry		1,376	
1913	Lowry		1,074	
1914	Lowry		703	

Rnd I 11, 12 were found in fenceposts near here.

(continued)

- Goodland, KS.

		Red oak	Pine	Gum
1908	Lowry	88		
1909	Lowry	1,118	139	
1910	Lowry		737	
1911	Lowry	105	1,603	
1912	Lowry	72	536	
1913	Lowry		2,271	
1914	Lowry		2,438	357

- Eldon, MO.

		Red oak	Pine	Gum
1910	Lowry	4,200		
1911	Lowry	2,423		
1912	Lowry	2,423		
1913	Lowry	1,268		
1914	Lowry	553		429

The original test section was 6 miles long. Bill Bunch found rnd I (07) 10, 12, 13 in the track. In fence posts he got dia I 10, dia R 19, 21, sqr R 13-18, and rnd R 13-26. Mel smith found a 10-mile stretch near here full of 62's.

- East Des Moines, IA.

		Red oak	Pine	Gum	Elm
1908	Lowry			99	
1909	Lowry		390	624	188
1910	Lowry		155	331	
1911	Lowry		56		
1912	Lowry	5,526		1,263	231

- Topeka, KS.

		Red oak	Pine	Gum
1909	Lowry	1,073		
1910	Lowry	522	487	
	Rueping	1,237	501	
1911	Lowry		160	
	Rueping	864	180	
1912	Lowry		261	
1913	Lowry	676	374	545
1914	Lowry	765	602	408

- Dalhart, TX.

		Red oak	Pine	Gum
1908	Lowry		320	
1909	Lowry		165	
1910	Lowry			64
1912	Lowry		278	
	Rueping		641	
1913	Lowry		141	141
	Rueping		1,385	
1914	$ZnCl_2$		1,820	

Southern tests were conducted in Oklahoma, Arkansas, and Texas. These tests were mainly of ties treated by the Rueping process at the Argenta plant. A 70-30 creosote-tar mixture was used from at least 1910 through 1931. See also the Topeka and Dalhart tests above.

(continued)

- Ola, AR.

		Red oak	Pine	Gum	
1909	Rueping	741	1,066	82	
1910	Rueping	68	430		
1911	Rueping		5,116	65	
1912	Rueping		1,252		
1914	Rueping	266	97		
	$ZnCl_2$	50			
1917	$ZnCl_2$			135	['35, 113]
1918	$ZnCl_2$		205		['35, 113]
1929	Rueping			1,222	['53, 193]
1930	Rueping	467			['53, 193]

- Yukon, OK.

		Red oak	Pine	Gum	
1909	Rueping	672	1,622	571	
1910	Rueping		1,003		
1911	Rueping	418	1,486		
1912	Rueping	373	1,584		
1913	Rueping	462	1,868		
1914	Rueping		1,927		
	$ZnCl_2$	117			
1918	$ZnCl_2$			84	['35, 113]
1921	$ZnCl_2$		531		['35, 113]

- Haywood, OK.

		Red oak	Pine	Gum
1908	Rueping		2,459	
1909	Rueping	225	2,187	564
1910	Rueping	586	877	
1911	Rueping	270	960	
1912	Rueping		1,042	
1913	Rueping	480	950	
1914	Rueping		984	567
	$ZnCl_2$		292	

- Okarche, OK.

		Red oak	Pine	Gum
1909	Rueping		481	77
1910	Rueping		844	73
1911	Rueping	149	1,044	151
1912	Rueping		1,600	203
1913	Rueping	269	945	
1914	Rueping		708	
	$ZnCl_2$		888	

(continued)

• McLean, TX.		Red oak	Pine	Gum	White oak	
1908	Rueping		1,843	264		
1911	Rueping	545				
1912	Rueping	171				
1914	Rueping		328			
	Untreated				1,170	['35, 113]
1915	Untreated				3,167	['35, 113]
1916	Untreated				1,169	['35, 113]
1917	$ZnCl_2$			259		['35, 113]
1918	Untreated				1,616	['35, 113]

• Chico, TX.		Red oak	Pine	Gum	White oak	
1908	Rueping		845			
1909	Rueping		2,764			
1911	Rueping		2,223			
1912	Rueping		1,342			
1913	Rueping		1,431			
1914	Rueping		891			
	$ZnCl_2$		596			['35, 113]
1917	$ZnCl_2$			163		['35, 113]
1925	Rueping				87	['35, 113]
1928	Rueping	412				['53, 193]
1931	Rueping			229		['53, 193]

• Leola, AR.		Red oak	Pine	Gum
1909	Rueping		1,324	385
1910	Rueping		1,868	80
1911	Rueping		277	
1912	Rueping		1,817	
1913	Rueping		1,715	
1914	Rueping		368	382

Rockdale, Sandow & Southern

2 1/2 × 1/4 rnd R stl (17) 67,69

This line ran from Marjorie to Sandow, TX. [(2nd) Fall 2001, 3]

Rutland

2 1/2 × 1/4 sqr R stl (05) 25
2 1/4 × 1/4 cut I stl (03) 26,26:b,26:c
2 1/2 × 1/4 rnd R stl (01) 27,27:b,28,28:b,29
2 1/2 × 1/4 rnd R stl (07) 30,31
From second hand ties
2 1/2 × 1/4 rnd I stl (07) 29

The Rutland was abandoned in 1963. The section from Ogdensburg, NY to Norwood is now operated by the St. Lawrence & Raquette River, and is loaded with nails. The portion in Vermont is operated by the Vermont Ry.

In 1899-1900 the Rutland installed 110,880 untreated cedar, hemlock, tamarack, spruce, and pine ties. ['16, 290]['20, 96]

Nails are generally found 13"–14" inside either rail. 26:a is far commoner than 26:b or 26:c. 27:b is rarer than 27:a, and 28:a and 28:b are each common. All other nails are easy to find. See Vermont Ry for many nails found in second hand ties, possibly inserted by the Rutland. One second hand 29 was found in North Bennington, VT. It may have arrived after the Vermont Ry took over.

Nail hunts: [M-J '86, 25], [S-O '92, 6].

Sacramento Northern

2 1/2 × 1/4	rnd I	stl (07)	21
2 1/2 × 1/4	rnd R	stl (17)	30:c
2 1/2 × 1/4	rnd R	stl (18B)	27-33,35,36
2 1/2 × 1/4	rnd R	stl (18A)	34
2 1/2 × 1/4	rnd R	stl (18C)	37-41,44-46
From bridge piles			
2 1/2 × 1/4	rnd R	stl (07)	27
From second hand SP ties			
2 1/2 × 3/16	rnd R gm	stl (18C)	39

In January, 1929 the Sacramento Northern Ry, and electric railroad, was created from the Sacramento Northern RR and the San Francisco-Sacramento Ry. In January, 1948 it was reclassified as a steam road, though they never used steam locomotives for general service.

The line was owned by the Western Pacific from 1921 until 1987, when it became part of the Union Pacific. See Larry Meeker's article [Jun '75, 4].

From rarest to commonest the nails are (18B) 27-29, (07) 21, (17) 30:c, (07) 27, (07) 32-33, with the rest, (18B) 30-31, (18A) 34, (18B) 35-36, and (18C) 44-46, being about equally common. (From Larry Meeker.)

The 3/16" (18C) 39 is probably from a second hand Southern Pacific tie. Some Santa Fe nails can be found in second hand ties on this line.

St. Francois County

Most are probably from second hand ties

2 1/2 × 1/4	rnd I	stl (07)	08,09,15:b,16,17:c
2 1/2 × 1/4	rnd R	mi (11)	10,19,20,21:b,22
2 1/2 × 1/4	rnd R	stl (07)	21,23-31
2 1/2 × 1/4	rnd R	stl (17)	32,35,38-41
2 1/2 × 1/4	rnd R	stl (09)	35

The StFC was an Missouri electric line 15 miles long, and was reclassified as steam in January, 1952. It was abandoned November 30, 1957.

The 09 has a wide upright triangle under the date. It is not a bar. The 17 has almost a diamond shaped head, and the "7" has the bend of the rnd I (05) 17.

The 29, 32 and 35 were found between the rails. All others were found outside the rail. The type (11) nails are probably not originally from the DL&W, since that road drove all its nails in the middle of the tie.

Some nails are from bridge timbers, possibly the (11) 19's and the rnd R (07) 30's.

Sources for second hand nails

Missouri Pacific

2 1/2 × 1/4	rnd R	stl (07)	26,28
2 1/2 × 1/4	rnd R	stl (17)	32,35
2 1/2 × 1/4	rnd R	stl (09)	35

The 26 and 28 may come from another railroad.

St. Johnsbury & Lake Champlain

See St. Johnsbury & Lamoille County.

St. Johnsbury & Lamoille County

2 1/2 × 1/4	rnd R	stl (07)	25,30-33,44,45
1 1/2 × 1/4	rnd R	stl (24)	34-36,36:b,37-40
1 1/2 × 1/4	rnd R	stl (23)	41-43
Short line code set			
2 × 1/4	rnd I	stl (07)	34
From second hand ties			
2 1/2 × 1/4	rnd I	stl (05)	22
2 × 1/4	rnd I	stl (07)	24
2 × 1/4	sqr R	stl (07)	25
2 1/2 × 1/4	rnd R	mi (11)	25,28-30
2 1/2 × 1/4	rnd R	stl (07)	25-38,40,41,46-53
2 1/4 × 1/4	cut I	stl (03)	26
2 1/2 × 1/4	rnd R	stl (01)	28
2 1/2 × 1/4	rnd I	stl (07)	29,54,61
2 1/2 × 1/4	cut R	stl (03)	35,36
2 × 1/4	cut R	stl (03)	35
1 1/2 × 1/4	rnd R	stl (07)	38
1 1/2 × 1/4	rnd R os cp	stl (38)	38
1 1/2 × 1/4	rnd R	stl (05)	39,41-44:b
1 1/2 × 1/4	rnd R	stl (23)	40
1 1/2 × 1/5	rnd R	stl (07)	42-45
2 1/2 × 1/4	rnd R	stl (05)	46
2 1/2 × 1/4	rnd R	stl (17)	47

The St. Johnsbury & Lake Champlain, a Vermont railroad, was controlled by the B&M until 1925, the year their offices were consolidated with the Barre & Chelsea and the Montpelier & Wells River. In January, 1940 the SJ&LC became the St. Johnsbury & Lamoille County. After several name changes in the 1970's it became the Lamoille Valley RR.

The StJ&LC seems to have used the same nails as the Barre & Chelsea / Montpelier & Wells River. See B&C for a further explanation of this connection, and a general description of the set.

Nails are found between the rails.

See the nail hunt article in [M-J '86, 26].

Sources for second hand nails

Some nails are attributed based on position in the tie. New Haven nails are always dead center while B&M and CV nails are always closer to one rail.

Rutland

2 1/4 × 1/4	cut I	stl (03)	26	(may be Boston & Albany)
2 1/2 × 1/4	rnd R	stl (01)	28	

Boston & Maine

2 1/2 × 1/4	rnd R	mi (11)	25,28-30
2 1/2 × 1/4	rnd R	stl (07)	38,47,49,50
1 1/2 × 1/5	rnd R	stl (07)	42-45

Boston & Maine or Central Vermont

2 1/2 × 1/4	rnd R	stl (07)	27,31
2 1/2 × 1/4	rnd R	mi (11)	28,30

(continued)

Central Vermont

1 1/2 × 1/4	rnd R	stl	(07)	38
1 1/2 × 1/4	rnd R os cp	stl	(38)	38
1 1/2 × 1/4	rnd R	stl	(05)	39,41-44:b
1 1/2 × 1/4	rnd R	stl	(23)	40

New York, New Haven & Hartford

2 1/2 × 1/4	rnd I	stl	(05)	22
2 × 1/4	rnd I	stl	(07)	24
2 1/2 × 1/4	rnd R	stl	(07)	26,29-31,33,34
2 1/2 × 1/4	cut R	stl	(03)	35,36

Unattributed

2 × 1/4	sqr R	stl	(07)	25
2 1/2 × 1/4	rnd R	stl	(07)	27,28,32,35-37,40,41,46,48,51-53

The 27 and 28 may be StJ&LC nails. Some 32's may be second hand, others true StJ&LC nails.

2 1/2 × 1/4	rnd I	stl	(07)	29,54,61
2 1/2 × 1/4	rnd R	stl	(05)	46
2 1/2 × 1/4	rnd R	stl	(17)	47

Shadow sets

M&NJ shadow set

2 × 1/4	cut R	stl	(03)	35

St. Joseph Lead

1 1/2 × 1/5	rnd R	stl	(06)	45,48,49
1 1/2 × 1/5	rnd I	stl	(06)	46
1 1/4 × 3/16	rnd I gm	cop	(60)	53,54

These nails are from St. Joseph's mine railroad in Herculaneum, MO. The St. Joseph Lead Co. also operated a line west of the Adirondack Mountains in New York which was built in 1929 by the NYC.

The 54 is the rarest nail. See Joe McCraith's article with photo in [M-A '78, 4].

St. Louis & Belleville Electric

The early copper nails 03-10 which were once thought to be from this line are now known to be from the Cotton Belt Route.

St. Louis, Iron Mountain & Southern

2 1/2 × 1/4	rnd I	stl	(07)	08,9,10,11

In 1879 the railroad tested some ties treated by the Wellhouse process. This was the first year the method was used. [ASCE 7-85, 258]

342,400 untreated white oak ties are recorded as having been installed in 1905. The number may reflect several years of insertions. ['16, 312]['20, 118]

In May, 1917 the StLIM&S became part of the Missouri Pacific.

St. Louis, Rocky Mountain & Pacific

2 1/2 × 1/4	rnd I	stl (07)	06:c,B6,F6
From second hand ties			
2 1/2 × 1/4-	dia I	stl (07)	5

This small railroad ran from DesMoines, NM a little past Ute Park, NM with branches to Raton and Koehler. Construction began June 25, 1905, and the road was in operation in September, 1907. On August 1, 1913 it came under control of the Santa Fe, and it was absorbed into the AT&SF that July.

Ben Kriegh and his two sons Rommel and Eric pulled the nails near Clayton, NM. The 5's are from second hand Santa Fe ties. Arn Kriegh thinks that the other nails indicated wood and year, like GN nails. The B stands for Birch, F for Fir, and O (on the 06) for Oak. So far this is just a guess. The B6 for years was mistakenly attributed to the Santa Fe and to the Great Northern.

St. Louis Southwestern

See Cotton Belt Route.

St. Paul Bridge & Terminal

Probably from second hand ties

2 1/2 × 1/4	rnd R	stl (07)	25

This nail is probably from a second hand GN tie.

Salt Lake, Garfield & Western

1 1/2 × 3/16	rnd R	stl (18C)	54
From second hand ties			
2 1/2 × 1/4	rnd R	stl (18B)	32-36
2 1/2 × 1/4	rnd R	stl (18C)	37,39,41,44

Some second hand nails are from the Santa Fe. The (18B) 36 might be (18C).

Salt Lake Route (San Pedro, Los Angeles & Salt Lake. Later, Los Angeles & Salt Lake)

2 1/2 × 1/4	rnd I	stl (18A)	5,07,08,09,10	
2 1/2 × 1/4	rnd I	stl (18B)	5,6	
2 1/2 × 1/4	rnd I	stl (07)	08,12,21	
2 1/2 × 1/4	sqr I	stl (07)	11,14	
2 1/2 × 1/4	sqr I	stl (18)	12,13,13:b,15	
2 1/2 × 3/16	rnd R gm	stl (07)	16	
2 1/2 × 1/4	rnd I	stl ( )	17	
2 1/2 × 1/4	rnd R	stl (18B)	21:b	
2 1/2 × 1/8+	rnd I gm	stl (18B)	21	(might be OSL, SLR, or UP)
2 1/2 × 1/4	sqr R	stl (18)	25,26	

This list of nails is taken mainly from the photo of DeVon Mich'l's collection in [S-O '80, 4]. Probably many are UP, not SLR, and many true SLR nails are missing. It is impossible to determine the SLR set with any accuracy. See Union Pacific for a full explanation.

In August, 1916 the San Pedro, Los Angeles & Salt Lake became the Los Angeles & Salt Lake. The railroad was owned by OSL, and came under direct control of the UP in April, 1921. The Salt Lake Route was fully absorbed into UP in January, 1936.

The SLR constructed a treatment plant at Zinc, CA, near East San Pedro in 1908. As of 1910 the two-retort plant was treating ties with both $ZnCl_2$ (Burnett) and creosote (Boiling). These are exactly the treatments in use at the OSL's Wyeth plant. Most likely both treatments were used on ties, as they were on the OSL. ['12, 286]

(continued)

In 1921/22 the UP took over track maintenance of the Salt Lake Route, and in 1923 the Zinc plant was abandoned. Nails after 1921 are identical to UP, with the exception of the sqr R 25 and 26 listed above. [WPN 8-51, 100]['23, 537]

The round nails were probably driven into zinc chloride treated ties, and the square nails in creosoted ties. This is consistent with the national wartime shortage of creosote in the late teens and early twenties.

It is really impossible to get an idea of what the Salt Lake Route set is like, because of the fact that many UP nails are mixed in the set. Our list derives from DeVon Mich'l's article in [M-A '80, 5-6]. The nails in the SLR list above which are not in the UP list are the rnd I (18A) 07, 10; the 3/16" rnd R gm (07) 16:b (which might not belong), the ( ) 17, and the (18B) 21:b.

It would be convenient to assume that the Salt Lake Route did not use nails before the treatment plant opened, and that the pre-1908 nails (and maybe others as well) are from UP or OSL ties re-used on the Salt Lake Route after 1921. But the railroad may have purchased treated ties before 1908, possibly from UP itself.

Two other articles by DeVon Mich'l are in [S-O '80, 4] and [M-J '83, 1-2]. The first of these gives the order of rarity. From rarest to commonest they run 17, 15, 13:a & 12, 14, 07, 6, 10, (18A) & (18B) 5, 16 & 21, 08, 09, 13:b, 12, and 11.

Al Nielsen published an article in which he tells of the over 200 rnd I (18A) 09's and about 100 (18A) and (18B) 5's found in a burn pit. [Summer 2000, 13-15]

San Pedro, Los Angeles & Salt Lake

See Salt Lake Route.

Santa Fe (Atchison, Topeka & Santa Fe)

2	×	5/16	rnd I		stl ( )	1,1:b,1:c
2 1/2	×	1/4	rnd I		stl ( )	1,1:b,2,2:b,3,3:b,4,4:b,4:c
2 1/2	×	1/4	rnd I	bullseye	stl (07)	4,4R
2 1/2	×	1/4	rnd I	GM	stl (07)	4,5,9,10,10,T10,11,11:b,12-15
2 1/2	×	1/4-	dia I	hb	stl (07)	4-8,9,9:b,10,10:b,12
2 1/2	×	1/4	rnd I		stl (07)	5,5:b,6,6,7,8,9,9,10,10:d,10,15-25,25:b,25:c
2 1/2	×	1/4-	dia I		stl (07)	6,6:b,7,8:b,9,9:b,10:b
2 1/2	×	1/4	sqr I		stl (07)	10,15-17,17:b,18-25
2 1/2	×	9/40	rnd I		stl (07)	10
2 1/2	×	1/4	sqr I	hb	stl (07)	11-15
2 1/2	×	9/40	rnd I	GM	stl (07)	12
2 1/2	×	1/4	rnd R		stl (01)	19
2 1/2	×	1/8+	rnd R	gm	stl (07)	22
2 1/2	×	1/4	rnd I		stl (18A)	24-26
2 1/2	×	1/4	rnd I		stl (18B)	25,26
2 1/2	×	1/4	sqr I		stl (18)	26
2 1/2	×	1/4	rnd R		stl (18B)	26,28,29,31-34,36
2 1/2	×	1/4	rnd R		stl (01)	27,27:b
2 1/2	×	1/4	sqr R		stl (01)	27
2 1/2	×	1/4	rnd R		stl (07)	27,27:b,28,28:b,29,29:b
2 1/2	×	1/4	sqr R		stl (07)	28,29,31-38,40,43
2 1/2	×	1/4	rnd R		stl (18A)	29
2 1/2	×	1/4	rnd R		stl (17)	29,30,30:b,31:b,32,33,35,36,38,40-45,45:b,46,47,49,53
2 1/2	×	1/4	rnd R		stl (06)	30-40,40:b,43,48,48:b,56:b
2 1/2	×	1/4	sqr R		stl (18)	30-33,33:b,34,38,39,44-48,50-52,54-56,58,59
2 1/2	×	1/4	pnt R	rs	stl (07)	34-38
2 1/2	×	1/4	rnd R		stl (18C)	36,37,39,44-48,50-52,52:b,54,55,56:b,57-62,64,67,68
2 1/2	×	1/4	pnt R	rs	stl (18B)	36
2 1/2	×	1/4	rnd R		stl (03)	36-39
2 1/2	×	1/4	pnt R	rs	stl (18C)	39,45-48,50-52,54,55,57-59
2 1/2	×	1/4	pnt R	rs	stl (17)	40,40:b,40:c,40:d,41-43,43:b,44,44:b,45-47,49,53
2 1/2	×	1/4	sqr R	rs	stl (17)	42,44-47,49,53
2 1/2	×	1/4	sqr R		stl (17)	40,41
2 1/2	×	1/4	pnt R	rs	stl (06)	48,56
2 1/2	×	1/4	rnd R		stl (09)	63,65,66,69
Code nails						
2 1/2	×	1/4	rnd I		stl (07)	OZ #1
2 1/2	×	1/4	rnd I		stl (07)	ST #13,ZM #2
2 1/2	×	1/4	sqr I		stl (07)	ST #18
2 1/2	×	1/4	rnd R		stl (18C)	ST #3,X #9
2 1/2	×	1/4	rnd R		stl (01)	X #1
2 1/2	×	1/4	rnd R		stl (06)	X #2
2 1/2	×	1/4	rnd R		stl (07)	X #3,X #4
2 1/2	×	1/4	rnd R		stl (17)	X #5,X #6
2 1/2	×	1/4	rnd R		stl (18A)	X #7
2 1/2	×	1/4	rnd R		stl (18B)	X #8,ZM #1
From second hand Texas & Pacific ties						
2 1/2	×	1/4	rnd I		stl (07)	28
2 1/2	×	1/4	rnd I		stl (18C)	40,41
2 1/2	×	1/4	rnd R		stl (18C)	42,43,45-49
2 1/2	×	1/4	rnd R		stl (09)	44

(continued)

Quick guide to Santa Fe nails

Head shape

- rnd Used in treated ties and timbers.
- dia Used in untreated ties and timbers. These were considered to be square by the railroad.
- sqr Used in untreated ties and timbers.
- pnt Used in second hand ties and timbers. When a tie was reused, a pentagon headed nail was inserted in the tie or timber showing the year the tie was reused.

Code nails

- ST Special Treatment, or possibly Steam Treatment.
- OZ Oil-Zinc treated.
- ZM Zinc + creosote-petroleum Mixture treated.
- X Substandard tie.

These are all explained in more detail below.

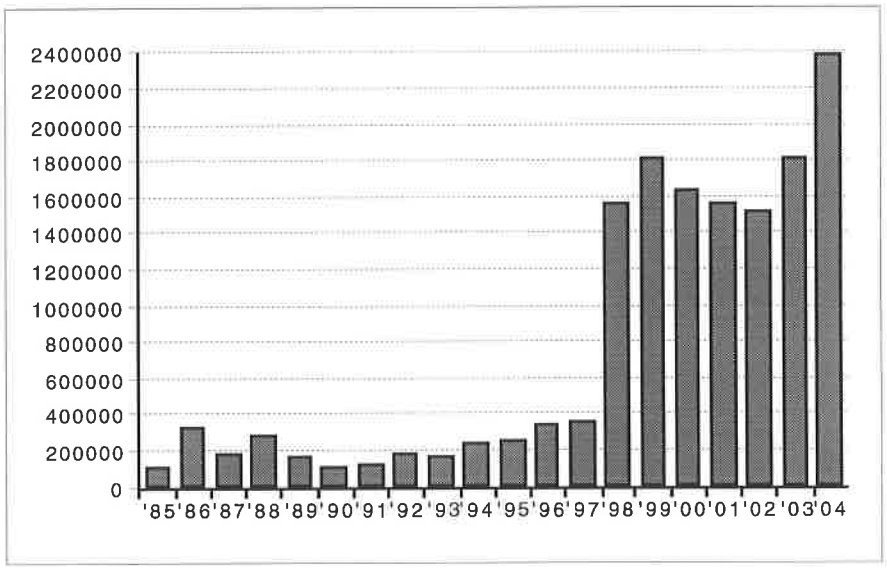
Creosoting bridge timbers

In 1875 the Santa Fe first used treated timbers. Creosoted piles were used that year in an open deck bridge over Galveston Bay. From then on creosoted materials were standard in marine construction to prevent damage by shipworms. ['22, 236]

Tie treating, 1881-1905

With track running through some of the worst areas in this country for railroad ties, it is no surprise that the Santa Fe was the first railroad to respond to the timber crisis of 1880. In 1881 they contracted Joseph P. Card in St. Louis to treat 384 ties with zinc-tannin. These were inserted in test tracks in 1881-1882 in La Junta, CO and Topeka, KS.

The railroad was impressed with the results, and in 1885 they erected the first tie treating plant in the U.S. at Las Vegas, NM. Ties there were treated with zinc tannin by the Wellhouse process, and were used primarily on the Rio Grande and New Mexico divisions, with some ties on the Western and Colorado divisions as well. Untreated ties were still used on the other eight divisions. [RG 9-6-01, 622]



Treated ties laid by the Santa Fe, 1885-1904. [RG 7-21-05, 63]

Judging by the numbers, the majority of divisions first received large numbers of treated ties in 1898, when the new treating plants opened. After 1904, the Santa Fe averaged over 2,600,000 ties per year. [DNC, 336]

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George Kittredge spoke at the 1901 AREA meeting: "I understand that beginning with the first of last year they have been treating ties on the entire system. Prior to last year they were only used on the Western and New Mexico divisions." George was speaking from memory. Judging by our statistics, "The first of last year" can only mean January 1, 1898, not 1900, and he named only two of the four divisions which first received treated ties in 1885. [AREA '01, 122]

More reliable is the table of ties removed in [AREA '04, 89]. It shows that the Middle division received treated ties as early as 1893, the Oklahoma division as early as 1896, and the Pan Handle division as early as 1897.

Apart from a two-year period 1890-1892 when the Burnett process was used, the Santa Fe continued to treat ties by the Wellhouse process to the end of 1900. [RG 9-19-02, 720][AREA '04, 67, 89]

In 1897 the Texas Tie & Lumber Preserving Co. built a plant in Somerville, TX. The plant was completed July 15, and the Santa Fe was the main customer from the start. The railroad erected its second treating plant at Bellemont, AZ in 1898. [R&ER 9-11-97, 525]

From January, 1901 to the end of 1905 the Burnett process was again used. In this period the Santa Fe may have stopped buying ties from the Somerville plant, which continued to treat ties by the Wellhouse process for other railroads. [AREA '02, 107]

Tie marking and record keeping, 1881-1910.

Ties in the La Junta and Topeka tests, from 1881-1882, were marked with copper tags. This is the oldest use of tie tags known. ['11, 136]

From the time the Las Vegas plant went into operation in 1885, the year of treatment was hand stamped into all treated ties. An inspector made the mark with a hammer of at least 4 pounds. The stamp was made "on the end of the wood or on the beveled kerf of the tie." [RG 7-27-00, 507] The "beveled kerf" implies that some ties were wedge-shaped on the ends, like early Chicago, Burlington & Quincy ties. Ties were hand stamped to the end of 1900. ['11, 137]['23, 331]

With the opening of the Somerville plant in July of 1897, the railroad began to keep a record of ties taken out of track by recording the hammer-stamped dates of ties removed. Previously the stamps had been ignored. [RG 6-12-03, 409][ASCE 6-01, 535][R&ER 9-11-97, 525]

"In the spring of 1901, round-headed dating nails were first inserted in treated crossties and bridge timbers on the Santa Fe. The dating nails were necessary to determine the service lives of the various treatments of materials being tried." [DNC, 336] See [Summer 2002, 14-15] for a Feb. 2, 1901 letter by Chanute on the Santa Fe's first nails. He is probably the man who convinced the railroad to take up nail use.

1901 nails were placed in the ends of ties, but from 1902 up they were driven in the "upper face of the tie eight inches outside of the rail on the line side of the track." ['14, 406] The 1901 placement suggests that the nails were driven at the treating plants. ['23, 331] But see [Winter 2003, 11] for a photo of a stubby 1 in the top of the tie!

The record of ties removed from service continued until 1904, when a more ambitious plan was adopted. "Commencing in 1904 we started to keep a record of all ties inserted in the track on all parts of the System and continued this until 1910..." [WPN 10-23, 169] This record included *all* ties, so in 1904 diamond date nails were introduced for use in untreated ties. Diamond nails were considered to be square, and the introduction of square nails in 1910 was made solely to fit the date on the head more efficiently. [DNC, 336]

Tie treating, 1906 up

At the beginning of the century, when timber prices climbed again at an alarming rate, the Santa Fe decided to test creosoted ties. In 1904 and 1905 it was the first U.S. railroad to experiment with an empty cell method when they placed over 4,000 Rueping treated ties in test tracks. The ties were treated at Somerville, and the Santa Fe purchased the plant in 1905, and rebuilt it for the Rueping process. German creosote arrived by ship in Galveston harbor, and was piped to the treating plant, which began creosoting ties on a regular basis in February, 1906. [WPN 4-61, 6]

Also in 1904 the Santa Fe began experimenting with creosoted wooden tie plates. Starting 1910 instructions were given that all new ties were to be inserted with steel tie plates. [RG 1-20-05, 54]['22, 244]

Some creosoting was done at the Las Vegas and Bellemont plants, but these facilities continued to use $ZnCl_2$ up to the times they ceased to operate. The Bellemont plant burned in 1906, and the Las Vegas

(continued)

plant was damaged, if not destroyed, by fire in 1908. In any case it was dismantled, and like the Bellemont plant, was not rebuilt. [RG 4-27-06, 436]['13, 197]['22, 243]

To replace the Las Vegas and Bellemont works, the Santa Fe built a new creosoting plant at Albuquerque, NM in 1907. It went into operation in March, 1908, creosoting ties according to the standard set by the Somerville plant.

In 1909 at Albuquerque they began to test ties treated with a mixture of creosote and petroleum. From 1909 to 1911 a 10-12 lb. 30-70 creosote-petroleum mixure was used, and in 1912-1913, a 7 lb. 50-50 mixture was tried. In all, about 1,000,000 ties received the mixture treatment in these years. [WPN Oct '23, 168]['24, 118, 121ff]['41, 189]

Because of the wartime shortage of creosote, the Santa Fe was forced to revert to the use of zinc chloride in 1915. Through about 1922 some ties, possibly the majority, were treated with $ZnCl_2$ by the Burnett process. At the end of this period about 137,000 ties had been treated with a combination of $ZnCl_2$ and creosote/petroleum: 25,000 with 1/2 lb. $ZnCl_2$ followed by 5 lb. petroleum, and 112,000 treated with 1/2 lb. $ZnCl_2$ followed by 5 lb. of a 30-70 creosote-petroleum mixture. ['22, 243]['41, 189]

By 1923 the creosote supply was reestablished, and that year the railroad built a third treating plant at National City, CA. Beginning January, 1923 the Santa Fe used a creosote-petroleum solution. Subsequent treatments can be seen in the table below.

Standard treatments for Santa Fe ties

Date commenced	Chemical	Process	lb/ft^3	Treating plants
July 1885	Zinc tannin	Wellhouse	1/4	All
ca. June 1890	Zinc chloride	Burnett	1/4	All
ca. June 1892	Zinc tannin	Wellhouse	1/3	All
January 1901	Zinc chloride	Burnett	1/2	All
February 1906	Creosote	Rueping	4 1/2	Somerville, Albuquerque
1909	Creosote	Rueping	5	All
1915	Zinc chloride	Burnett	1/2	All
January 1923	70-30 Creo-petro	Rueping	7 1/2	Somerville
January 1923	50-50 Creo-petro	Rueping	7 1/2	Albuquerque
January(?) 1924	50-50 Creo-petro	Rueping	8	Somerville, Wellington
January(?) 1924	45-55 Creo-petro	Rueping	8	Albuquerque, National City
January 1, 1948	30-70 Creo-petro	Rueping	10	All

[ASCE 6-01, 535][AREA '04, 67][WPN 10-23, 168]['41, 188-189]['48, 199] The Wellhouse process was two-movement.

Tie marking and record keeping, 1910 up

Following the lead of the CB&Q, the Santa Fe, having obtained a bad record of ties from date nails, decided to concentrate their record-keeping in test sections. Keeping track of millions of treated and untreated ties was found to be impossible, so the date nail was abandoned except for use in these tests. They had three types of test section beginning 1910: (1) 26 section foreman's tests, (2) A.R.E.A. tests, and (3) other special tests. See below under "Test sections" for a description of these.

Beginning 1921 the Santa Fe again drove date nails into all ties. The reason for the return to nails can be seen in the following exchange. At the 1923 AWPA meeting William Steen asked "Which is better, a dating nail or a stamp?" S. D. Cooper of the Santa Fe responded "I think they are both of great advantage, because in a dry country where you put in a pine tie the tie is liable to check and you are liable to lose the nail, but you never lose the mark on the end of the tie. Of course, the advantage of the nail on the top of the tie is that it makes the inspection so much quicker. If there is any doubt the stamping is as distinct as the date it was put in." The stamps were made by boring and adzing machines at the treating plant. See below under "Stamps in ties." ['23, 331][DNC, 337]

A minor reason it was desired to resume the use of date nails is that sometimes ties would not be used until one or more years after being treated, so the date stamped in the end would not be the date the tie was inserted in the track. [SFe, 3]

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Specifications for date nails remained about the same as they were before 1910: "On every tie inserted a dating nail is placed; a round head nail for a treated tie and a square head nail for an untreated tie. This nail bears the year of insertion and is placed on the end of tie [top of tie, outside rail] about halfway betwen the end of the tie and the rail base, and is a ready means of identification." [WPN 10-23, 169]

A similar statment, made after 1939, is even more explicit about when nails were driven into ties: "As all crossties are inserted, a dating nail indicating the year must be driven into the top of each tie, nine inches outside of base of rail on the south or west side of track, to conform to timetable directions. However, for main tracks between Chicago and Kansas City, the dating nails shall be driven twelve inches inside the base of the north rail." The last sentence became effective in May, 1939 "as a result of brine drippings from cars causing excessive corrosion to date nails on the outside of the rail." [Shaw, 42]

The date nail went from being the absolute mark by which a comprehensive record was kept (pre-1910), to a "ready means of identification" (post-1921). Detailed records continued to be kept in test sections.

"By 1934 the need of a dating nail to make possible the determination of the life of treated ties or bridge timbers removed from an abandoned line and reinserted in the track arose. A nail with a five-sided head bearing raised numerals was made standard for second-hand material being reinserted. Additional instructions for the use of the pentagon head nail were to leave the original dating nail in the timber to provide a more complete record of its life." [DNC, 337]

Pentagon nails were driven outside the rail on the opposite side of the tie from the original date nail. This was not always practiced: Ken Gronewald found a round 39 and pentagon 47 about four inches apart in one tie in Wyaconda, MO. ['M-A '88, 2]

"...we decided to discontinue using dating nails [in all kinds of timbers] in the middle of April, 1969." [Shaw, 41]

Stamps in ties

Stamps were made by boring and adzing machines at the treating plants. On the Santa Fe these machines were first installed in 1911 ([H&G, 158]), though another source give a date of about about 1915. ['22, 244][AREA '26, 975] "The machine then stamps on one end of the tie the kind of wood and weight of rail for which the tie was bored, and on the other end the kind of treatment and year treated." [WPN Oct '23, 169]

In [Feb '72, 5] is a Santa Fe document dated February 1, 1942 titled "Classification of crossties." It contains information on stamps and treatments. Into one end of each tie was stamped

Kind of wood
Length (9' ties only)
Weight of rail for which bored
Degree of curvature (over 6°)
Class of tie (except class 1-9 and 1)

and on the opposite end

Kind of treatment
Treating plant
Year treated.

An undated report reproduced in [DNC, 120] gives the meanings of codes used "on both date nails and stamped into the ends of the ties at one time:

G	Gum, Magnolia, and Tupelo
O	Oak, Beech, Elm, and Hickory
W	Arizona, New Mexico White Pine
S	Southern Pine
M	Mexican Ponderosa and Mexican White Pine
F	Fir (Pacific Coast Douglas Fir)
X	Special ties

(continued)

ST	Steam Treated
OZ	Oil-Zinc Treated
A	50-50 Mix 8 lb. A.T.&S.F. Creosote Spec.
AH	50-50 Mix 8 lb. A.R.&A. Creosote Spec.
B	45-55 Mix 8 lb. A.T.&S.F. Creosote Spec.
BH	45-55 Mix 8 lb. A.R.E.A. Creosote Spec.
V	30-70 Mix 8 lb. A.T.&S.F. Creosote Spec.
Y	30-70 Mix 10 lb. A.T.&S.F. Creosote Spec.
Z	30-70 Mix 12 lb. A.T.&S.F. Creosote Spec.

v ahead of symbol, ties were vapor dried
a Albq. treating plant
s Somerville treating plant"

The mention of the 10 lb 30-70 mixture dates the document to no earlier than 1948. The 12 lb. mixture may have become standard sometime after 1948, making the document even newer. Because only the Somerville and Albuquerque plants are mentioned, it might date to sometime after 1951. These were the codes used "at one time," so the omission of the other plants needs to be explained.

The nails

Nails with indented figures were used up to 1926. Beginning 1926 nails with raised figures were used. This applies also to code nails. The only exceptions are the rnd R (01) 19's from the Chilocco test section and the rnd R 1/8+" 22's found by Mel Smith in a California test section.

1901 nails were supposed to have been driven in the end of the tie, but at least one has been found on top. From 1902 up nails were placed outside the rail. Beginning 1939 nails used on the Chicago–Kansas City route were placed inside the north rail.

The head shapes are

rnd Round nails, including round code nails, were driven into treated ties and timbers. Because the Santa Fe by and large did not use two different treatments simultaneously, there was no need to distinguish treatment by head shape, as was the case on many other railroads.

dia Diamond headed nails were considered to be square, and these were driven into untreated ties and timbers.

sqr In order to fit the date better on the nail head, diamond nails gave way to square nails for untreated ties and timbers in 1910. Some ST's, which were driven into treated ties, are square. The significance their shape is not known.

pnt In 1934 the Santa Fe began using pentagon headed nails with round shank to date ties and timbers used a second time. They were last used in 1959.

The code nails stand for the following.

OZ Oil-Zinc treated. 1/2 lb. Zinc [chloride] followed by 5 lbs. straight petroleum. The OZ was used in test sections in the early 1920's, before the creosote supply was reestablished. [SFe, 3] [Shaw, 42]

ST Steam Treatment, according to [Shaw, 42] and [DNC, 120]. [SFe, 3] says the nail means Special Treatment, but that may be a misprint. Rnd I (07) ST's have been found in poles as well as ties.

X Special ties which do not meet specifications. These were "treated 8 foot ties of any size, so classified account of 'heart rot' or 'sap rot.' " These ties were to be used "In passing, side and industry tracks of Class 'A' and Class 'B' territory." [SFe, 3] The 'X' was introduced sometime between 1926 and 1936.

ZM Zinc [chloride], 1/2 lb. followed by 5 lbs. 30% creosote 70% petroleum. Literally ZM may stand for Zinc + Mixture. These nails were first used in the early 1920's. A rnd R ZM was found by Jeff Slosser in a tie with a 26. ZM's might not have been used much later than that.

When found in ties, code nails are located outside the rail, on the opposite side of the tie from the date nail.

In [AREA '14, 808] is an up-close photo of a Santa Fe track clearly showing a bullseye 4 in a tie.

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The "R" on the bullseye "4R" probably stands for the Rueping process. In 1904 the Santa Fe began experiments with Rueping treated ties. See the AREA test sections below.

See [N-D '90, 2-8] for photos of the Santa Fe set. A brief description of the nails of the Santa Fe appears in [M-J '77, 4]. Mel Smith shows some odd nails in his Santa Fe set in [M-A '85, 2].

The Santa Fe may have used sqr R (18) 49, sqr R rs (17) 39, 43, 55, 56 (Pete Martinez). From the photos in [N-D '89] there appears to be a rnd I (01) 5 and a rnd I (18A) or (18B) 25.

See [Fall 2002, 16-17] for comments by Charles Sebesta on questionable Santa Fe nails.

The letter nails shown with 9's and 10's in [Lewis, 136] are from the CB&Q, not the Santa Fe. The letters B, C, D, E, I, K, L, and Z were not found on the Santa Fe.

Bobby Rowland conducted a survey to rank by rarity the scarce Santa Fe nails. Here is his list, beginning with the rarest. (He ranked the sqr R (18) 33:b as #3, but it is more common than once believed.)

1 (07) Bullseye 4R.
2 sqr R (18C) 52 (The head is turned 45° with respect to the shank).
3 (07) Bullseye 4.
4 sqr R (18C) 59 (There are thin and thick shank varieties of this nail).
5 sqr R rs (17) 40 (long "0").
6 sqr R (17) 41.
7 sqr R (18C) 55.
8 sqr I (07) 17:b (with a flag on the 1).
9 sqr I (07) 10.
10 point-down pentagon 44.
11 The (03) rnd R nails (see below for discussion).

The rnd I (07) 10:e's were found in the Somerville, TX test section. See below under "Special tests."

The dia I hb 10. has been found mainly in California.

In the late 1960's George Privett, a Santa Fe conductor, found about six rnd I T10's with gripper marks (GM) in a siding in Tahoka, TX. Three GM T10's have also been found on the Great Northern. The nail has a Great Northern head (T = Tamarack, 10 = 1910), and a Santa Fe shank. It is a hybrid. [J-A '98, 7]

The sqr I (07) 17 (no flag) which many people have in their sets is often really a pole nail from some utility company, or from the Union Pacific. This nail was used by the Santa Fe, but it is rare. Jeff Slosser found one in November, 1998 on the Santa Fe in Arizona.

Dale White found the rnd R (01) 19's between Chilocco, OK and Arkansas City, KS. They were used in the Chilocco, OK test section. See the description of the test for an explanation of the screw dowels used in these ties. The (01) 19's have not been found elsewhere on the Santa Fe. [M-A '89, 7]

The rnd R 1/8+" 22's were found by Mel Smith in a California test section with copper tags. See below under "Special tests."

Bill and Lou Tucker pulled a 3 × 5/16 rnd R cp stl ( ) ET from the same tie as a rnd I 9. The ET has a cup-head like Long Island RR nails. See [Oct '71, 7] for a drawing and description of the nail. It may be a survey nail.

Henry Potter and Carson Franks found quite a few sqr R (18) 30's and 31's in bridges north and west of Fort Worth.

Only one pentagon (18B) 36 is known. It was found in a group of nails from an estate in Nevada. [Winter 2003, 1]

Jeff Slosser found the second hand 1940's Texas & Pacific nails in the track which ran through Colfax, NM. They were found in the proper positions in the tie for T&P. The Southern Pacific owned this branch until abandonment in 1952. The track was dismantled. The Santa Fe rebuilt the line in 1965. Probably the second hand ties were used in the reconstruction.

Lyle Burkhart found several small date (06) 40's and rnd I (18C) 41's near Santa Fe Springs, CA. The 41's are either from ex-T&P ties, or they are the result of a keg mix-up. [J-F '90, 2]

No one knows of any sqr R (18) 57's having been pulled on the Santa Fe. There are a number of fakes, however. Some of these are very good. Read about them in [J-F '97, 1-3].

Ken Gronewald found that "several ties had a nail in the bottom side" at Wyaconda, MO. [M-A '88, 2] This apparently contradicts the fact that nails were driven at the track, but the ties may have been reused upside down.

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Some people suspect that the rnd R (03) nails were used by another railroad which was either absorbed into the Santa Fe, or whose usable crossties were acquired by the Santa Fe. These nails are known to come from Arizona. I have found two possibilities for the original source of the nails, if they are second hand.

The Verde Tunnel & Smelter RR was a 10.9 mile short line in Arizona which connected only with the Santa Fe. It ran from Clarkdale to Jerome and was abandoned in 1953. Jeff Slosser found a (03) 37 in a bridge tie in a fenceline near Clarkdale. The nail was in the middle of the tie, just where the Santa Fe placed bridge tie nails.

The other possiblity is the Santa Fe Northwestern Ry. This railroad operated from 1923 until January 1942, and ran north-west from Bernalillo, NM to Porter via San Ysidro. Their only connection was with the Santa Fe at Bernalillo. The Santa Fe, San Juan & Northern Ry, another short line, ran from San Ysidro to Northend, connecting only with the SFNW at San Ysidro. It ceased operations in December 1932 and was abandoned in 1940. Though the state is wrong, the dates of the SFNW match the nails.

Jeff Slosser bought several (03) 37's from a retired AT&SF engineer at Mayer, AZ who purchased several Santa Fe buildings, including a tool house in which a partial keg of 37's was found. From this it seems that the (03) nails were originally used by the Santa Fe, but the question is still open.

Nails in timbers

Date nails were used in bridge timbers beginning 1901.

See [May '72, 4] and [J-F '84, 3] for a Santa Fe diagram illustrating the placement of nails in timbers. It was drawn in October, 1929 and was revised to include pentagon nails in December, 1940. "Round head dating nails indicating the year shall be used for treated timber, square head nails for untreated timber and five sided head nails for reused second hand timber. One dating nail shall be carefully driven into each timber 3" thick and over, as follows:" The diagram then lists the location of nails for bridges, wooden boxes (for drainage under the roadbed), road crossing planks, and cross and switch ties. At switches nails were to be placed outside the rail, and on bridges, in the middle of the tie.

Tags

Jeff Slosser collected information on the Santa Fe's tags in [N-D '86, 4-7] (with photos) and [J-A '89, 6]. Diamond copper tags were nailed to ties with date nails to indicate curve elevation. Mileposts plates, found in crossties and on bridges, were copper rectangular 3" × 4". Bridge piling tags were copper and diamond shaped. See also "3. Other tests" below for information on treatment tags.

Jeff acquired from Lyle Burkhart a rectangular aluminum tag, 3"× 1 7/8", with the number 230 stamped on it. Lyle told him that the "tag was used to number switches, and it was held by two round raised 1937 date nails."

Round 1 1/8" aluminum tags were nailed to poles with one common nail. These were "used on cross arms on telegraph poles to identify each line." The tags are factory stamped "A.T.&S.F.RY." under which is a hand stamped code. These include "7 30" and "2384 BA". Jerry Waits supplied this info.

Clark and Garrett Nelson found tags on the line north of Radium Springs, NM. The copper diamond tags have a single digit (0 or 2) and are held by two date nails. One tag reads "2*" and is held down by 68's. Another tag is secured by 63's. [e-NN 11-10-03]

Treating plants

Most of the information below can be found in Charles Sebesta's article on Santa Fe plants in [S-O '96, 5]. Other sources are given.

— Las Vegas, NM. This two retort facility went into operation in July, 1885. It was the first permanent tie treating works in the U.S. Enlarged to three retorts in 1896. [AREA '01, 107][RG 1-4-01, 7][RG 3-21-02, 203][RA 2-3-05, 151]

In January, 1908 it burned and was not rebuilt. [WPN 10-23, 168]['22, 243]

— Somerville, TX. Completed July 15, 1897 by the Texas Tie & Lumber Preserving Co., this four retort plant was enlarged to six June 10, 1898. It was owned by Ayer & Lord as of 1900. It supplied Zinc tannin treated ties under contract for the Santa Fe (beginning 1897) as well as the Rock Island (beginning 1900) and probably other railroads. [R&ER 9-10-98, 500]

As of September, 1898 "it is the intention to begin creosoting piling and bridge timbers for the Santa Fe and Rock Island roads." [R&ER 9-10-98, 500]

The plant was purchased by the Santa Fe in January, 1905. In November, 1905 the works were dismantled and rebuilt nearby for treating ties with creosote by the Rueping process. The new 5-retort plant, the first in the U.S. to use the Rueping process, began treating ties in February, 1906. [RG 3-21-02, 203]['10, 139][RA 2-3-05, 151]

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The plant operated under the old name TT&LPCo. until December 2, 1912, when its name changed to the Santa Fe Tie & Lumber Preserving Co. It kept that name until June 2, 1950, when the railroad absorbed the company, which became known as the Gulf, Colorado & Santa Fe Tie & Timber Treating Plant. ['52, 396] In 1951 the Somerville plant was upgraded with equipment from the National City and Wellington plants.

— Bellemont, AZ. The Bellemont plant was built in 1898 and went into operation the same year. It had 2 retorts as of 1901, and was destroyed by fire in August, 1906. [AREA '01, 107][WPN 10-23, 168] ['22, 243]

— Albuquerque, NM. This plant was built in 1907-1908 to replace the Las Vegas and Bellemont plants. It began operating in March, 1908 with three retorts, and was reduced to two in 1912/13. The plant closed down on September 30, 1971. ['12, 284]['13, 458] ([WPH, 11] says the plant was originally equipped to treat with crude oil.)

— National City, CA. Built 1923-1924, this two retort plant began treating ties on April 12, 1924. Since 1911 National City had been the site of a large tie and timber seasoning yard. They treated only Douglas fir there, and the plant closed September 28, 1950. ['30, 419]

— Altus, OK. This plant was acquired by the Santa Fe August 1, 1929 when the Santa Fe took control of the Kansas City, Mexico & Orient RR. The one retort plant was operated by the KCM&O before. It closed in April, 1931. ['30, 419]

— Wellington, KS. This plant was built in 1930-31, and opened in February, 1931. It had two retorts and was shut down February 20, 1951. ['44, 428]

Early test sections

- La Junta, CO, 1881, 1882.

  The following Wellhouse treated ties were laid. They were treated by Joseph P. Card in St. Louis. [RG 7-31-91, 536][AREA '02, 95][RG 3-21-02, 203]

  50 Colorado pine in July, 1881.
  50 cottonwood in May, 1882.
  49 white cottonwood in May, 1882.
  49 black oak in May, 1882.

  C. D. Chanute spoke at the 1911 APWA meeting "That calls to mind an illustration of the trouble we have in getting returns from the section foremen. In 1882 we treated forty-nine ties; I think it was for the Santa Fe Road by the Wellhouse process. They were laid at La Hunta, Colo., and we examined them fifteen years later, finding forty-four still in the track. The supervisor told the section foreman to be very careful of the small brass tags nailed on to the ties. A couple days afterwards, upon returning to his office, he found a little package on his desk, and upon opening it he found all the small brass tags." ['11, 136][AREA '05, 776] The tags were removed from the lot of black oak ties.

  The tags are called "numbered tin tags" in [AREA '05, 776]. They were probably brass, and carried information on the species, and possibly the treatment and year also.

- Topeka, KS, 1882.

  The following Wellhouse treated ties were laid. They were treated by Joseph P. Card in St. Louis. [RG 7-31-91, 536][RG 3-21-02, 203]

  87 cottonwood ties on August 1, 1882.
  51 sweet gum ties on August 1, 1882.
  48 red oak ties on Augist 18, 1882.

- Topeka, KS, 1885.

  305 $ZnCl_2$ Burnett treated Mountain pine ties were laid September 17. [AREA '02, 96] [RG 3-21-02, 203]['16, 322]['20, 123]

- Three locations, November 1885.

  Colorado pine ties treated by the Wellhouse process at Las Vegas were laid: 178 at Mile 154, 145 at Mile 301, and 156 al La Junta, CO. [AREA '02, 96][RG 3-21-02, 203]['16, 319]['20, 120]

(continued)

- Santa Fe, NM, 1886.

  This test is listed for Union Pacific, which had no track here. The test may be garbled further: Santa Fe may be the railroad while NM is the location of the treating plant. Some Wellhouse treated ash, pine, spruce, fir, elm, maple, and red oak ties were laid. ['16, 287]['20, 94]

- California, 1899.

  11,827 $ZnCl_2$-treated pine. [RAG 3-23-11, 638]['16, 317]

The Bureau of Forestry 1902 test

"The Bureau of Forestry of the United States Department of Agriculture, in co-operation with the Santa Fe and several other railways, laid a section of experimental track about 2 1/2 miles long on the Beaumont Division of the Gulf, Colorado & Santa Fe in 1902." This section extended west from Pelican, TX. 5,481 ties were laid from March to May, 1902, except the Avenarius Carbolineum treated pines, which were laid in April, 1905.

"...The locality was selected for this test because of its extreme weather conditions. During a number of months in each year the temperature is very high and rainfall extremely heavy, and it was thought that these conditions would hasten the determination of the life of treated ties. The ties were furnished by railways, and were taken out of stock, being of grades that were easily obtained." "The ties were treated without charge by preserving companies..." "All ties of the same wood were laid together, so that practically the same conditions exist for all. Each tie was marked with nails showing the kind of timber, the kind of treatment and the year in which it was laid." "No tie plates were used and the track is laid with 60 and 61-lb. rails." [RAG 4-28-11, 999-1001][RAG 7-26-12, 159-161].

From [AREA '02, 99-101] and [AREA '10, II, 768], the nails used were

Treatments

AL	Allardyce Process	Texas Tie & Lumber Co., Somerville, TX
AL ⋊ ⋊	Zinc chloride and English oil	Int'l Creosoting & Construction Co., Beaumont, TX
BA	Hasselmann Process–Barshall salts	Texas Tie & Lumber Co., Somerville, TX
BO	Beaumont oil (open vat)	Texas Tie & Lumber Co., Somerville, TX
BU	Burnett	Texas Tie & Lumber Co., Somerville, TX
BU ⋊	Burnett	Chicago Tie Preserving Co.
BZ	Zinc chloride & Beaumont oil	Texas Tie & Lumber Co., Somerville, TX
SP	Spirittine	Texas Tie & Lumber Co., Somerville, TX
WE	Wellhouse Process	Texas Tie & Lumber Co., Somerville, TX
WE ⋊	Wellhouse Process	Chicago Tie Preserving Co.

Untreated ties received no treatment nail. Some ties were treated with Avenarius carbolineum.

Woods

B	Beech	S	Short Leaf Pine
BO	Black Oak	SO	Spanish or Water Oak
H	Hemlock	T	Tamarack
L	Long-leaf Pine	W	White Oak
LL	Loblolly Pine	WO	Willow Oak
RH	Redheart Loblolly Pine	YB	Yellow But (=Turkey Oak)
RO	Red Oak.		

"Each tie is marked by three zinc-coated wire nails, which indicate the date, kind of wood, and the treatment. In the case of a few ties, which have been treated by Mr. Chanute [Chicago Tie Preserving Co.] and Mr. Byrnes [International Creosoting & Construction Co.] by approximately respective treatments, such as used at Somerville, those treated by Mr. Chanute have been marked by a fourth nail, stamped ⋊; while those treated according to the Allardyce process by Mr. Byrnes at Beaumont are marked by a nail stamped ⋊ ⋊." Nails were placed 4" outside the south rail. Example: a Wellhouse treated black oak tie from Chicago was marked 2, BO, WE, and ⋊. (The "2" might have been a "02".) The star nail is variously shown as ⋊, ⋆, and ∗ in the sources. The first two were hand drawn.

The Burnett, Wellhouse, and Allardyce treated ties yielded good results. Hasselmann and Beaumont oil did not fare well.

(continued)

In February, 1902 under the heading "Topeka ties," 174 ties of varoius woods and treatments were laid in this test section. The woods were

Longleaf pine	Pin oak
Shortleaf pine	Red oak
New Mexico pine	Water oak
Arizona pine	Gum
California redwood	

The treatments were

Diamond glue private
Burnett–California crude oil
Boiled in $ZnCl_2$
Bakersfield oil
Boiled in $ZnCl_2$, California oil forced in.

74 ties were pines treated with Barshall salts. The other 100 ties were treated by the other processes. [RAG 7-26-12, 161]

Tests beginning 1910

Santa Fe tests "may be divided into three general classifications:

1. Those comprising complete section foreman's territories, generally one on each operating division.
2. Those known as A.R.E.A. tests, the condition of which is reported from time to time by the Wood Preserving committee of the American Railway Engineering Association, and by the Tie Service Records committee of this Association.
3. Other tests inaugurated for special purposes." ['41, 190]

1. Section foreman's tests

"The tie tests falling under the first classification total 26 in number and each consists of a section foreman's district as it existed in 1910 when these tests were first laid out. In general, one of these sections is located on each operating division. These test sections total 165.3 miles of main track and 19.5 miles of side track, in which there are now 544,175 ties in main tracks and 48,866 in side tracks, a total of 593,041. Including the test ties still in track, these test sections have provided for the study a total of 1,278,591 main-track and 88,183 side-track ties of various woods and treatments. When the ties in these sections reach the limit of their service life, the replacement ties are taken into the records and these test installations are therefore perpetual in nature." ['41, 190]

"In 1910 the Santa Fe selected one section foreman's section on each operating division and took a careful inventory of every tie under both the main and side tracks, determining, whenever possible, the year each tie was put in. Since that time a monthly report of all ties renewed has been made and an inspector from the timber treating department examines all ties removed from each test section every three months. In addition this inspector makes a close annual inspection of all ties in these special sections. In this way the character and condition of the ties taken out can be observed and more important, all ties inserted are properly marked. Due to the large number of unmarked ties which were left undisturbed in these sections when the records were started, it will be some time before full information will be available." ['14, 402]

I have found no published record of the locations of tests. These are the Santa Fe's "regular" tests.

2. AREA tests

Ties in these tests were laid out of face, and the first were initiated in 1904. Sometimes these are refered to as "special" tests. "...no attempt is made to follow up the ties laid in replacement of the original ties..." "The A.R.E.A. tests range in length from short stretches to a test embracing 90 miles of line, and a total 181.5 miles of main tracks containing 428,235 test ties, plus ties that have replaced test ties that have failed and which are included within the limits of these tests although not carried into the records of the test. To date a total of 579,235 test ties have been reported in the A.R.E.A. tests." ['41, 190]

The letter nails OZ, ST, and ZM were used in these test sections. [SFe, 3]. They were also used in "3. Other tests" which follow.

(continued)

Sources include the test section lists in ['16], ['17], and ['20], along with lists of Santa Fe tests in ['21, 149-154], [WPN Oct '23, 170], ['25, 160], ['28, 101], ['34, 212-214], and ['37, 168-171]. For each test I list only two sources, though there are often more.

Creosoted ties were treated by the Rueping process. In the lists for 1925 and earlier the Rueping process is named explicitly, while the later sources just say "creosote." Ties which received creosote-petroleum were also treated by the Rueping process.

The Santa Fe kept separate records of sawn and hewn ties. I lump them together here.

- Bliss, OK, 1904.
  275 creosoted southern yellow pine ties at MP 297-245. (Note that Bliss was renamed Marland later on.) ['21, 149-150]['17, 206]
- Clements, KS, 1904.
  165 creosoted southern yellow pine ties, at MP 800. ['21, 149-150]['28, 101]
- Perry, OK, 1904.
  393 creosoted southern yellow pine ties at MP 323-5274. ['17, 206]['21, 149-150]
- Ponca City, OK, 1904.
  190 creosoted southern yellow pine ties at MP 286-4754. ['17, 206]['21, 149-150]
- Newton, KS, 1904, 1905.
  This became a test section in 1912 when George Rex and Mr. Cooper noted that every tie had a 1904 or 1905 dating nail. ['22, 251]
  1904 In the eastbound track from MP 179-264 to 184-3036, 8,874 $ZnCl_2$-treated southern yellow pine ties. ['17, 208]['21, 149-150]
  1905 In the eastbound track from MP 179-264 to 184-3036, 9,291 $ZnCl_2$-treated southern yellow pine ties. ['17, 208]['21, 149-150]
  Fewer than 40 of the 1905 ties had screw spikes.
- Argonia, KS, 1905.
  572 creosoted southern yellow pine ties at MP 264-1580. ['17, 208]['21, 149-150]
- Chillicothe, IL, 1905.
  179 creosoted pine ties, mostly loblolly. ['16, 316]['17, 206]
- Garnett, KS, 1905.
  384 creosoted southern yellow pine ties at MP 86-435. ['17, 206]['21, 149-150]
- Marceline, MO, 1905.
  304 creosoted southern yellow pine ties from MP 348-2506 to 348-2838. ['17, 206]['21, 149-150]
- Sutton, KS, 1905.
  44 creosoted pine ties at MP 436-2600. ['17, 206]['21, 149-150]
- Ottawa cutoff, near Melvern, KS, 1906.
  24,238 creosoted southern yellow pine ties from MP 80-0 to 87-3155. "...when the Santa Fe laid a double track through Kansas in 1906 it laid sixty-six miles of loblolly pine ties out of face on its heaviest freight main line." ['22, 117] This became a test section in 1914 when they put in new rail and noted that not one of the creosoted ties had been removed. ['17, 208]['21, 149-150, 169]
- Plevna, KS, 1907.
  262 creosoted gum ties at MP 240-3696. ['17, 134]['21, 149-150]
  52 creosoted red oak ties at MP 240-3696. ['17, 176]['21, 149-150]
- Hutchinson (KS) main line, 1907.
  230 creosoted gum ties at MP 219-1150. ['17, 134]['21, 149-150]

(continued)

- Hutchinson (KS) cutoff, 1907, 1909, 1910.
  - 1907 670 creosoted gum ties at MP 219-0. ['17, 134]['21, 149-150]
  - 1909 1,267 creosoted gum. ['21, 149]['28, 101]
  - 1910 64,057 creosoted pine ties from MP 247-1608 to 268-0, and MP 290-0 to 294-1320. ['17, 208] ['21, 149-150]
    - 14,497 creosoted gum ties at MP 247-1608. ['21, 149-150]['25, 160]
    - 240 untreated ohia ties from MP 257-0 to 258-0. ['17, 190]['21, 149-150]
  - Screw spikes were used on all 1910 ties.
- Mission-Hutchinson, KS, 1909.
  - 175 creosoted southern yellow pine ties. ['34, 212]['37, 168]
- St. Jonn-Sylvia, KS, 1909, 1910.
  - 1909 1,330 creosoted gum ties. ['34, 212]['37, 168]
  - 1910 50,575 creosoted southern yellow pine ties. ['34, 212]['37, 168]
    - 13,076 creosoted gum ties. ['34, 212]['37, 168]
- Barstow, CA, 1910.
  - 12,910 creosoted Douglas fir ties. ['34, 213]['37, 169]
- Lewis, KS, 1910.
  - 13,642 creosoted southern yellow pine ties. ['28, 101]['34, 212]
- Stafford, KS, 1910.
  - 240 untreated ohia ties. ['28, 101]['34, 214]
- Justiceburg, TX, 1911.
  - 2,210 creosoted southern yellow pine ties. ['34, 212]['37, 168]
  - 375 creosoted white oak ties. ['34, 212]['37, 168]
  - 506 creosoted red oak ties. ['34, 212]['37, 168]
  - 700 creosoted gum ties. ['34, 212]['37, 168-169]
  - 307 creosoted beech ties. ['34, 213]['37, 169]
- Marceline, MO, 1912.
  - 99 creosoted beech ties at MP 349-1320. ['20, 94]['21, 149-150]
- Smithshire, IL, 1912.
  - 386 creosoted beech ties at MP 201-2640. ['20, 94]['21, 149-150]
- Tecumseh, KS, 1912.
  - 161 creosoted beech ties at MP 47-4980. ['20, 94]['21, 149-150]
- Newton, KS, 1912, 1913.
  - 1912 157 creosoted beech ties at MP 181-2640. ['20, 94]['21, 149-150]
  - 1913 In the eastbound track, 300 creosoted pine ties at MP 183-2640. ['20, 125]['21, 149-150]
    - 150 creosoted gum ties at MP 183-2640. ['20, 103]['21, 149-150]
    - 150 creosoted red oak ties at MP 183-2640. ['20, 112]['21, 149-150]
- Texico-Lubbock, TX, 1913.
  - 262,652 creosoted southern yellow pine ties. ['34, 212]['37, 168]
  - 171 creosoted red oak ties. ['34, 212]['37, 168]
  - 8,259 50-50 creosote-petroleum treated western yellow pine. ['34, 213]['37, 169]
- Walton, KS, 1917.
  - 12,388 creosoted southern yellow pine ties, from MP 173-0 to 178-1320. ['20, 125]['21, 149-150]
  - 4,395 creosoted red oak ties, from MP 173-0 to 178-1320. ['20, 110]['21, 149-150]
    - Screw spikes were used on many of these ties.
- Turner-Holliday, KS, 1918.
  - 5,311 $ZnCl_2$-treated southern yellow pine ties, from MP 7-0 to 13-0. ['21, 149-150]['28, 101]
  - 9,430 creosoted southern yellow pine ties, from MP 7-0 to 13-0. ['21, 149-150]['28, 101]
  - 2,864 creosoted red oak ties, from MP 7-0 to 10-0. ['20, 110]['21, 149-150]

(continued)

- Chilocco, OK, 1919.

  14,155 creosoted (dowelled) southern yellow pine ties. ['28, 101]['34, 212]

  These ties had screw dowels, also called trenails. On the Santa Fe they were usually used in untreated ties, as can be seen in this quote:

  > Neither Port Oxford cedar nor redwood ties are treated for the reason that they are removed from the track on account of mechanical wear before they really begin to decay. This mechanical life is now being very substantially increased by the use of hardwood dowels into the tie for the reception of cut or screw spikes. These hardwood dowels are treated with a preservative before being screwed into the redwood tie and greatly reduce rail cutting and spike killing, which are particularly great in the case of the soft redwood timber. The necessity for the use of these soft wood ties on the Pacific Coast is because there is no hardwood timber available. [AREA '20, 287]

  Trenails are described in more detail in a 1904 report:

  > The upper part of the dowel is somewhat larger than the body. A hole somewhat less than the diameter of the screw or spike is bored through the center of the dowel. The dowel is heavily creosoted. The dowel is put into the tie in the following manner: A hole is bored somewhat less than the diameter of the dowel, and by means of a threading device a thread is cut in this hole. The dowel is then screwed in either by hand, when there are a few ties to be provided with dowels, or by machinery, when a large number are to be provided. [AREA '04, 96-97]

  The Santa Fe trenails are about 1 3/4" in diameter. We can suppose that the Chilocco test was initiated to see if trenails would be cost effective on creosoted softwood ties.

  Dale White and others found ties with screw dowels north of Chilocco. Each tie had a rnd R (01) 19, and there were two dowels for each rail. The dowels are about 1 3/4" in diameter. A photo of one of these ties reveals a third, ordinary spike hole at each rail, which had been filled with an ordinary tie plug. The ties had been plated, but it is unknown if they had plates when originally laid. The (01) 19's have not been found elsewhere on the Santa Fe. [M-A '89, 7]

- Lucy, NM, 1923.

  150 5 lb/ft^3 creosoted cottonwood. ['34, 213]['37, 169]
  150 7 lb/ft^3 50-50 creosote-petroleum treated cottonwood. ['34, 213]['37, 169-170]

- Staffordville, KS, 1923, 1924.

  1923 12,917 7 lb/ft^3 70-30 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 169]
  2,766 7 lb/ft^3 70-30 creosote-petroleum treated gum. ['34, 213]['37, 169]
  1924 107 7 lb/ft^3 70-30 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 169]
  297 7 lb/ft^3 70-30 creosote-petroleum treated gum. ['34, 213]['37, 169]
  8,300 8 lb/ft^3 50-50 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 170]
  141 8 lb/ft^3 50-50 creosote-petroleum treated gum. ['34, 213]['37, 170]

- Mission-Hutchinson, KS, 1923-1930.

  1923 39,394 7 lb/ft^3 70-30 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 169]
  1,042 7 lb/ft^3 70-30 creosote-petroleum treated red oak. ['34, 213]['37, 169]
  1925 54 7 lb/ft^3 70-30 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 169]
  1927 24 8 lb/ft^3 50-50 creosote-petroleum treated southern yellow pine. ['34, 214]['37, 170]
  1928 3,544 8 lb/ft^3 50-50 creosote-petroleum treated southern yellow pine. ['34, 213, 214]['37, 170]
  1929 32,562 8 lb/ft^3 50-50 creosote-petroleum treated southern yellow pine. ['34, 213, 214] ['37, 170]
  1930 131 8 lb/ft^3 50-50 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 170]

- Acomita, NM, 1924.

  998 8 lb/ft^3 25-75 creosote-petroleum treated western yellow pine. ['34,214]['37, 170]
  999 8 lb/ft^3 25-75 creosote-petroleum treated southern yellow pine. ['34,214]['37, 170]

(continued)

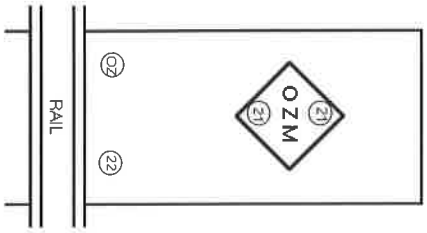
- Whiteface, TX, 1925.
  558 8 lb/ft^3 25-75 creosote-petroleum treated southern yellow pine. ['34,214]['37, 170]
  254 8 lb/ft^3 25-75 creosote-petroleum treated gum. ['34,214]['37, 170]
- Boise City, KS, 1925.
  500 8 lb/ft^3 25-75 creosote-petroleum treated southern yellow pine. ['34,214]['37, 170]
  253 8 lb/ft^3 25-75 creosote-petroleum treated gum. ['34,214]['37, 170]
- Chillicothe, IL, 1925, 1926.
  1925 2,104 8 lb/ft^3 70-30 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 169]
  1926 2,424 8 lb/ft^3 70-30 creosote-petroleum treated southern yellow pine. ['34, 213]['37, 169]
  336 Creosoted gum ties. ['34, 212]['37, 169]
  329 7 lb/ft^3 70-30 creosote-petroleum treated gum. ['34, 213]['37, 169]
- Wellington, KS, 1926.
  15,552 creosote-petroleum treated southern yellow pine ties. ['53, 193]
- Amarillo, TX, 1927.
  9,870 creosote-petroleum treated western yellow pine ties.
  5,863 creosote-petroleum treated southern yellow pine ties. ['53, 193]
- St. Francis, TX, 1927.
  6,940 creosote-petroleum treated western yellow pine ties.
  7,689 creosote-petroleum treated southern yellow pine ties. ['53, 193]
- Defiance, NM, 1927.
  13,338 creosote-petroleum treated Douglas fir ties. ['53, 193]
- Mulvane, KS, 1927, 1928.
  14,269 creosote-petroleum treated southern yellow pine ties. ['53, 193]
- Pinta, AZ, 1927, 1928.
  1927 1,889 creosoted Engelmann spruce. ['34, 213]['37, 169]
  1928 3,157 8 lb/ft^3 45-55 creosote-petroleum treated western yellow pine. (Some were steamed 2 hrs.) ['34, 214]['37, 170]
  1,853 8 lb/ft^3 45-55 creosote-petroleum treated southern yellow pine. ['34, 214]
  1,210 8 lb/ft^3 45-55 creosote-petroleum treated Engelmann spruce. ['34, 214]['37, 170]
  1,406 8 lb/ft^3 25-75 creosote-petroleum treated western yellow pine. (Some were steamed 2 hrs.) ['34,214]['37, 171]

3. Other tests

"Under the third classification of tests inaugurated for special purposes, we have 13 tests including 7 stretches of untreated ties of foreign woods, which incidentally have not given the service life in our tracks we were led to expect, because of their excellent performance in the countries in which they originated. The other [six] tests in this group are designed for the comparison of service life of ties of various woods and treatments under similar conditions of climate, traffic and track conditions." ['41, 190]

Characterizing these six tests are the copper treatment tags which were nailed to the ties outside the rail with date nails. The copper tags were used as early as 1910, and probably no earlier. There is a photo of a 1910 tagged tie in [AREA '14, 838]. Here is an example found by Mel Smith, which illustrates (not to scale) how the square tags were nailed as a diamond to the tie:

(continued)



Usually there are no nails near the rail.

Jeff Slosser wrote two articles on Santa Fe tags which include info on treatment tags. They are [N-D '86, 5-7] and [J-A '89, 6]. His tags include

Copper, 2"	PCSOB2 185, PCSOR2 232
Copper, 1 3/4"	D, MB, MV, MW, SRB, SRM, ZMK, CFV 211, OPMH 288
Galvanized, 1 3/4"	AA, AKS, SMA
Copper, 1 1/4"	AA, AKS, AOR

All are diamond tags. The number below the letters is the tie number in the test section. The CFV nail was probably found at Somerville, TX (see below). The PCSOB2 and PCSOR2, also probably from Somerville, were held to the tie by rnd R ST's. Jeff found the ZMK. It was held by two 1921 date nails.

In Bobby Rowland's collection are tags which begin with every letter of the alphabet except H, K, N, Q, U, V, X, and Y. Some are OZB, OZJ, ZMA, ZMAA 18, ZMAOZ, ZMG, ZMK, ZMM, ZPRP (rectangular), and Z1.25 3. Some of these can be deciphered using the key given below under the Kingman, AZ 1922 test.

- Albuquerque Division, 1910.

  In [AREA '14, 838] is a photo of a Santa Fe tie with a standard diamond tag held outside the rail by two 10's. The tag is not readable, but has one line of about three letters. The ties in this test included redwood and cedar.

- Cleveland, TX, 1912-1913, 1915, 1917.

  The following 975 ties were treated in October, 1909 and September, 1910 with a combination of creosote and crude petroleum oil. The amount of oil ranged from 2 parts to up to 4 parts per part of creosote. The woods inserted were pine, gum, and oak. Absorbtion ranged from less than 5 lb/ft^3 up to over 15 lb/ft^3 for full cell treatment, and from less than 1 lb/ft^3 up to 8 lb/ft^3 for the Rueping process. Ties treated with Ebano oil did not fare well because the high viscosity of the oil prevented adequate penetration of the preservative. ['24, 127-137]

Date set	No. of ties	Kind of oil	Proportion	Process	Year treated
1912-13	103	Beaumont	2 parts	Rueping	1910
1912	30	Beaumont	2 parts	Full cell	1909
1912	47	Beaumont	3 parts	Full cell	1909
1912-13	144	Beaumont	4 parts	Rueping	1910
1912-13	125	Oklahoma	2 parts	Rueping	1910
1912-13	124	Oklahoma	4 parts	Rueping	1910
1912	214	Oklahoma	4 parts	Full cell	1910
1912	28	Ellinor	2 parts	Full cell	1909
1912	141	Ebano	2 parts	Full cell	1909
1912	19	Ebano	3 parts	Full cell	1909

(continued)

Ties in this test were marked for identification.

Symbol	Meaning
2 BC	2 parts creosote to 3 parts Beaumont oil
3 BC	1 part creosote to 3 parts Beaumont oil
2 EC	1 part creosote to 2 parts Ellinor oil
OC	1 part creosote to 4 parts Oklahoma oil
R BM	Rueping process, Beaumont oil
R OK	Rueping process, Oklahoma oil

The symbols were probably stamped on tags nailed to the ties. [AREA '28, 728-737]

"The Santa Fe placed another series of ties at Cleveland, Tex., in 1915 and 1917, using a two-movement process [with zinc chloride and petroleum]...." ['41, 361] The purpose was to "determine the effects imparted to ties treated with zinc chloride and crude oil by different amounts of steaming and various quantities of preservative...".

All 1915 and 1917 ties were treated with $ZnCl_2$ and Bakersfield oil.

Date	No. of ties	Wood	Treatment	Symbol
1915	91	pine	Burnett/Full-cell	ZP
1915	39	oak	Burnett/Full-cell	ZO
1915	55	gum	Burnett/Full-cell	ZG
1915	10	elm	Burnett/Full-cell	ZE
1917	60	pine	Burnett/Rueping	S&C
1917	20	oak	Burnett/Rueping	S&C
1917	20	gum	Burnett/Rueping	S&C

"S&C" stands for Steaming and Checking test, to determine the relationship between steaming time and subsequent checking of the ties. Diamond tags were nailed to the ties outside the rail. Judging by the captions of photos of these ties, some of the 1917 tags were stamped "S&C-B", "S&C-C", "S&C-K", and "S&C-R", possibly along with the tie number.

Other ties were inserted, both untreated and treated with straight zinc chloride. ['24, 161-170] ['41, 278ff]

- Kingman, AZ, 1922.

  "In connection with the construction of second track in 1922 in the vicinity of Kingman, Ariz., the Santa Fe started a tie test which included approximately 35,000 ties of 8 kinds of wood and 6 preservative treatments." "It was the object of this test...to compare various woods and treatments under similar conditions of climate, traffic and ballast, and with this in view, ties were laid in groups of 100 ties of a kind, with one or more duplications of these groups." ['48, 199]

No. of ties	Symbol	Treatment
8,143	CR	5 lbs. Rueping Creosote
5,962	SR	7 lbs. Rueping Creosote
7,725	M	7 lbs. Rueping Mixture 50% Creosote 50% Petroleum
5,356	OZ	Zinc chloride 1/2 lb. followed by 5 lbs. Petroleum
5,098	ZM	Zinc chloride 1/2 lb. followed by 30% Creosote 70% Petroleum mixture
2,594	Z	Zinc chloride 1/2 lb.

  In addition to these, Charles and Kathleen Young have found tags with prefixes CZ, HM, and SZ at this test section. [Winter 2001, 7]

(continued)

Symbol	Wood
A	Hewn Texas Pine
B	Hewn New Mexico Pine
D	Hewn New Mexico Spruce
E	Hewn Texas Gum
F, I	Hewn Red Oak
G	Hewn White Oak
H	Hewn Gum—Plated in 1923
J	Sawn Texas Pine Wide Ring
K	Sawn Texas Pine Long Leaf
L	Sawn New Mexico Pine
M	Sawn Arizona Pine
O	Sawn Texas Gum
P, T	Sawn Red Oak
R	Sawn White Oak
S	Sawn Gum—Plated in 1924
U	Sawn Douglas Fir—5/8" Perf.
V	Sawn White Fir
W	Sawn Douglas Fir—1 1/16" Perf.
X, Y	Sawn Douglas Fir—1 1/16" Perf., Plated in 1923

The symbols were stamped into diamond-shaped tags which were secured to the ties by date nails. For example, a 5 lb. Rueping treated sawn Arizona pine tie was marked "CRM". Not all combinations of wood and treatment were used. For example, straight zinc chloride was used on pine, gum, and red oak only. ['48, 199-203]

- Somewhere in California, 1922.

  Mel Smith found some tagged ties reused as fenceposts. Diamond copper tags were secured outside the rail by 1921 date nails, while 22's were driven close to the rail along with an OZ or a ZM. An example is illustrated above, in the general introduction to tags. [M-A '85, 1]

1 3/4" tag	Nail holding tag	Code nail near rail	Date nail near rail
OZB	21	OZ	22
OZM	21	OZ	22
ZMB	21	ZM	22

  The 22's are rnd R with a shank diameter of 1/8+", and some were located between the rails. For the meanings of the tags, see the Kingman test section above.

  Either the ties were treated in 1921 and laid in 1922, or the 21's were leftover nails from the previous year.

- Somerville, TX, 1922 to 1942.

  This test is described by Charles Sebesta in [J-F '90, 7-8]. In "a four mile stretch of track on the Somerville-Silsbee branch just east of the Santa Fe yard in Somerville, Texas," is a test section "that has probably produced more treatment tags than any other of equal distance on the Santa Fe system."

  In 1921-1922 ties numbered consecutively 1-300 were inserted. Each tie had a copper diamond tag 1 3/4" square, nailed top & bottom to ties by two of the following:

  Large diamond 10,
  rnd I gm 9, <u>10</u>, 10, and
  round 2 1/2 × 1/4 nail with no date.

  The tags read "CFV" over the tie number. "The third date nail in each tie was either a 22 (earlier numbers) or 23". The 9's and 10's were probably leftover nails, and the 22's and 23's were used to date the ties.

(continued)

On later ties the tag was held by two date nails, but often there was a third, newer nail in the tie. It seems likely again that the older nails were used just to hold the tag while the newer nail dated the tie. "A random sampling of dates that I recorded included:"

Tag	Secured by	Third date nail
1 3/4" copper DA	28's	29
1 1/4" copper AOR	25's	none
1 3/4" zinc AA	25's	none
*2" copper PCGER	38's	42
SMKS	24's	none
1 3/4" copper AEA	21's	26 (raised)
AEF	21's	26 (raised)
*1 3/4" copper LDA	21's	26 (raised)
*2" copper PCSOR3	ST's (raised)	none

* indicates that the tag has a number below the letters. All steel tags (see below) were held by a rnd R ST and a rnd I ZM. Charles adds that these were all found on the north side of the track, and he guesses that they were used in the early- to mid-1960's.

Tags Charles pulled from this test section include: (Note: I have a more complete list now. Write me.)

1 3/4" diamond zinc, no number below the letters
AA AP AKS SMKS

1 1/4" diamond copper, no numbers
AA AP AER AKS AOR BZ SMKS

1 3/4" diamond copper, no numbers
AEA AEL DA DB DF DKS

1 3/4" diamond copper, with numbers
CFS CFV LDA OPMH XZA ZOA / 2"tags: A1 A2 A3 PCSOB2 PCSOR2 PCSOR3

2" steel, with numbers
A3 A4 B5 B6 B7 B8 C9 C10 C11 C12

- Eldorado, KS, 1923.

"Another duplicate installation employing the same grouping of ties as at Kingman was established near Eldorado, Kan., in 1923 in connection of the construction of a new line. The Eldorado test track is 8.2 miles long, and contains ties of about the same woods and treatments as the Kingman test, except that zinc chloride and combinations of zinc chloride were omitted because we already had ample data of this particular treatment under climatic conditions comparable to those at Eldorado, where the rainfall is much heavier than at Kingman. To date, 26,166 ties in the Eldorado test section have been studied, 25,498 of which are still in track." ['41, 191-192]

Nail articles

[Aug '73, 2], [Oct '76, 2], [M-A '81, 2, 7], [M-J '81, 2], [S-O '82, 1], [J-A '83, 1], [S-O '84, 1], [M-A '86, 7], [Jan '87, 11], [M-A '87, 4], [M-J '87, 2], [S-O '87, 2-4, 13], [J-A '88, 11-12], [M-A '88, 1-2], [M-A '89, 4-7], [M-J '89, 6], [S-O '89, 4], [J-F '90, 2-3], [M-A '90, 3], [M-J '90, 8], [N-D '90, 1], [M-A '91, 2], [J-A '91, 2], [S-O '91, 10-11], [S-O '93, 1-2], [J-A '93, 1], [M-A '94, 1].

Santa Maria Valley

2 1/2 × 3/16	rnd R gm	stl	(18C)	39
2 × 1/4	rnd R	stl	(23)	41,42
2 1/2 × 1/4	rnd I	stl	(18C)	59
2 × 1/4	rnd I	stl	(18C)	59
2 1/2 × 1/4	rnd R	stl	(18C)	60-64

The SMV is a 15 mile long California line which connects with the Santa Fe.

(continued)

In a 1977 letter to Larry Meeker, Sue Sword, Vice President and Manager of the railroad wrote "Date nails were used on the SMVRR in the years 1939, 1942, 1959, 1960, 1961, 1962, 1963, 1964, and 1975. A surplus of 1939 nails were used in 1940 by placing a common box nail adjacent to the 1939 nail.

"We ceased using date nails when our Maintenance of Way forces started to mechanize.

"Records were not kept as to number placed in service each year, nor is there a close record of removals. Collectors have removed so many of the date nails that records would be meaningless.

"The 1939 and 1940 nails were put in pressure-treated fir ties and numerous are still in the track. The 1942 nails were put in redwood ties and are in the portion of track not used. All other nails were put in pressure treated ties."

Schenectady

2 1/2 × 1/4 rnd I stl (07) 12-14,15:b,15:c,16

The Schenectady was an interurban railway which operated three branches originating in Schenectady, NY. These went to Albany, to Troy, and to Saratoga. The Albany line was abandoned to bus service July 30, 1933. The Troy branch fell to busses on July 15, 1934, and the Saratoga branch was abandoned December 6, 1941.

Nails were placed between the rails. The Schenectady sometimes redated its own ties. One tie was found with a 13 and 16 on opposite sides, and on another tie a 14 and 16 were found in the same face.

From nail finds we know that many of the usable crossties from this railroad went to the Fonda, Johnstown & Gloversville, the Arcade & Attica, the Lowville & Beaver River, and the Norwood & St. Lawrence. In fact, Schenectady nails are more common on the FJ&G than on the Schenectady itself. Russ Hallock identified the set by pulling the 12-14, 15:b off the Schenectady. The FJ&G operated an electric line which connected with the Schenectady in Schenectady. On the FJ&G ties bearing Schenectady date nails were reinserted in two periods, 1935-36 and 1942-44. These correspond well with the abandonment dates of the Troy and Saratoga branches. Here is a table of the number of ties dated by both the Schenectady and the FJ&G which Steve Worboys and I have found.

		Schenectady date						
		12	13	14	15:b	15:c	16	14 & 16
	35	0	0	2	0	0	0	
	36	0	4	4	1	0	0	
FJ&G	42	0	3	1	0	2	2	
date	43	1	6	0	0	4	1	
	44	2	0	0	0	1	1	
	K/44	0	5	2	0	0	0	1

42 ex-Schenectady ties out of 119 were associated with an FJ&G date. Note that because the FJ&G did not use nails from 1945 to 1948, the use of Schenectady ties could have persisted later than 1944.

The 16 is different from the nail shown in DNC in minor ways. The shape of the head and the numbers set it apart from the 16 found on other railroads.

By classifying the 12's by anchor markings (number and spacing of the anchors, and their orientation to the head), the Schenectady 12 can be distinguished from other 12's, like those of the Buffalo, Rochester & Pittsburgh and the Lehigh Valley. By this analysis I know that the 12's found in second hand ties on the Dansville & Mt. Morris are not from the Schenectady Ry. The 12 pulled from the Schenectady by Russ Hallock matches exactly one of the shank varieties of 12 pulled from a second hand tie on the FJ&G.

Seaboard Air Line

2 1/2 × 1/4	rnd I	mi	(11)	24
2 1/2 × 1/4	rnd R	stl	(07)	28-32,34
2 1/2 × 1/4	rnd R	stl	(01)	31
2 1/2 × 1/4	sqr R	stl	(07)	32
2 1/2 × 1/4	rnd R	stl	(04)	33
2 1/2 × 1/4	cut R	stl	(07)	34-38
From bridge timbers				
1 1/2 × 1/4	rnd R	stl	(09)	63,64,66,67
1 1/2 × 1/4	rnd R	stl	(07)	65

SAL merged with ACL to form SCL July 1, 1967.

The Charlotte Harbor & Northern Ry built a one retort treating plant which employed the Rueping process. The plant passed over to the SAL when the SAL took over the CH&N in 1926. The SAL was still operating the plant in 1952. ['13, 450]['52, 399]

Why do these bridge timber nails match ACL nails?

A 31 was found in the end of a tie re-used as a fence post. Other dates were found approximately 6" inside south rail on the Roanoke Rapids, NC branch. Jim Cullen pulled his 35 a foot inside the west rail. [M-A '90, 1]

The CAS #4 is a Southern Wood Piedmont nail, since it is found in switch ties, and also on the Louisville & Nashville. See [J-F '79, 2].

The Southern Wood Piedmont nails are also found on the SAL. See page 347.

Nails from ties originally used by other railroads have been found here. I am collecting info on them now.

Nail hunt: [J-F '90, 4-5].

Sierra

2 1/2 × 1/4	rnd R	stl	(07)	28-30
2 1/2 × 1/4	rnd R	stl	(06)	36
From second hand Santa Fe ties				
2 1/2 × 1/4	rnd R	stl	(07)	27
2 1/2 × 1/4	rnd R	stl	(17)	30,38
2 1/2 × 1/4	rnd R	stl	(18C)	45,47,48,58

The Sierra is a 57.43 mile long California railroad.

[Lewis, 147] shows more nails. These and the second hand nails listed above come from ex-Santa Fe ties. Could the (06) 36 also be from a Santa Fe tie?

Skaneateles Short Line

From second hand ties				
2 1/2 × 1/4	rnd R	stl	(07)	28:b,34,37,40:c,41,57
2 1/2 × 1/4	sqr I	stl	(05)	31
2 1/2 × 1/4	rnd I	stl	(07)	33,35,39-41,43,45-48,49:b,50,52,53
2 1/2 × 1/4	rnd I	stl	(05)	36
2 1/2 × 1/4	rnd I	stl	(06)	50

In April, 1941 the Skaneateles RR became the Skaneateles Short Line. It was abandoned in 1981. It connected with the NYC and operated only 5 miles of track in later years.

All nails were pulled from the track.

(continued)

Sources for second hand nails

Erie

2 1/2 × 1/4	rnd I	stl (07)	33,35,39-41,43,45-48,49:b,50,52,53
2 1/2 × 1/4	rnd I	stl (05)	36
2 1/2 × 1/4	rnd I	stl (06)	50

and possibly

2 1/2 × 1/4	rnd R	stl (07)	57

New York Central

2 1/2 × 1/4	sqr I	stl (05)	31

Sonora-Baja California (Ferrocarril Sonora Baja California)

2 1/2 × 1/4	rnd R	stl (09)	52,53
2 1/2 × 3/16	rnd R	stl (18C)	53-55
1 1/2 × 1/4	rnd I	stl (06)	53
2 1/2 × 1/4	rnd R	stl (06)	55,56
1 × 1/4	rnd I	stl (06)	56
2 1/2 × 1/4	rnd R	stl (31)	59-62,62:b,63,65,73
2 1/2 × 1/4	rnd R	stl (32)	66,66:b,68,68:b,69,69:b,70,72,72:b,72:c,72:d,74,74:b,74:c, 76,76:b,76:c
2 × 1/4	rnd I	stl (18C)	68,69
2 1/2 × 1/4	rnd I	stl (32)	68
2 1/2 × 1/4	rnd I	stl (12)	71,75
2 1/2 × 1/4	rnd R	stl (12)	75

Code nails

2 1/2 × 1/4	rnd R	stl (31)	G #4

See Mexico for general comments. The S-BC was built sometime between 1948 and 1951 by the National Railways of Mexico. The 2" (18C) 69 was thought to be a Southern Pacific nail for years. SP nails are found here also, including the 8-penny rnd R 24. [M-J '86, 16-17]

The rnd R (32) 68 may be 2".

In Larry Harvey's list, the (18C) 54 and 55 are 2". Other nails Harvey listed are:

2 1/2 × 1/4	rnd R	stl (12)	61
2 1/2 × 1/4	rnd R	stl (31)	66

Soo Line (Minneapolis, St. Paul & Sault Ste. Marie)

2 1/2 × 1/4	rnd R	stl (07)	23,26-28
2 1/2 × 1/4	rnd R	stl (18B)	25
1 1/2 × 1/4	rnd R	stl (07)	29
2 1/2 × 1/4	rnd R	stl (17)	30:d
2 1/2 × 1/4	rnd I	stl (07)	31
2 1/2 × 1/4	rnd R	stl (06)	32-34,37,43-47,48:b,49,50:b,51:b,52-55,57,58,63
2 1/2 × 1/4	rnd R	stl (24)	35,36,38-40
2 1/2 × 1/4	rnd R	stl (23)	41
1 1/2 × 1/4	rnd R	stl (06)	56

Code nails

2 1/2 × 1/4	rnd R	stl (07)	ABR #6,B #3,E #2,H #2,M #1,R #1,Y #1

The Minneapolis, St. Paul & Sault Ste. Marie, informally known as the Soo Line, absorbed the Duluth, South Shore & Atlantic and the Wisconsin Central on January 1, 1961 to become officially the Soo Line RR.

From 1925: "I believe the investment in nails is warranted." [AREA '26, 711][DNC, 331]

(continued)

An ad for USS Creosote in [WPN, Feb. 1956] shows date nails from 1929, 1932, and 1945 being a foot inside the rail.

The shank of the (24) 38 has the "+" of (24), but the anchor markings of (01).

The letter nails are identical to those found on the Missouri Pacific.

Articles: [J-A '85, 2], [M-A '86, 17], [J-F '90, 6-7].

Test sections

- Minneapolis, MN, 1913.
  100 ties treated with carbolineum in an open tank were laid. There were 20 each of beech, birch, white elm, maple, and tamarack. ['20, 94, 96, 98, 108, 128]
- Shoreham, MN, 1914.
  966 ties treated with carbolineum in an open tank were laid. There were 161 each of beech, birch, white elm, maple, white oak, and tamarack. ['20, 94, 96, 98, 108, 117, 128]
- Waukesha, WI, 1927.
  In September 2,700 ties treated with either $ZnCl_2$ or creosote were laid. The numbers were

  Zinc chloride: 150 each of maple, beech, yellow birch, white birch, red oak, and elm.
  Creosote–6 lb.: 150 each of maple, beech, yellow birch, white birch, red oak, and elm.
  Creosote–8 lb.: 150 each of beech, yellow birch, and red oak.
  Creosote–9 lb.: 150 each of maple, white birch, and elm. ['31, 39]

South Buffalo

2 1/2 × 1/4	rnd R	stl	(07)	26,28-33
2 × 1/4	rnd R	stl	(07)	27
2 1/2 × 1/4	rnd R	stl	(03)	30
2 1/2 × 1/4	rnd R	stl	(24)	34-39
2 1/2 × 1/4	rnd R	stl	(10)	37
1 1/4 × 3/16	rnd I	cop	(61)	63
1 1/4 × 3/16	rnd I	alm	(61)	66

The SB is a switching line in Buffalo, NY.

The copper 63's were ordered but never used. The aluminum 66's may not have been used, also. Russ Hallock pulled several of the (03) 30's. The other nails were acquired by Walter Studer through railroad employees and by pulling nails himself.

Southern

Predecessors of the Southern will be dealt with first.

South Carolina

The SC became part of the Southern in April, 1899.

The 136 miles of the South Carolina RR extended from Charleston to Hamburg. Construction began on January 9, 1830 and was completed October 3, 1833. The rails were of wood, with a plate of iron secured on top. This was standard for the time. "The rails so prepared were to be wedged into transverse pieces of timber." "Where the ground was soft he [Col. Blanding] recommended that the transverse timbers be supported by 'well-driven piles'—the rails to be so far elevated above the ground as to admit a free circulation of air beneath them. Robert Mill recommended that piles be driven into the earth at a distance of from eight to ten feet of each other and of such height that the rails would be six to twelve inches above the surface of the ground to prevent 'premature decay.' " [SCR, 39-40]

This was before ties were invented in 1832. "It is certain that the treatment [of the wooden parts of the track] with tar supplemented by turpentine was used when the road was constructed, for in the statement of the cost of the road made in October, 1833, an item was listed as follows: 'Turpentining Road, includes amounts paid for turpentine, tar, etc., and labor—$4,424.74.' " [SCR, 105] This is the oldest known application of timber preservation on an American railroad, and I doubt one will be found which predates it.

(continued)

The system of piles proved to be both dangerous and expensive. "The timbers decayed rapidly at the surface of the ground, which necessitated continuous and expensive repairing." [SCR, 101] In 1834 work was begun to convert the road to embankments and trestles.

On July 9, 1838 President Tupper suggested the treatment of timber with mercuric chloride (Kyanizing). "Experiments with the method were undertaken in the next three years, and in 1841 it was stated that the results obtained clearly demonstrated its practical value. At about the same time a second method, known as 'Earlizing' (a process patented by Dr. Edward Earle of Philadelphia, formerly of Savannah), was introduced. This process was the treatment of the timber with a solution of sulphate of copper and iron. Its cost was much less than Kyanizing. In 1843 it was reported that by the adoption of this means of preserving the timber the cost of operating the road was being materially reduced..." [SCR, 106]

Memphis & Charleston

This railroad became part of the Southern in 1898. In 1871 they did an experiment with Foremanized ties. Foremanizing involves treating the ties with mercuric chloride and powdered arsenic. Chanute recounted the experience of the M&C: "Great expectations...were entertained, and a conditional sale was made to various parties of the right of using the process, notably, it is said, to the Memphis & Charleston Railroad for $50,000; and some ten miles of ties were prepared on that road, when the poisonous nature of the ingredients used brought about disaster.

"The arsenic and corrosive sublimate effloresced from the ties... Cattle came and licked them for the sake of the salt, and they died, so that the track for ten miles was strewed with dead cattle. The farmers rose up in arms, and made the railroad take up and burn the ties. The company promoting Foremanizing was sued and cast in heavy damages, and it went out of business." [ASCE 7-85, 286]

Illinois & St. Louis RR & Coal Co.

The I&StL eventually became part of the Southern in 1901. In 1880 this railroad tested some Wellhouse treated ties. [ASCE 7-85, 258]

New Orleans & North Eastern

This railroad was part of the Queen & Crescent (see below) before being purchased by the Southern in 1916.

In 1879 the NO&NE built a timber preserving plant at Slidell, LA for creosoting bridge timbers. The plant was built to treat the pilings used in the bridge over Lake Ponchartrain. Construction of the bridge took place from 1882 to 1883, after which the treatment plant was abandoned. In the latter part of 1902 the plant was sold to the Southern Creosoting Co. ['13, 197, 450]['23, 30ff] The owner is given as Queen & Crescent Ry in ['13, 199].

Two retorts were added about 1923. In ['24, 313] the owner is given as the Hattiesburg Creosoting Co. In ['30, 420] it is the Gulf States Creosoting Co. The plant was still operating in 1952. ['52, 396]

Queen & Crescent Route

Owned by a British holding company, this system was composed of five railroads:

Alabama Great Southern,
Cincinnati, New Orleans & Texas Pacific,
New Orleans & North Eastern,
Alabama & Vicksburg, and
Vicksburg, Shreveport & Pacific.

Different lines were merged into others as late as 1969, but the Southern controlled major portions of the Q&C as early as 1890.

The Q&C had three test sections.

- Birmingham, AL, 1910.

  300 ties treated with 17.4 lb/ft^3 of creosote were laid. They included 50 ties each of post oak, red oak, white oak, heart pine, loblolly pine, and longleaf pine. There is a chance that only 200 ties were laid. The post oak ties might be really red oak, and the hear pine might be longleaf or loblolly. ['16, 319, 307]['17, 170, 186, 190, 198]['20, 112, 121, 122]

(continued)

- Cincinnati, OH, 1914.
  4,070 creosoted red oak ties were laid "Under track in street paved with granite blocks—set in concrete." Perhaps the expense of replacing the ties made treating them the most economical option. ['17, 171]['20, 112]
- Williamstown, KY, 1914.
  3,200 red oak ties, treated with 8.7 lb/ft^3 of creosote, were set. Screw spikes were used. ['17, 170] ['20, 112]

Southern

Southern Wood Piedmont switch nails can be found in the ends of Southern RR switch ties. See page 347.

I have only fragmentary evidence for the treatment of Southern ties. Almost all of it is derived from the membership lists of the AWPA.

The Slidell plant, built by the NO&NE, was expanded from one to three retorts in 1921 by its new owners, the Southern Creosoting Co. The Southern RR had a treating inspector in Slidell in at least 1922 and 1923. It is possible that the railroad owned the company which ran the plant. ['22, 506]['23, 529, 553]

Eppinger & Russell built a three retort plant at Jacksonville, FL in 1909. The Southern had a treating inspector there at least 1923-1924. ['23, 551]['24, 313, 338]

Gulf States Creosoting Co., Meredith, MS, was treating Southern yellow pine and red oak for the Southern as of 1939. This plant was built in 1925 and was expanded the next year. The Lowry process was used here. ['40, 450] Note that this company also took over the Slidell plant in the 1920's.

In 1945 the Southern had a treating inspector in Atlanta, GA. There were two treating plants in the area. One was the Wm. C. Meredith Co. in East Point, GA (built 1927, expanded 1940), and the other was the Southern Wood Preserving Co. in Atlanta (originally built in 1908, expanded in 1921, rebuilt in 1930, expanded 1935). ['24, 315]['45, 265, 266, 298]

(continued)

Southern Pacific

2 1/2 × 1/4	rnd I	stl	(07)	03,04,05,5,06,06:b,6,6:b,07,7,08,08:b,8,09,09:b,09:c,09, 9,10,10:c,10,11:c,11:d,12,12:b,13-18,18:c,19-25,25:b
2 1/2 × 1/4	rnd I	stl	( )	4
2 1/2 × 1/4	rnd I	stl	(01)	4,5,09
2 1/2 × 1/4	rnd I	stl	(18B)	05,06
2 1/2 × 1/4	rnd I	stl	(18A)	5,8,08-11,20-25
2 × 1/4	rnd I	stl	(07)	07-11
2 1/2 × 1/4	rnd I GM	stl	(07)	12
2 1/2 × 7/40	rnd R gm	stl	(07)	12,13,13:b,14,15,15:b
2 1/2 × 1/4	rnd R	stl	(07)	15,24,25
2 1/2 × 3/16	rnd R gm	stl	(18B)	16
2 1/2 × 1/8+	rnd R gm	stl	(18B)	17,18,20-23,23:b,24,24:b,24:c,25
2 1/2 × 1/8+	rnd R gm	stl	(07)	19,21,21:b
2 × 1/4	rnd I	stl	(18A)	20
2 1/2 × 1/8+	rnd I	stl	(07)	24
2 1/2 × 1/4	rnd R	stl	(18A)	24
2 × 1/8+	rnd R gm	stl	(18B)	24
2 1/2 × 1/4	rnd R	stl	(18B)	25

Code nails

2 1/2 × 1/4	rnd I	stl	(07)	0,1 (Set #26)
2 1/2 × 1/4	rnd I	stl	(07)	A #4,B #7,C #2,D #2,E #1,F #1,G #6,G #7,H #5, J #2
2 1/2 × 1/4	rnd I	stl	(14)	E #2

Code nails from bridge timbers (Pictured on page 133 of Volume III.)

2 × 1/4	rnd I	stl	(07)	0
1 1/2 × 1/4	rnd I	stl	(07)	1
1 3/4 × 1/4	rnd I	stl	(07)	5,6

Southern Pacific, Texas & Louisiana Lines

2 1/2 × 1/4	rnd I	stl	(07)	25,25:b
2 1/2 × 3/16	rnd R gm	stl	(05)	26-30
2 1/2 × 3/16	rnd R gm	stl	(07)	26,29-32
2 1/2 × 9/40	rnd R	stl	(01)	27,28
2 1/2 × 1/5	rnd R	stl	(04)	31-33
2 1/2 × 1/5	rnd R gm	stl	(04)	33,37-42
2 1/2 × 1/5	rnd R gm	stl	(24)	34
2 1/2 × 1/5	rnd R gm	stl	(09)	35
2 1/2 × 1/5	rnd R gm	stl	(18B)	36
2 1/2 × 1/5	rnd R gm	stl	(19)	47,48
2 1/2 × 1/5	rnd R	stl	(18C)	49-51

Code nails from bridge timbers

2 1/2 × 1/4	rnd R	stl	(03)	0-9 (Set #7)
2 1/2 × 1/4	rnd R	stl	(04)	0,1,1:b,2-6,7-9,9 (Set #8)
2 1/2 × 1/4	rnd R	stl	(06)	– (Set #8)
2 1/2 × 9/40	rnd R	stl	(07)	0-5 (Set #9)

(Note: Some rnd I (07) 24's have a "T" on the shank instead of the type (07) diamond. These were probably made at the Cleveland, OH works of American Steel & Wire Co. This 24 has numbers identical to the type (07) 24.)

(continued)

Southern Pacific, Western Lines

2 1/2 × 3/16	rnd R gm	stl (18B) 25-30,30:b,34,35
2 1/2 × 3/16	rnd R gm	stl (07) 28,28:b,29,33,36-38,40,40:b
2 1/2 × 1/4	rnd R	stl (18B) 31
2 1/2 × 1/5	rnd R	stl (04) 32:b
2 1/2 × 3/16	rnd R gm	stl (18C) 39,41,42,42:b
From bridge timbers		
2 1/2 × 3/16	rnd R gm	stl (07) 37
2 1/2 × 3/16	rnd R gm	stl (18C) 39

Southern Pacific of Mexico

2 1/2 × 1/4	rnd R	stl (18B) 25
2 1/2 × 1/4	rnd R	stl ( ) 27
2 1/2 × 1/4-	rnd R	stl ( ) 28,30-33,33:b
2 × 1/4-	rnd R	stl ( ) 34-36

Corporate information

For a short history of the SP see [J-A '88, 6-10], continued in [S-O '88, 8-9] and [N-D '88, 3-5].

East of El Paso the SP owned several railroads which they did not merge until 1961 due to Texas law. The three major proprietary lines were the Texas & New Orleans, the Galveston, Harrisburg & San Antonio, and the Houston & Texas Central. The latter two were merged into the T&NO in March, 1927.

Morgan's Louisiana & Texas RR was leased to the SP until 1902, and also became part of the T&NO in March, 1927.

Charles Sebesta explained the histories and routes of these lines in [S-O '97, 1-4]. The general location of the lines were:

T&NO: East from Houston to New Orleans and other points in east Texas and Louisiana.
HG&SA: West from Houston to El Paso and other points in south and west Texas.
H&TC: North from Houston to Dallas and other points in north central Texas.

In the lists of test sections the three lines generally keep their identity, but often they are listed as SP. The lines in Texas and Louisiana were refered to as the Atlantic System of the SP until about the teens. Lines west of El Paso were called the Pacific System.

Creosoting bridge timbers

The H&TC built a treating plant at Houston in 1876 for creosoting piles and timbers. It was here that some experimental ties were creosoted in 1880-1882. The ties in the 1877 test were probably treated here as well. ['13, 197]

It may be that this plant was temporary in nature, for in [WPN 6-50, 65] is this statement copied from the *Southern Pacific Bulletin*: "Small experimental installations of creosoted ties, piles and bridge timbers had been made prior to 1880. However, wood preservation as a regular operating activity on these properties had its beginning in 1883. At that time a small creosote pressure treating plant was constructed by the Houston & Texas Central Railroad..."

It was moved to a different location near Houston in 1889, "and in 1890 additional retorts were added and the plant was redesigned to use zinc chloride for the treatment of piles and bridge materials." [WPN 6-50, 65] These changes were made also for treating ties.

The use of creosoted solid deck bridges on the SP goes back to 1885. [RG 6-10-04, 439]

At West Oakland, CA a Southern Pacific treating plant was built in 1889 for creosoting timbers.

Tie treating with zinc chloride, 1887-1923

As just mentioned, the Houston & Texas Central laid a considerable number of creosoted ties in tests in the period 1877-1882, but the cost of treatment outweighed the extended life of the ties.

(continued)

"In 1887 the Southern Pacific Company leased the creosoting works of the Houston & Texas Central Railway, at Houston, Tex., and began "Burnettizing," or the injection of chloride of zinc by itself, without subsequent treatment." [AREA '01, 106] The statement that the SP leased the Houston plant, and that they subsequently built their own treating facility at Houston in 1891 is found frequently in the literature. The lease makes sense, even though the SP owned the H&TC. The lists of treating plants name SP as owner of the new plant through 1908, and from 1910 the owner is given as T&NO. [RG 2-3-05, 151]

Treated ties were mostly pine, and received 1/4 lb/ft^3 of $ZnCl_2$. They were originally used only in regions where untreated wood was exceptionally short lived. As late as 1901 an SP man was saying that they "use no Burnettized ties on the Gulf roads. West of San Antonio, in that arid country, they use altogether Burnettized ties, and it does not seem to be with them a question of ballast at all, but one rather of soil and climate and conditions of humidity, rainfall, etc." [RG 3-29-01, 222][AREA '01, 129] [RG 2-3-05, 151]

The Pacific System first received treated ties in 1894 when the SP built its portable plant, which was used alternately in California and in Oregon. "...and since then [SP has] treated practically all the ties on that end of the system." [AREA '01, 107][RG 4-24-03, 293][RG 2-3-05, 151] In 1900 the portable plant worked in Texas or New Mexico "to take advantage of cheaper prices for ties." [WSE 4-00, 102]

Table of Burnettized ties installed on the Southern Pacific

Year	Atlantic System	Pacific System	
1887	4,114		
1888	118,098		
1889	196,365		
1890	212,677		
1891	180,670		
1892	247,179		
1893	179,229		
1894	190,769	81,803	
1895	190,802	433,139	
1896	165,783	475,198	
1897	86,737	478,724	
1898	152,329	631,056	
1899	207,555	639,830	
1900	342,335	486,999	
1901	292,493	1,099,532	
1902	204,217	1,165,695	[AREA '04, 87, 90-91]

After the 1900 figure for the Pacific System the table notes "6 months". If this means that the number is for the first six months of 1900, then the figures for 1901 and 1902 might be for the fiscal year beginning the previous July 1.

As of 1901, 17% of ties in the Pacific System's main line were treated, while 39% of the Atlantic System's main line ties were treated. [AREA '01, Form 1] In 1915 28% of all ties on the SP were treated. By 1948 the number was up to 81%. [WPN 6-50, 67]

E. B. Cushing of Morgan's Louisiana & Texas RR wrote in 1907 that the line contained both creosoted and Burnettized ties. [AREA '08, 703] (Cushing was generally known as an SP man.)

Tie treating with creosote, beginning 1923

The SP continued to use zinc chloride up to 1923. "Since 1923, practically all material, including crossties, has been treated with mixtures of creosote and petroleum." The treatment was in all probability Rueping's, as one gleans from this quote: "You may be interested to know that the five original 1890 retorts [at Houston] are still in use. Three are occasionally used for treating, one has been converted into a Rueping tank, and one is used as an air receiver." [WPN 6-50, 65]

(continued)

"Some time later fuel oil was substituted for the petroleum." [WPN 6-50, 65] In 1927 the treatment in use was a 70-30 creosote-fuel oil mixture. "After a few years' observation of ties failing from splitting, rail cutting, crushing and spike-killing, but not from decay, the idea developed that we might be wasting a lot of good 14-cents-a-gallon creosote." Thus in 1929 a test track was established near San Francisco where ties treated with 50-50 and 25-75 mixtures were placed under observation. [WPN 6-47, 46-47] The proportion of creosote was reduced, and by 1950 the SP's tie treatment was an 11 lb/ft^3 50-50 creosote-fuel oil mixture. [WPN 6-50, 65]

Treating plants

— Houston, TX. Perhaps this plant was built in 1876 and rebuilt in 1883. See above under "Creosoting bridge timbers" for a discussion about its origin. The plant, which was owned by the H&TC, began also treating ties with $ZnCl_2$ in 1887.

The plant was moved in 1889 to another location near Houston, and was revamped the following year. In 1891 the rebuilt treating works opened with five retorts. The annual capacity for ties was 1,500,000, though an average of less than 200,000 ties were treated each year in the period 1887-1900. The balance was made up with the treatment of other timbers.

From 1910 on the owner is listed as Texas & New Orleans Wood Preserving Co. At least in the period 1910-1912 both the full cell creosote and Burnett processes were in use, the latter for ties. ['10, 139] ['11, 213]['12, 286]

In 1913 and 1915 the only wood listed as being treated here is pine. ['13, 453]['15, 474]

In 1923 two of the old retorts were retired and a new one added. A fifth retort went into operation in 1934. This contradicts H. J. McKenzie's article in [WPN 6-50, 65], which says that in 1950 all five 1890 retorts were still in use. Perhaps the 1923 and 1934 retorts were refurbished old ones. ['40, 452]

The plant was still operating in 1952. ['52, 399]

— West Oakland, CA. This plant was constructed in 1889 with two retorts for treating timbers, not ties, with creosote. The wood was boiled in the preservative. At least in 1910 and 1911 Burnettizing was also done, presumably of crossties. ['10, 139]['11, 213]['12, 286]

The plant is listed as also treating ties in 1913 and 1915. They may have begun tie treating here sometime after 1894. ['13, 459]['15, 478]

Douglas fir is the only wood listed for this plant in 1913 and 1915. ['13, 459]['15, 478]

In 1925 the plant was rebuilt with two retorts, and it was still operating in 1952. ['52, 399]

— California–Oregon. The SP built this portable plant in 1894 for treating ties with $ZnCl_2$ on the Pacific System. The works had two retorts, and treated pine and fir. [AREA '08, 737]

In 1900 the plant treated ties in Texas and New Mexico, but otherwise it remained in the West. In 1901-02 it was located in Dietze, CA, Latham, OR, and Oakland, CA. In this period, when stationed at Oakland and Latham, the plant treated timbers with creosote as well as ties with $ZnCl_2$. [Rowe, 107-08, 122] In 1912 the plant was situated at Cottage Grove, OR, and the treatments were given as "Burnettizing & Creosote (boiling)", the former for ties, the latter for other timbers. ['12, 286] Later lists place the plant at Latham, OR. The plant was dismantled sometime 1924-1930. ['24, 315]

— Wilmington (Los Angeles), CA. This two retort plant was built in 1907. As of 1910 the treatments in use were "Creosote (Boiling) [and] Burnettizing". Piles and other timbers were treated with creosote while ties received zinc chloride. As of 1913 the plant was treating only Douglas fir ties. ['10, 139]['12, 286] ['13, 458-459]

In 1922 two retorts were added, and the plant was abandoned sometime between 1934 and 1940. ['24, 315]['34, 474]['40, 452]

— Alomogordo, NM. The El Paso & Southwestern built this plant in 1902 for treating ties with zinc tannin. About 1907 it was reconfigured to treat ties with creosote by the Rueping process.

In November, 1924 the SP acquired the EP&SW, along with the treating plant. The SP was still running the plant in 1952. ['52, 399]

— Eugene, OR. This one retort plant was built in 1925. It was still operating in 1952. ['52, 399]

(continued)

Record keeping, 1887-1925

Mr. Kruttschnitt of the Southern Pacific was responsible for the adoption of $ZnCl_2$ for ties in 1887, and from that date he saw to it that a comprehensive record was kept of the lives of treated ties. The year of treatment was hammer stamped into each tie beginning 1887, and a record was kept of the dates of ties removed from the track. The SP was the first U.S. railroad to keep such a record. [RG 6-10-04, 438]

"We make a cast-iron hammer—quite a large one; the figures are raised on it about one-eighth inch, perhaps a little more, and we have been using those since 1892 or 1893." [AREA '00, 77] Since they had stamped ties since 1887, it may be that his particular type of hammer was forst used in 1892 or 1893. The stamps were applied "at the time of putting in the track. It is part of the duty of the section foreman—a rule which the roadmaster is required to enforce—that when the new ties have been laid in track, men walk along with a sledge and strike the date of putting in the tie." [AREA 1900, 78]

"The Southern Pacific, the Santa Fe System and perhaps others indent on the ends of ties figures indicating month and year of treatment. This is done by use of a hammer, on the face of which figures are cut, different ones for each month being necessary." [AREA '04, 70][DNC, 23]. On the Santa Fe an inspector made the mark with a hammer of at least 4 pounds. See [DNC, 16] and [Jun '74, 8] for photos of stamped SP ties dated 96 through 02 and 09 found by Arnold and Linda Smith. None of the marks gave the month. All dates were found in the ends of the ties except the 97, which was found "in the rail side about the same place as the early S.P. nails are found". They were all found in a building made of ties.

I have seen no solid evidence that the SP used date nails before 1903. Some people still have the code nails 0 and 1 as dates in their sets, and the 00 shown in [DNC, 111] is probably fake. See below for a discussion of the possibility that the letters A, B, etc. stand for dates.

The SP used the same nails from Louisiana to the Pacific until 1925. From that year on the nails from lines east of El Paso (Texas and Louisiana), lines west of El Paso, and the SP of Mexico form distinct sets.

In November, 1924 the El Paso & Southwestern became part of the SP. The EP&SW used nails, and many of these are in people's SP sets. Some may be wrongly listed here under SP, and I need help in untangling the sets. Sqr I (18) 10 and 11 are EP&SW nails, and some collections also continue the series (wrongly) with the 12 and 13, really UP nails. All diamond nails in SP sets are really from the EP&SW.

From the 1914 AWPA report, the SP used dating nails and kept records in test sections. Records had been kept for 19 years. This dates their record to 1894/5, the time treated ties were first used on the Pacific System. ['14, table][DNC, 290]

From the Chief Eng. office, Feb 4, 1970: "Southern Pacific first used dating nails about 1900. They were originally made of iron, then copper, later galvanized iron." All of this is suspect. No iron or copper nails are known from the SP. "Southern Pacific Texas and Louisiana lines discontinued the use of date nails in 1953." No nails were used by the SP in the period 1943-1946. [Shaw, 114][Jun '71, 7]

The location of nails is given in a drawing adopted December 12, 1933. It is labeled "Southern Pacific Lines", and does not indicate whether it applies to lies east or west. I believe it was drawn up for both. "Dating nail to be driven into every tie put into track, and to be placed 10" inside of rail on right hand side of tie in the direction that Mile Post increases in number." The drawing shows a 1925 date nail, which is probably the year the original drawing was made. [e-NN 3-19-04]

The letters "A" through "J" "may have been used to indicate the year from 1901 thru 1909." [DNC, 119] Charles Sebesta found the following nails just west of Sanderson, TX:

E, F, G, H, 11, 12, 13, 14.

Charles found 09's about 25-30 miles east of Sanderson. He wrote "Based on the location of the nails in the tie (same for numbers & letters), I am convinced that the letters represented a year, however, I'm not sure...as to the years they stood for. However, I am willing to offer this: the J found further west represented either 1908 (the last year letter nails were used) or 1909 when S.P. use both the J and 09. The A could then be 1900 or 1901.—just a qualified guess at any rate."

Charles Sebesta has a rnd I (07) 01 (flag on the 1) in his SP set. It came from Bill Turner's collection. Bill was told it came from Arizona, but was never really sure about its origin.

A rnd I (01) 08 was once thought to be part of this set, but it is really a Gila Valley, Globe & Northern nail.

The <u>09</u> and D are particularly rare.

(continued)

Charles Sebesta found that all 12's along the SP between Del Rio, TX & Alpine, TX have GM. They were pulled mostly near Sanders, TX from ties "in loading pens, etc." The 12's found west of Alpine do not have GM.

Elias Castillo and Jim Leitschuh report that the 7/40" 12 through about 16 were placed outside the rail. Later thin shank nails, from as early as 1918, were placed between the rails, closer to one rail.

Charles Sebesta has found rnd I 22, 24, 25 between the rails.

It may be that rnd I (18A) 22, rnd R (18A) 24, and rnd R (18B) 25 belong to the West. Charles Sebesta has these three in his collection but cannot verify them.

On a branch line south of Los Angeles John Iacovino noted the positions of nails in the ties. 2 1/2 × 1/8+ (18B) 23, 24, and 27 were found outside the rail while the 2 × 1/8+ (18B) 24's were found between the rails. See SP Western Lines below for the locations of nails 25-40. [S-O '97, 10-11]

The Dayton-Goose Creek RR was bought by the SP in 1926. This railroad used the sqr R rs 24 and sqr R (07) 24:b which many people keep in their SP sets. Read Charles Sebesta's article in [J-A '91, 6] for this and other general SP info.

1/8+" (18B) 25 might really be a Nevada Northern nail.

Many people have a 2" rnd I stl (18C) 69 in their SP sets. These came from a person who sold them as SP nails at a nail show in the early 1970's. The nails are unused, and they have never turned up elsewhere on the SP. They have, however, been found on the Sonora-Baja California. [S-O '98, 6]

In [Apr '73, 4] is a drawing of a 2" rnd I (07) 0 (same as the 1 1/2" 0 listed above?) found in a bridge timber. Also, Charles Sebesta and Henry Potter pulled eight 1 3/4" 6's from a set of pilings at the Navadod River east of Victoria, TX. This nail is older than the other code nails. Sebesta adds that someone has found short 5's.

The 1 1/2" and 2 1/2" rnd I (07) 0, 1 are not dates. Bill Turner found about 150 2 1/2" 1's scattered in and around a section house at Sierra Blanca in the early 1970's. The 0's were found under similar circumstances in Utah or Nevada. These nails are probably from the late 1920's or early 1930's, since the 1 is identical to the Indiana-Michigan Electric Co. code nail.

Possibly only one of the code 5's is known. Eight 6's were found by Charles Sebesta and Henry Potter. Most were found in the same stringer.

International Creosoting & Construction 42's were found in bridge timbers by Don Chamberlin near Lexington, TX. [S-O '98, 17]

Bob Thorpe's SP collection appears in [M-A '86, 20-22]. For another photo of the set, see [Oct '76, 7]. Some of his nails probably do not belong.

In [Jun '75, 5], reprinted [J-F '86, 9], Bob listed a sqr R 23, and wrote that the 1/8+" 24 was found "around the Baton Rouge, LA area on tin flashing under a trestle." It has also been found in South Texas by Sebesta and Potter. [Oct '76, 7] Later, in [S-O '78, 5] Bob wrote of 1" rnd I cop (64) 24, 25 which he pulled in Clifton, AZ from ties in the track. Bob later called these nails type (18), claiming they were found in California. [M-J '86, 30] He also claims to have found a dia (07) 3 "in a burn hole alongside SP track in Nevada". The 3 is sketched in [M-J '86, 30], and is probably spurious.

Some rnd I (07) 24's have a "T" on the shank instead of the type (07) diamond. These were probably made at the Cleveland, OH works of American Steel & Wire Co. This 24 has numbers identical to the type (07) 24. [Winter 2000, 17]

Bob Thorpe reports "SP used nails very sparingly on their bridges and culverts and ties".

Lymon Robberson wrote the article "Southern Pacific Curve Canting Plates" (curve elevation plates) which appeared in [M-J '88, 2].

Southern Pacific, Texas and Louisiana Lines

At least in 1951, SP's lines east of El Paso inserted ties already with the date nail, as some nails were found in the bottom of the tie, while others were found nearer the opposite rail from the rest.

Date nails 28 through 42 and single digit code nails are found in bridge timbers. From [DNC, 177]: "It is believed that the bridge was precut and assembled at the creosoting plant. Each piece was marked with code nails. The bridge was disassembled, creosoted, then sent to the site. It was reassembled in accordance with a diagram using the numbers marked on each piece. By using this procedure, all ends of timbers received the proper treatment and no cutting had to be done after the treatment which would expose the raw wood." Wiswell and Evans admit that this explanation may easily be wrong. It is for now the only satisfactory theory for the use of these nails.

(continued)

In [DNC, 187] is information supplied by Henry Potter: The SP bridge code nails were used only on bridges built between 1928 and 1942. The (07) set is usually found with dates 1928 to 1932. The (03) and (04) sets are found mixed on bridges dated 1933 to 1942. Because many nails are found in impossible positions, the nails must have been driven before each bridge was completed. "If the bridge has code nails, they will most likely be on the pilings; however, they are also sometimes found on the caps and stringers. The nails on the pilings may be found from ground level (below ground?) to the very top." Ten different types of code and date combinations are shown in [DNC, 188].

The shank diameters of most 3/16" nails are really in the range .190" to .195".

Type (18C) is noted for the line running part way down one side of the shank through the anchors. Some SP 49's have this line on both sides of the shank.

Southern Pacific, Western Lines

On a branch running south of Los Angeles, John Iacovino found dates 25-27, 29, 36, and 37 inside the southeast rail, and dates 24 (2"), 28-30, 32-34, 39, and 40 inside the northwest rail. The nails were probably driven before they reached the track. He also found 23, 24 (2 1/2"), and 27 outside the northwest rail. [S-O '97, 11]

John R. Gibson in [N-D '87, 11] wrote of a strange find in bridge timbers. In the center of each of six pilings of a wood SP bridge, above the 1939 date nail, was the number "36" written out in small brads in a connect-the-dots fashion, with over a dozen nails to make each number. After asking around for an explanation, a man from the SP Bridge & Building department told him that the 36 was the "transition or the depth the piling was in the ground" This would have been 36 feet. [M-J '88, 8] Iacovino, in his article in [Winter 1999, 11], thinks that the numbers do not represent depth.

John Iacovino found another bridge with date nails and small brads. Near Mecca, CA the piles in one bridge had 1937 date nails, but this time the brads spelled out consecutive numbers: "1", "2", up to "25".

John also pulled many Union Pacific 2" (17) 29's in SP track in Orange County, CA. Perhaps a keg of UP date nails was given to the SP crew? He found too many of this single date for them to be from second hand ties. Also, he found no true SP 29's in the area. [Fall 2002, 8-9]

Rolland Meyers has found several (18B) 39's, which are otherwise identical to the (18C) 39 used by the SP. It may be that the nail factory mistakenly omitted the line running through the top few anchors.

Probably many other date nails have been found in bridges.

The shank diameters of most 3/16" nails are really in the range .190" to .195".

Southern Pacific of Mexico

See Mexico for general comments.

The SP acquired the line from the Arizona border south to Guaymas in 1898. In 1909 the SP of Mexico was formed to complete the line south to Guadalajara. This was finished in 1927. All was sold to the Mexican government in 1951, when the railroad became the Ferrocarril del Pacifico (Pacific RR).

Just as the nails from SP's eastern and western lines began using different nails in 1925, the SP of Mexico used ordinary SP nails until that date. Pre-1925 nails found here include the following:

2 1/2 × 1/4 rnd I stl (07) 07,08,08:b,10,10:c,12,27

(At least the 07 and 08's are from second hand SP ties reused on the SP of Mexico. The 27 is too new, also.)

2 1/2 × 1/4 rnd R stl (07) 24

Houston & Texas Central test sections

The location of a creosote test is given as "between Keeney and Sherman" in ['09, 22]. It could refer to any of the following tests 1877-1882.

- Texas, 1877.

  Some creosoted pine ties were laid. ['16, 315]

- Houston, TX, 1880.

  49,000 creosoted (steaming) pine ties were laid. Houston may be the location of treatment, not where the ties were laid, and these may be part of the 150,000 ties in the test below. ['16, 323]

(continued)

...Southern Pacific

- 1880-1882.
  150,000 creosoted pine ties were laid. The ties were treated with 10 lb/ft^3 at the H&TC's Houston plant. [ASCE 7-85, 268, 276][AREA '05, 775][AREA '09, 471, 618]['15, table]['20, 120]

Galveston, Harrisburg & San Antonio test sections

- Between Ft. Hancock and Iser, TX, 1894.
  200 southern yellow pine ties treated with zinc chloride, then covered with creosote, were laid. ['15, table]['16, 319]['20, 125] See the same site for a 1907 test below.
- Watkins, TX Cut Off, 1894.
  In April, 1894, in connection with the construction of the mail line cutoff, the following were laid. [AREA '04, 76][RG 6-10-04, 439][RA 2-3-05, 151]['16, 291, 319]['17, 114, 208]['20, 97-98, 123, 126] (['16], ['17], and ['20] wrongly say 1895, the year the line opened.)
  2,643 untreated cypress ties.
  1,824 zinc-creosoted treated southern (Texas) yellow pine ties. The process given is Allardyce, which had not been developed yet. The GH&SA used a method similar to Allardyce's in 1905-1907, so these ties may have received the same treatment.
  1,694 sap pine, treated with 6 lb/ft^3 of tar oil.
  1,694 untreated longleaf heart pine ties.

  "The new line was about two miles long, the east end being built around a rocky point, and the west end across a vega or sandy plain. We obtained a number of each kind of the ties used in that territory, and laid a portion of each of these at either end of the line, subdividing them so that a portion of each should be laid on a curve and a portion on tangent." [AREA '01, 130]
- Galveston, TX, 1905.
  1,003 two-step zinc-creosote treated sap pine ties. Some had screw spikes. ['16, 323]['17, 204] ['20, 123]
- Between Bay View and San Leon, TX, 1905, 1909.
  In 1905 the folowing were laid. Some of each group were laid with screw spikes.
  1,000 untreated cypress ties. ['16, 291]['17, 114]['20, 98]
  200 creosoted (full cell) red gum ties. ['15, table]['16, 296]['17, 136]['20, 103]
  41 untreated red gum ties. ['16, 296]['20, 103]
  244 zinc chloride treated red gum ties. ['15, table]['16, 296]['17, 138]['20, 104]
  201 full cell creosoted tupelo gum ties. ['16, 298]['17, 138-140]['20, 104]
  42 untreated tupelo gum ties. ['16, 298]['17, 104]
  176 zinc chloride treated tupelo gum ties. ['16, 298]['17, 140]['20, 104]
  42 two-step zinc-creosote treated tupelo gum ties. ['16, 298]['17, 140]['20, 104]
  1,131 untreated heart longleaf pine ties. ['16, 319]['20, 123]
  1,001 zinc chloride treated sap pine ties. ['15, table]['16, 322-323]['17, 204]['20, 123]
  45 two-step zinc-creosote treated red gum ties. ['20, 104]
  In 1909 the following were laid. All ties had screw spikes.
  5,927 untreated yellow cypress ties. ['16, 291]['17, 114]['20, 98]
  868 creosoted (full cell) southern yellow pine ties. ['16, 315]['17, 206]['20, 125]
- Louisiana, 1906-1907.
  1906 250 low pressure zinc creosote treated red oak ties. ['16, 310]['17, 184]['20, 117]
  285 full cell creosoted southern yellow pine ties. ['16, 315]['20, 125]
  1907 24 full cell creosoted southern yellow pine ties. ['16, 315]['20, 125]
- Between Witherow and Salix, LA, 1906-1907.
  1906 205 full cell creosoted pine ties. ['15, table]['17, 206]['20, 125]
  547 zinc-creosoted southern yellow pine ties. ['16, 319]['20, 120]
  1907 386 full cell creosoted southern yellow pine ties. ['16, 315]['17, 206]['20, 125]
  95 Rueping treated southern yellow pine ties. ['15, table]['16, 315]
  433 two-step zinc-creosote treated southern yellow pine and hemlock ties. ['16, 319]['17, 208] ['20, 126]

(continued)

...**Southern Pacific**

- Between Lafayette and Scott, LA, 1906-1910.
  1906 476 two-step zinc-creosote treated southern yellow pine ties. ['17, 208]['20, 126]
  285 full cell creosoted southern yellow pine ties. ['17, 206]['25, table]
  1907 100 Rueping creosoted southern yellow pine ties. ['15, table]['16, 315]['20, 125]
  100 untreated southern yellow pine ties. ['16, 317]['20, 124]
  1910 6,675 untreated yellow cypress ties, with screw spikes. ['16, 291]['17, 114]['20, 98]
- El Paso, TX, 1907.
  500 diamond wood preserver treated red oak ties. ['16, 308]['17, 178]['20, 114]
- Between Ft. Hancock and Iser, TX, 1907.
  1,000 ties treated with diamond wood preserver were laid. They were 500 sap pine and 500 red gum ties. ['16, 295, 322]['17, 136, 204]['20, 103, 123]
- Between Olivier and New Iberia, LA, 1911.
  3,838 full cell creosoted southern yellow pine ties. Some had screw spikes. ['16, 315]['17, 206] ['20, 125]

Southern Pacific test sections

- West Oakland, CA, 1906.
  196 zinc-fluoride treated western yellow pine ties. All were removed by 1915. [DNC, 254]

In August, 1906 345 unseasoned douglas fir and western yellow pine ties were treated in an experimental retort at West Oakland, CA with crude oil followed by zinc chloride. The ties were laid in October, 1906 at the following three sites. ['24, 174-177]['17, 128, 202]

- Arbuckle, CA, 1906.
  112 western yellow pine ties.
- West Oakland, CA, 1906.
  140 western yellow pine ties. (['17] says fir and pine.)
- Tracy, CA, 1906.
  93 douglas fir ties.
- Edenvale, CA, 1913.
  85 zinc-chloride treated douglas fir ties. All were taken up by 1920. [DNC, 252]
- Near Cleveland, TX (Houston East & West Texas), 1914-1915.
  115,000 Texas loblolly pine and gum ties were treated in the Fall of 1914 at the SP's Houston plant with $ZnCl_2$-crude oil. The ties were inserted in the track from late 1914 to the Spring of 1915. The ties were installed on the "lines serving the Gulf coast and on a number of main-line tracks in the semi-arid district west of San Antonio." "Records of location and exact time of installation were not kept..." ['41, 361-363]['24, 170-174]
- Nulo, TX, 1914, 1916.
  In 1914 598 creosoted white oak ties were laid. ['25, 165]['27, 173]
  In 1916 189 red gum and 315 dead heart pine ties, treated with $ZnCl_2$, were laid. ['25, 165] ['27, 173] (['27] says 250 pine.)
- Near San Francisco, CA, 1929.
  In September 960 ties, treated with a 25-75 creosote-fuel oil mixture at 10.5 lb/ft^3, were installed, along with a lot of ties treated with a 50-50 mixture. [WPN 6-47, 49]

Articles: [Apr '71, 7], [Jun '71, 7], [Apr '73, 4], [Jun '74, 8], [Jun '75, 5] reprinted [J-F '86, 9], [Feb '76, 2], [Apr '76, 5-7] reprinted in [J-F '86, 10-12], [Aug '76, 1], [Oct '76, 2, 7], [S-O '78, 5], [N-D '78, 2], [M-J '81, 1-2] (EP&SW nails were pulled on this trip), [S-O '84, 1], [M-A '86, 6-7, 13-14, 20-22], [M-J '86, 28, 30], [M-J '87, 10-11] reprinted in [J-F '92, 9-10], [S-O '87, 4], [N-D '87, 11], [J-A '88, 12], [M-J '88, 2, 8], [S-O '90, 10], [J-A '91, 6], [M-A '94, 5], [J-A '94, 1], [S-O '97, 1-4].

Articles: [Apr '71, 7], [Jun '71, 7], [Apr '73, 4], [Jun '74, 8], [Jun '75, 5] reprinted [J-F '86, 9], [Feb '76, 2], [Apr '76, 5-7] reprinted in [J-F '86, 10-12], [Aug '76, 1], [Oct '76, 2, 7], [S-O '78, 5], [N-D '78, 2], [M-J '81, 1-2] (EP&SW nails were pulled on this trip), [S-O '84, 1], [M-A '86, 6-7, 13-14, 20-22], [M-J '86, 28, 30], [M-J '87, 10-11] reprinted in [J-F '92, 9-10], [S-O '87, 4], [N-D '87, 11], [J-A '88, 12], [M-J '88, 2, 8], [S-O '90, 10], [J-A '91, 6], [M-A '94, 5], [J-A '94, 1], [S-O '97, 1-4].

Spokane International

2 1/2 × 1/4	rnd R	stl (18C)	51,54
2 1/2 × 1/4	pnt R rs	stl (18C)	51
2 × 1/4	rnd R	stl (18C)	52
1 3/4 × 1/4	rnd R	stl (18C)	53-55

See [J-A '87, 4] for a brief history of the line. The UP took control of the SI in 1958. In 1988 it became part of the UP.

The SI began using treated ties only in 1949. Numbers started out small, rising to a peak in 1952, after which they leveled off. See [Fall 2000, 8-9] for the numbers.

The pentagon 51 is more common here than on the Santa Fe. It may be that the shape of the head held no significance for the SI. 1 3/4" 51 and 57 have been reported, but they probably do not belong to the set.

Only three 2 1/2"rnd R (18C) 54 have been found, by Jim Sinsley. [Fall 2000, 8-9]

Spokane, Portland & Seattle

2 1/2 × 1/4	rnd R	stl (18B)	26
2 1/2 × 1/4	rnd R	stl (07)	27,28,30,31
2 1/2 × 1/4	rnd R	stl (24)	29,31
2 1/2 × 1/4	rnd R	stl (17)	33,34
From bridge timbers			
2 1/2 × 1/4	sqr I	stl (05)	52,53,59,63

Test sections

- About 300 feet east of MP 105, 1915.

  Some Douglas fir ties treated with a 5% Cresoil solution were inserted. The ties were connected somehow with the 1915 Lind, WA test of the Milwaukee Road. ['21, 144]

- 1927.

  Some creosoted ties were placed under observation. ['29, 157]

A. J. Witchell, Chief Engineer, spoke at the 1929 AWPA meeting: "We have two pieces of test tracks: One with a special patented treatment, and another one with creosote. One piece of test track material has been in a matter of ten years, and the other piece of test track since 1927. We keep track of the ties by having signs printed warning the trackmen that no tie must be removed without the permission of the Engineering Department. About once a year we make an inspection of the condition of those ties. I am refering now to the ones that are ten or twelve years in the track, but I have no data with me on the results." ['29, 157]

His inconsistency about the date of the earlier test means that it might be the same as the 1915 Cresoil test.

John R. Gibson, in two articles ([J-A '83, 2] and [S-O '83, 1]), wrote about his extensive hunting on the SP&S. In the first article he wrote "I am convinced that the SP&S used no date nails past the year of 1935, if they used them even that long." John listed all the tie nails you see above except the (17) 33 and 34, which were pulled by Al Byers.

Dave Parmalee pulled the bridge timber nails 52, 53, 59, which were probably not used by the railroad, but rather by the treatment company or the firm which built the bridges. Rolland Meyers acquired the 63. [e-NN 2-18-03]

Stewartstown

From second hand ties

1 1/4 × 3/16	rnd I gm	cop	(60)	23:b,24
1 1/2 × 1/4	rnd I	stl	(03)	30
2 × 1/4	cut R	stl	(03)	34,34:b,36
2 1/2 × 1/4	rnd R	stl	(07)	43
2 1/2 × 1/4	rnd I	stl	(07)	50

The Stewartstown is a pitiful shortline in southeastern Pennsylvania which connects with the PRR. See [J-A '89, 4-5].

The rnd R 43 was found outside the rail, while the rnd I 50 was found in the bottom of a tie used only on the other face. The 50 is certainly from a PRR tie, which either went directly (first-hand) to the Stewartstown, or was waiting for re-insertion. See also Arcade & Attica and Pennsylvania.

Shadow sets

M&NJ shadow set

1 1/4 × 3/16	rnd I gm	cop	(60)	23:b,24
1 1/2 × 1/4	rnd I	stl	(03)	30
2 × 1/4	cut R	stl	(03)	34,34:b,36

Sunset

The Sunset, operating 45.8 miles in California, came under the control of the Santa Fe and Southern Pacific in 1908.

Many SP and AT&SF nails have been found here, ranging in date from 1908 to 1965. See Jerry Gibby's article in [Feb '76, 6], reprinted in [M-A '88, 9-10].

Tennessee Central

2 1/2 × 3/16	rnd R gm	stl	(07)	27,28,29:b,29:c,30:b,31-33
2 1/2 × 1/4	cut R	stl	(07)	34-38
2 × 1/4	rnd R	stl	(19)	37,47,49
2 1/2 × 1/4	rnd R	stl	(19)	39-43,43:b,44-48,50-53

The following info comes mainly from Dave Parmalee's article in [M-A '79, 1]. The TC was incorporated in 1901, and was divided among the Louisville & Nashville, the Southern, and the Illinois Central in December, 1968, having ceased operations August 31 that year. Nails "from 27 through 33 are 2 1/2 × 3/16", similar to Southern Pacific, but...all are different than SP nails." Possibly the 29:c has only been found on the top of an abandoned trestle in Harriman, TN. Nails were also used in bridge timbers from 1927 through at least 1940.

The 27-32 are pictured in [Lewis, 158]. His 27, 30, and 32 seem to be the same as the Southern Pacific nails pictured in DNC. The 2 on Lewis' 28 is shaped differently than DNC's, his 29 has a narrower 9, and the numbers on his 31 are farther apart.

The scarce nails in the set are the 27, 29:b, 33, 34, and 37-39.

Tennessee Coal Iron & RR Co.

The TCI&RR Co. operated coal and possibly iron mines between Bessemer and Ensley, AL, just southwest of Birmingham. Their mines, railroad, and treatment plant were located in that area. Their steel mill was in Fairfield, in another part of the state.

The railroad succeeded the Cahaba Coal Mining Co. in 1893. The CCMC owned 8.1 miles of track which connected with the L&N and the Augusta, Gibson & Sandersville. Presumably the railroad was still in operation as of the 1940's, having become private in 1902.

(continued)

They built a one retort treatment plant at McAdory, AL, near Bessemer in 1909. Pine ties, poles, dimension timbers, and fenceposts were treated there with creosote (low pressure). Curiously, mine props are excluded from the list. The plant was expanded in 1916 with another retort, which were both still in operation in 1944. In 1944 a single new retort replaced the old ones, and the plant was still operating in 1952. ['12, 286]['13, 450]['44, 432]['52, 399]

This company also ran a steel mill at Fairfield, AL. There they manufactured type (19) date nails. Sometime after 1939 the mill became U.S. Steel's Tennessee Coal & Iron division.

In cooperation with the Forest Products Laboratory the company installed the following test section.

Test section

- Ensley, AL, 1910.

  The following were laid:

  68 creosoted (5.54 lb/ft^3) red oak. ['16, 307]['17, 170]['20, 112]
  104 creosoted (low pressure) red oak. ['16, 307]
  34 untreated white oak. ['17, 188]['20, 118] (['20] says 35 ties.)
  35 zinc-tannin treated willow oak. ['16, 313]
  44 longleaf pine (treatment not known). ['16, 317]['20, 122]
  96 untreated longleaf pine. ['16, 321]['17, 200]['20, 123]
  113 creosoted (7 lb/ft^3) shortleaf pine. ['17, 200]['20, 124]
  183 creosoted (low pressure) pine. ['16, 315]
  398 cresol-calcium treated shortleaf and loblolly pine. ['16, 323]['17, 202]['20, 124]

  Totals from ['16] are off from the others a little.

The small amounts of creosote are cosistent with low-pressure creosoting. About this test Howard Weiss of the Forest Products Lab said "... there is [a test track] in Alabama, constructed by the Tennessee Coal & Iron Company, in which the ties are treated by various preservatives." ['11, 139]

Terminal RR Association of St. Louis

2 1/2 × 1/4	rnd R	stl (09)	52,56,57
2 × 1/4	rnd R GM	stl (06)	54,55
1 1/2 × 1/4	rnd R	stl (06)	53

This switching railroad operates over 200 miles of track.

In 1879 the St. Louis Bridge Co., a predecessor, tested pine bridge stringers and gum blocks treated with the Wellhouse process (zinc-tannin). [ASCE 7-85, 258]

St. Louis Bridge & Tunnel, another predecessor, tested woodiline treated longleaf pine ties in 1897. 150 were painted with hot preservative and 75 were dipped. ['16, 322]['20, 123]

Texas & Pacific

2 1/2 × 1/4	rnd I	stl (07)	10,11:c,15:b,16,17,18:b,19-31,36
2 1/2 × 1/4	rnd I	stl (18B)	28,29,33-35
2 1/2 × 1/4	rnd I	stl (05)	32
2 1/2 × 1/4	rnd I	stl (06)	33,36,38,39
2 1/2 × 1/4	rnd I	stl (18C)	37,40,41
2 1/2 × 1/4	rnd R	stl (18C)	41-49
2 1/2 × 1/4	rnd R	stl (09)	44,44:b

The T&P was owned by MoPac beginning 1924, and merged into MoPac in 1976.

(continued)

Tie treating

The Southern Tie & Timber Preserving Co. built a one retort plant at Texarkana in 1902. Sometime 1908/09 the name changed to National Lumber & Creosoting Co. Later lists of treating plants give the date of construction of this plant as 1910, which probably reflects a rebuilding of the facility. As of 1910 the plant had two retorts, and the treatment methods employed were Burnettizing and Bethell, with Card being included in 1911. In 1913-1915 the Rueping process is also listed. [AREA '04, 75]['10, 139]['11, 213] ['13, 452-453]

A fourth retort was added in 1927, and by 1940 the plant was owned by Koppers. It was still operating in 1952. Species treated in 1913 here were black oak, red oak, longleaf pine, shortleaf pine, loblolly pine, black gum, and red gum. ['30, 421]['40, 453]['52, 397]

The T&P had a supervisor of treatment at the National Lumber Texarkana plant at least 1922-1945. The T&P may have begun buying large numbers of ties from this plant when it re-opened in 1910. ['22, 503]['24, 336]['34, 500]['40, 482]['45, 298]

The T&P had a supervisor of treatment at the International Creosoting & Construction plant at Texarkana at least 1922-1923. See Cotton Belt for a description of the plant. ['22, 503]['23, 550]

The Shreveport Creosoting Company, a subsidary of the American Creosoting Co., built a two-retort treating plant at Shreveport, LA in 1910. The plant, which opened the same year, creosoted ties, piles, poles, and other timbers with creosote by the Lowry process for the Kansas City Southern, International & Great Northern, and Texas & Pacific. The plant was still operating in 1952. ['13, 89, 450]

The I&GN and T&P had a treating inspector in Houston, TX in 1922 and 1924. There, in 1912, a four retort works was built by the National Lumber & Creosoting Co. Various types of lumber were treated with $ZnCl_2$ or creosote. The Rueping process was used, prbably for ties. Between 1934 and 1940 the plant changed hands to Koppers, maybe in 1935 when three of the four retorts were replaced. It was still operating in 1952. ['13, 452-453]['22, 502]['24, 334]['34, 473]['40, 453]['52, 397]

The nails

Nails through 1940 were placed outside the rail. From 1942 on they were placed between the rails. Probably the rnd I 41 was outside the rail while the rnd R 41 was between the rails.

The (18B) 29 and (07) 36 may not belong. Has anybody found these nails? Jeff Slosser found two rnd R (18B) 29's, in the main line. They may be the result of a factory mix-up.

Jeff Slosser found a 2" rnd I (06) 34 from a fencepost about 60 miles from the T&P bed. It probably is not a T&P nail.

The 10 and 11:c were found in the El Paso-Odessa area.

Nail hunts: [S-O '91, 11], [M-A '94, 1].

Texas Pacific – Missouri Pacific Terminal RR of New Orleans

2 × 1/4	rnd R	stl (04) 33		
2 1/2 × 1/4	rnd I	stl (05) 35		
2 1/2 × 1/4	rnd I	stl (18B) 36		
Missouri Pacific nails				
2 1/2 × 1/4	rnd I	stl (07) 28		(may be T&P)
2 1/2 × 1/4	rnd R	stl (17) 30,37		
Texas & Pacific nails				
2 1/2 × 1/4	rnd I	stl (07) 28		(may be MoPac)
2 1/2 × 1/4	rnd I	stl (18B) 29,35		
2 1/2 × 1/4	rnd I	stl (18C) 40,41		
2 1/2 × 1/4	rnd R	stl (18C) 42-49		
From second hand Cotton Belt Route ties				
2 1/2 × 1/4	rnd R	stl (06) 32		
2 1/2 × 1/4	rnd R	stl (17) 38		
2 1/2 × 1/4	rnd R	stl (19) 39		

This switching road operated over 100 miles of track, with 19 miles of main line. It was owned by T&P / MoPac until it became part of the Missouri Pacific in 1978.

(continued)

The MoPac and T&P nails are probably from ties placed new in the track by the respective companies, though some may be from second hand ties.

Tidewater Southern

2 1/2 × 1/4	rnd R	stl (18B)	30-32,35,36
2 1/2 × 1/4	rnd R	stl (18A)	34
2 1/2 × 1/4	rnd R	stl (09)	37
2 1/2 × 1/4	rnd R	stl (18C)	38-41

The TS, a short line in California, was electric until January, 1934. It was owned by the Western Pacific and connected with the WP, Southern Pacific, and the Santa Fe. In June, 1987 the TS became part of the Union Pacific.

Wayne Gregory reports that the nails are found in the ends of the ties, on the east side of the track. [e-NN 4-11-03]

Toledo, Peoria & Western

1 1/4 × 3/16	rnd I gm	cop (60)	27-29
2 1/2 × 1/4	rnd I	stl (07)	28,29
2 1/2 × 1/4	rnd R	stl (07)	30
2 1/2 × 1/4	rnd R	stl (06)	31,33,34
2 1/2 × 1/4	cut R	stl (07)	35-41
2 1/2 × 1/4	rnd R	stl (09)	47,48,50
2 1/2 × 1/4	rnd R	stl (17)	49,51

Ken Gronewald found a "large head indented 35 that is not shown in either nail book" outside the rail. It is probably from a second hand tie. [S-O '90, 8]

Nail hunt: [M-J '89, 7].

Toledo Terminal

2 1/2 × 1/4	rnd R	stl (07)	27-44
2 1/2 × 1/4	rnd R	stl (06)	47

Tonopah & Goldfield

2 1/2 × 1/4	dia I	stl (07)	9:b,9:c,10:b
2 1/2 × 1/4	sqr I	stl (07)	10-14
2 1/2 × 1/4	sqr R	stl (07)	16
2 1/2 × 1/4	dia R	stl (07)	16
2 1/2 × 1/4	rnd R	stl (07)	17
2 1/2 × 1/4	rnd I	stl (07)	35-37

The T&G was a 100 mile line in Nevada, formed in 1905 from two previous lines. They ceased operations December 31, 1946, the line was abandoned October 15, 1947, and all was dismantled in 1948. See [M-A '87, 2].

Nails are located between 6"10" inside the rail.

Al Gustafson acquired a rnd I stubby (07) 12 from Bud Larson, who claimed to have pulled it from a tie on the Tonopah & Goldfield. The nail, which is so far unique, measures 1 1/8 × 5/16.

Three 2 1/2 × 1/4 sqr R stl (07) 14's were found, but they probably do not belong to the set.

Many of the rnd I (07) 35's have irregularly shaped heads.

Toronto, Hamilton & Buffalo

2 1/2	× 1/4	rnd I	stl	(14)	15
2 1/2	× 1/4	rnd R	stl	(07)	15,16
2	× 3/16	rnd R	mi	(11)	17
2 1/2	× 1/4	rnd I	stl	(01)	18,19
1 1/4	× 3/16	rnd I gm	cop	(60)	20,21,21:b,22,22:b
1 1/4	× 1/4	rnd I	cop	(39)	23-26
1 1/2	× 1/4	rnd R os cp	stl	(38)	35-41,46-48
1 1/4	× 3/16	rnd I	cop	(39)	34
1 1/2	× 1/5	rnd R	stl	(39)	42-46
1 1/2	× 1/4	rnd R cp	stl	(38)	49-57
1 1/2	× 1/5	rnd R ts	stl	(37)	58-60
1 1/2	× 1/4	rnd R ts	stl	(37)	61,62
Possibly from second hand ties					
1 1/2	× 1/4	rnd R os cp	stl	(38)	33,34
From second hand Michigan Central ties					
2 1/2	× 1/4	rnd R	stl	(07)	25
2 1/2	× 1/4	rnd R	stl	(05)	27
2 1/2	× 1/4	rnd R	stl	(10)	29,30

"About 1918 the Toronto, Hamilton & Buffalo began the treatment of beech, birch and maple ties. Again an 8-lb. net-weight retention of creosote coal-tar solution was specified." ['37, 192]

The (14) 15's (and possibly also the (07) 15's) are found in the end of the tie, like Western Maryland nails. Nails 16 through the copper 34 are found outside the rail, while later nails are found between the rails.

Earl Sanders found three short rnd R copper 27's on the TH&B—and he wanted $200 each for them! [Jun '76, 9]

Second hand nails from the Michigan Central are not uncommon. The TH&B was partly controlled by the New York Central, which owned the Michigan Central.

The shank markings on the copper (39) 23-25 are characterized by a verticle line running down both sides of the shank through five horizontal anchors, like (18C), but with the line running the entire length of the shank. The 26's have standard markings: several horizontal anchors only. One 25 pulled between Smithville and Hamilton has the markings of 1926.

Steve Worboys and I found the (38) 33 and 34 in ties reused as fenceposts along the TH&B. Three (38) 33's were pulled between Welland and Fenwick. The fence, close to the TH&B bed, also had nails common to both TH&B and CN, and a Michigan Central 25 (second hand). It is possible that the 33's are CN nails. Only one (38) 34 was found. It was pulled from a fencepost along the railroad.

The 53 is scarce, and the 48 is rarer.

See Steve Worboy's article in [M-A '90, 6-8].

Tremont & Gulf

2 1/2 × 1/4	rnd R	stl	(19)	36,37:b,38,39
2 × 1/4	rnd R	stl	(19)	41-45
2 1/2 × 1/4	rnd R	stl	(17)	56-58
From second hand ties				
2 1/2 × 1/4	rnd R	stl	(07)	24,25
2 1/2 × 1/4	rnd R	stl	(01)	27:b
2 1/2 × 1/4	rnd R	stl	(05)	28
2 1/2 × 1/4	rnd R	stl	(10)	28
2 1/2 × 1/4	rnd R	stl	(17)	30:b
2 1/2 × 1/4	rnd R	stl	(06)	32
2 × 1/4	rnd R	stl	(07)	33

The Tremont & Gulf, a Louisiana line, was 84.1 miles long. 79 miles were retained by the Illinois Central following formal abandonment July 31, 1959.

The (19) nails were found in terrible condition. Many were pulled by Bob Hines.

The second hand nails are in Jerry Penry's collection. They were traded to Vince Smedley long ago. Here are possible sources for them:

L&N	24, 25, (10) 28, 33
Cotton Belt	(05) 28, 32
MoPac	25, (05) 28
Santa Fe	27:b, 30:b, 32

Trona

2 1/2 × 1/8+	rnd R gm	stl	(18B)	22,23:b,24:b,25-29	
2 1/2 × 1/4	rnd I	stl	(07)	24	
2 1/2 × 1/4	rnd R	stl	(07)	26	
2 1/2 × 3/16	rnd R gm	stl	(07)	33,34,36	
2 1/2 × 3/16	rnd R gm	stl	(18B)	34	
2 1/2 × 1/4	rnd R	stl	(18B)	31,32,35,36	
2 1/2 × 1/4	rnd R	stl	(18C)	37-41	
2 × 1/4	rnd R	stl	(07)	46	
2 1/2 × 1/4	sqr I	stl	(05)	47-52,60	
1 × 1/8+	rnd I hs gm	stl	(18B)	8,9	(Shown also in Code Set #46)

The Trona operates 30.5 miles in California, and connects with the Southern Pacific. Many nails in the list were also used by the SP, which leads me to suspect that a good number of them are really from second hand SP ties.

Al Gustafson, in [Winter 2002, 7], claims that the 8 and 9 are switch nails, indicating ties 8 and 9 feet long, respectively. The 8 then does not make sense. We need to look into this.

Tucson, Cornelia & Gila Bend

2 1/2 × 1/4	rnd I	stl	(07)	22-29
2 1/2 × 1/4	rnd R	mi	(11)	26
2 1/2 × 1/4	rnd I	stl	(03)	30:b
2 1/2 × 1/4	rnd R	stl	(17)	30,31
2 1/2 × 1/4	rnd I	stl	(18B)	31,32,35
2 1/2 × 1/4	rnd R	stl	(18B)	32-36
2 1/2 × 1/4	rnd R	stl	(18C)	37-41,44-70
2 1/2 × 3/16	rnd R gm	stl	(18C)	42
2 1/2 × 1/4	rnd I	stl	(18C)	43

(continued)

Mel Smith, who walked all 40 miles, wrote in [M-A '85, 2] that the TC&GB "did not use a 47. This I found out from a retired section foreman from the TC&GB." "I have my doubts on the rnd R 30-32, 35, 43 as I have only found these years in a rnd I (03) 30, rnd I (18B) 31, 32, 35, 43. I did find (18B) and (18C) 36, (17) and (18C) 40. I also found a rnd R (07) 28, 29." About the (07) 28 and 29 he wrote "These could have been used ties from the Rock Island railroad as they were freshly inserted." See also [M-J '88, 1].

The rnd I (18B) 32 is rare.

Unadilla Valley

From second hand ties

2 1/2 × 1/4	dia I		stl	(07)	10:b
2 1/2 × 1/4	rnd R		mi	(11)	11,16
2 1/2 × 1/4	rnd R		stl	(07)	12-15,22-26,26:b,27:b,28-33
1 3/4 × 5/16	rnd I		stl	(01)	13,15
2 1/2 × 1/4	sqr I		stl	(07)	13,19,20,22,26:b,27,29,30
2 1/2 × 1/4	rnd I		stl	(01)	14
1 3/4 × 5/16	rnd I		stl	(05)	16,17
2 1/2 × 1/4	sqr R		stl	(07)	18
2 1/2 × 1/4	rnd I		stl	(64)	18,18:b
2 1/2 × 1/4	sqr I		stl	(05)	21,23-25,27,28,31
2 1/2 × 1/4	rnd I		stl	(07)	23,25,25:d,26:c,30:c,31,33,34:b
2 × 1/4	rnd I		stl	(07)	24
2 1/2 × 1/4	sqr R		stl	(05)	25
2 × 1/4	rnd R		stl	(07)	25
1 1/4 × 3/16	rnd I	gm	cop	(60)	26:b,27
1 1/2 × 1/4	rnd I		stl	(07)	27
2 × 3/16	rnd R		mi	(11)	27
2 1/2 × 1/4	rnd I		cop	(60)	29
2 1/4 × 1/4	cut I		stl	(03)	31
2 1/2 × 1/4	cut R		stl	(03)	35,36

The UV was a 20 mile short line in central NY, abandoned in December, 1966.

Leo Johnson, who owns part of the roadbed, pulled most of the nails. An "old-timer" who worked on the UV told him that the only nail the UV used is the rnd R (07) 26:a. This seems unlikely, and it is virtually impossible to verify.

The stubby 16 and rnd R 23 were each found outside the rail. See [M-J '90, 9].

Sources for second hand nails

Delaware, Lackawanna & Western

2 1/2 × 1/4	rnd R		mi	(11)	11,16

The 16 is very rusty and may be the 16:b of the LV.

Lehigh & Hudson River or New York, New Haven & Hartford

2 1/2 × 1/4	rnd I		stl	(01)	14

Narragansett Pier

2 1/2 × 1/4	cut I		stl	(03)	31

Nashville, Chattanooga & St. Louis

2 × 3/16	rnd R		mi	(11)	27

(continued)

New York Central

2 1/2 × 1/4	sqr	I	stl	(07)	13,19,20,22,27,29,30
2 1/2 × 1/4	sqr	R	stl	(07)	18
2 1/2 × 1/4	sqr	I	stl	(05)	21,23-25,27,28,31
2 1/2 × 1/4	sqr	R	stl	(05)	25

New York, New Haven & Hartford

2 1/2 × 1/4	cut	R	stl	(03)	35,36

Nickel Plate

2 1/2 × 1/4	sqr	I	stl	(07)	26:b

Pittsburg, Shawmut & Northern

2 1/2 × 1/4	rnd	I	cop	(60)	29
2 1/2 × 1/4	rnd	I	stl	(07)	30:c,31,33,34:b

The 34:b has smaller numbers than 34:a.

Shadow sets

Enigma set

2 1/2 × 1/4	rnd	I	stl	(64)	18,18:b

Stubby shadow set

1 3/4 × 5/16	rnd	I	stl	(01)	13,15
1 3/4 × 5/16	rnd	I	stl	(05)	16,17

and possibly

2 1/2 × 1/4	rnd	I	stl	(07)	25,26:b

Union RR of Cambridge

This was a horse railroad. In 1855 they laid a number of spruce stringers and ties treated under pressure with $ZnCl_2$. The wood lasted a long time, but subsequent work was done badly, and the process was abandoned. This is the earliest known use of $ZnCl_2$ for ties in the U.S. [ASCE 7-85, 257-258]

Union RR

2 1/2 × 1/4	sqr	R	stl	(07)	27-43
1 1/2 × 1/4	sqr	R	stl	(07)	34
2 1/2 × 1/4	sqr	R	stl	(08)	44-46
2 1/2 × 1/4	irr	R ss	stl	(08)	47,48
2 1/2 × 1/4	irr	R ss	stl	(07)	48,49,52,53
2 1/2 × 1/4	rnd	R	stl	(07)	59
2 1/2 × 1/4	rnd	R	stl	(06)	61
Code nails					
2 1/2 × 1/4	rnd	R	stl	(06)	P #4

This is a 38 mile switching railroad in Pennsylvania.

Union Carbide

2 1/2 × 1/4	rnd	I	stl	(07)	34-37,41
2 × 1/4	rnd	R	stl	(07)	44,61,66
2 1/2 × 1/4	sqr	I	stl	(05)	50-54
2 1/2 × 1/4	sqr	R	stl	(05)	55
3 × 1/4	rnd	I gm	brs	( )	56-60
2 × 1/4	rnd	I	stl	(06)	62,63
2 × 1/4	rnd	I	alm	(61)	65
2 1/2 × 1/4	rnd	R	stl	(06)	67
2 1/2 × 1/4	rnd	R	stl	(06)	68:b

Union Pacific / OSL / SLR

2 1/2 × 1/4	rnd I	stl	(01)	04,05,5,5:b,07,12,15
2 1/2 × 1/4	rnd I	stl	(18B)	4,5,6,6,08
2 1/2 × 1/4	rnd I	stl	(18A)	5,07,08,8,09,10
2 1/2 × 1/4	rnd I	stl	(07)	05,5,06,6,07,7,08,8,09:b,9,9,10,10:c,11-17,18:b,19-21
2 1/2 × 1/4	sqr I	stl	(18)	10-13,13:b,14,15,19
2 1/2 × 1/4	sqr I	stl	(07)	11,12,14-17,19,19:b,20
2 1/2 × 1/4	rnd I	stl	( )	12
2 1/2 × 1/4	rnd R GM	stl	(07)	12-20
2 1/2 × 7/40	rnd R gm	stl	(07)	12-14,17-20
2 1/2 × 7/40	rnd R	stl	(07)	15-17
2 1/2 × 1/4	rnd I	stl	(14)	15
1 1/2 × 1/4	rnd R	stl	(07)	15-19
1 1/2 × 1/4	sqr R	stl	(07)	15-19
2 1/2 × 1/4	rnd R	stl	(07)	16,17
2 1/2 × 1/4	rnd I	stl	( )	17
2 1/2 × 1/4	sqr R	stl	(07)	18-20
2 × 11/40	rnd R	stl	(07)	20,21
2 × 1/4	rnd I	stl	(07)	21
2 1/2 × 1/4	sqr R	stl	(18)	21-28
2 1/2 × 1/4	rnd R	stl	(18B)	21:b,31
2 × 1/4	rnd R	stl	(07)	22,23,23:b,25,27,34,34:b,36
2 × 1/4	rnd R	stl	(18A)	24-26,28
2 × 1/4	rnd R	stl	(18B)	24-29,35
2 × 1/4	rnd R	stl	(17)	29,29:b,30-33,36
2 × 1/4	rnd R	stl	(18C)	64

Pole nails

Some regular UP nails can be found in poles along the railroad.

Code nails

2 × 1/4	rnd R gm	stl	(07)	0-6,7-9	(Set #6)
2 1/2 × 1/4	rnd R gm	stl	(07)	0-9	(Set #15)
2 1/2 × 7/40	rnd R gm	stl	(07)	0,5,6,7,8	(Set #31)
2 1/2 × 7/40	sqr R rs gm	stl	(07)	9	(Set #31)
2 1/2 × 7/40	rnd R gm	stl	(07)	8	(Set #32)
2 × 1/4	rnd R GM	stl	(07)	A #4,B #7,C #14,F #8,G #5,L #3	
2 × 1/4	sqr R	stl	(18)	L #2,V #7	

Switch nails

See pages 135-138 of Volume III. There are too many types to legibly write here.

This is the combined list of nails found on the Union Pacific, Oregon Short Line, and Salt Lake Route. Though these lines probably used different nails before the early 1920's, collectors have mixed them up for so long that it is impossible to adequately separate them. Some have made the effort, and here are nails I have encountered as being from OSL or SLR, but not UP:

Oregon Short Line

2 1/2 × 1/4	rnd I	stl	(01)	05,5,07	
2 1/2 × 1/4	rnd I	stl	(18B)	6	
2 1/2 × 1/4	rnd I	stl	(07)	10:c	(Possibly also UP)
2 1/2 × 1/4	sqr I	stl	(07)	19:b	(Possibly also UP)

(continued)

Salt Lake Route

2 1/2 × 1/4	rnd I	stl (18A) 07,10
2 1/2 × 1/4	rnd I	stl ( ) 17
2 1/2 × 1/4	rnd R	stl (18B) 21:b

Many other nails in the combined list belong only to OSL or to SLR, but they cannot be identified. See OSL and SLR for possibilities. After about 1921 all three railroads used the same nails.

Corporate info

The UP owned the Oregon Short Line, the Oregon-Washington RR & Navigation Co., and the Los Angeles & Salt Lake (Salt Lake Route). The OSL was owned by UP before 1900, and trackage rights were granted to the UP July 1, 1909. Final integration took place on July 23, 1936. The OWRR&NCo. was created in 1910 from the Oregon RR & Navigation Co., the Oregon & Washington, the Idaho Northern RR, and the Ilwaco. OSL/UP owned all these lines before 1900. The OWRR&NCo., a subsidary of OSL, became part of the UP January 1, 1936.

The LA&SL was a subsidary of the OSL, and came under direct control of the UP in April, 1921. It was fully absorbed unto UP in January, 1936.

John M. Hoffmann wrote a short history of the UP which appears in [Oct '76, 4] and was reprinted in [J-F '86, 8]. Also, the first few pages of [S-O '80] give a nice history of the UP, with a description of the nail sets of UP, Oregon Short Line, and Salt Lake Route.

Early tie treating

The UP began its westward expansion in 1865, and they constructed a plant at Omaha which began operating that year treating ties with zinc chloride. Constuction of such a long railroad required more ties than the plant could handle, and what ties managed to fit the equipment were treated with too strong a solution, resulting in brittle ties. The plant was abandoned in 1866.

It was not until 1886 that the UP again attempted to treat large numbers of ties. In that year the UP's Laramie plant opened. It was built by Octave Chanute's Chicago Tie Preserving Co., which also built the Santa Fe's Las Vegas plant (1885) and the Rock Island plant at Chicago (1886). Ties, primarily pine, were treated by the Wellhouse process beginning July 26.

After treating over 200,000 ties, the plant was shut down for temporary economy in 1887. It burned shortly afterward, and was not rebuilt. UP officials did not believe that treatment would pay. [AREA '05, 776]

Burnettizing ties, beginning 1903

It was probably the combination of the rise in price of timber at the end of the nineteenth century, together with the success of the ties treated at Laramie in 1886-1887, which convinced officials to build a new plant. "As the then [1887] operating department had no faith in tie-treating, no records were kept of the ties in the track, but some years afterwards [in 1898] they were found to have outlasted several administrations and the present one has built another tie-treating plant on the site of the one dismantled at Laramie, Wyo., and it is to be expected that the records will show that it is obtaining good results." [AREA '05, 776][AREA '01, 106]

The new Laramie plant began treating ties with straight zinc chloride near the end of 1903. The UP built a portable plant which went into operation in 1902 at Rawlins, WY. It also treated ties with $ZnCl_2$. Burnettized ties on the UP were treated with .4 lb/ft^3. [WPN 8-51, 98]

The Rawlins plant was moved to North Topeka, KS in 1909, and it was dismantled in 1916.

Bridge piles on the UP were first treated with creosote beginning 1902, probably at the new portable Rawlins plant. [AREA '09, 619]

Consolidating track maintenance, 1921-1923

Up to 1921 the UP, Salt Lake Route, and Oregon Short line maintained their own track, operated their own treating plants, and individually determined which treatment to use. For example, the OSL (ORR&NCo.) used large numbers of full cell creosoted ties beginning 1906, treated at their Wyeth, OR plant, while the UP was using only zinc chloride. ['16, 293]['20, 100]

In the early 1920's the UP assumed control of ties on both the SLR and the OSL. The chronology of tie treating events is as follows:

(continued)

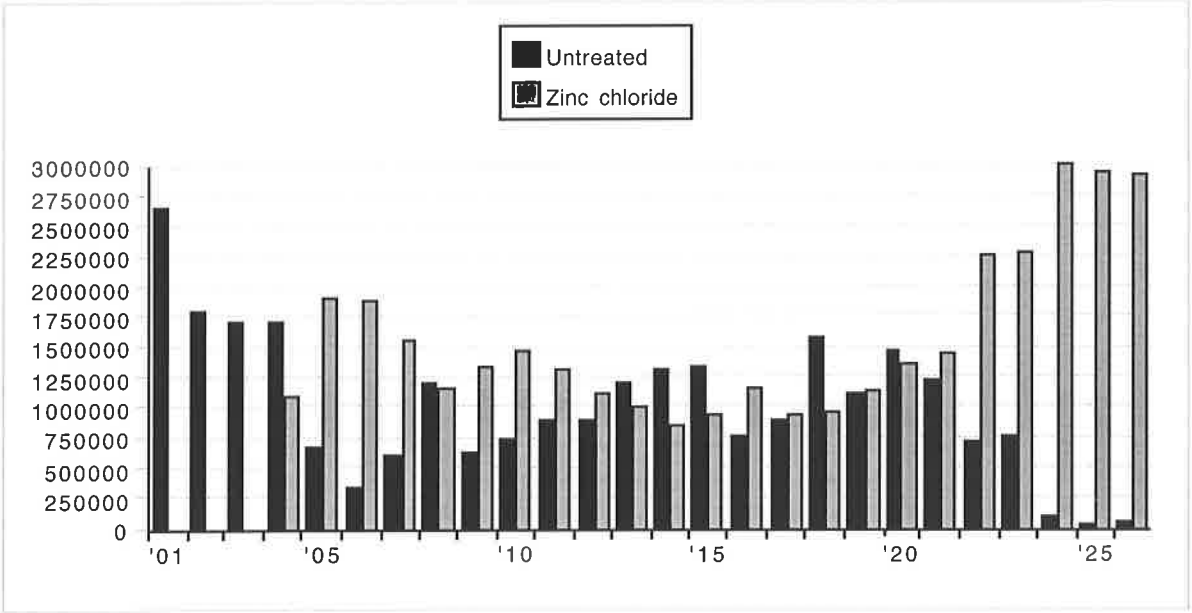
1920 On December 10, in time for 1921 tie installations, the UP completely revises its dating nail standard.
1921 In April the UP assumes direct control of the SLR.
The UP's Laramie plant is upgraded.
OSL builds its Pocatello, ID plant.
1921/22 UP assumes track maintenance of the SLR. [WPN 8-51, 100]
1922 OSL expands its Pocatello, ID plant.
1923 The UP assumes control of the OSL's treating plants.
UP moves the former OSL Wyeth, OR plant to The Dalles, OR.
UP abandons the Salt Lake Route's Zinc, CA plant.
Last year for large numbers of untreated ties on the UP.
1923-25 The UP establishes a series of comprehensive test sections on the OSL.
1924 The Laramie plant is again upgraded.

Date nails on the OSL, SLR, and UP become identical in 1921, so record keeping on the three railroads was certainly combined that year.

In the lists of treating plants published annually in the AWPA's *Proceedings*, the Salt Lake Route and OSL are listed as operating their own works through 1923. Beginning 1924 the former OSL plants are shown as UP, and the SLR's Zinc, CA plant is gone, abandoned by the parent company.

A footnote for the table of ties inserted by the UP (from which the bar graphs below were taken) says that in 1922 the Pocatello, ID plant was built, and the UP assumed track maintenance of the Salt Lake Route. Often such published dates are a year off, which explains why the two events are given as 1921 and 1923 respectively in the treatment plant lists. [WPN 8-51, 100]

Track consolidation of these three big railroads took from 1921 to 1923 to accomplish.



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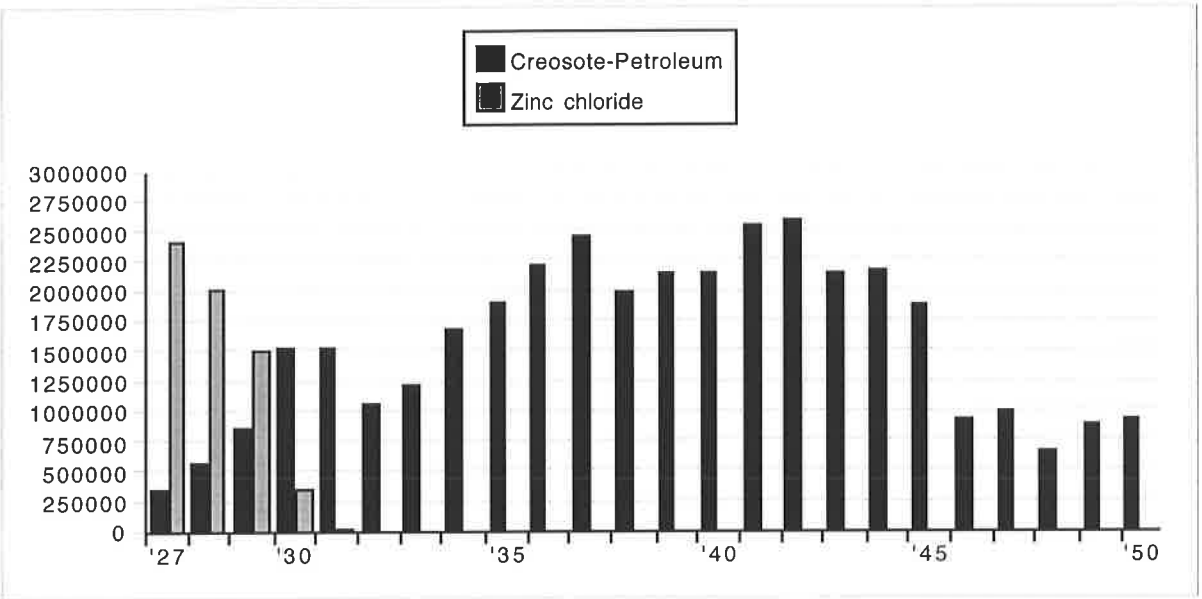

Ties laid by the Union Pacific, 1900-1950.

The bar graphs are from the table published in [WPN 8-51, 100]. The numbers of untreated ties installed are insignificant after 1923. We need to ask why zinc chloride treated ties begin in 1904 in the table. Perhaps, because the Laramie plant opened late 1903, the total for that year was lumped into the 1904 figure.

Tie treating, 1923 up

In the period 1923-1925 the UP established four extensive and varied test tracks on the OSL, with many ties being treated with creosote, some by Lowry's method, and some full cell. But still they did not veer from straight zinc chloride as their standard treatment until 1927.

"Creosote-petroleum treatment of crossties was initiated at Pocatello, Idaho and The Dalles, Ore. in 1927, and at Laramie, Wyo. in 1928." [WPN 8-51, 99] The treatment was 50-50 creosote-fuel oil by either the Rueping or Lowry process. After 1927 the proportion of zinc chloride treated ties declined rapidly, and the last year for the Burnett process on the UP was 1931.

"In June, 1942, as a war measure to conserve creosote," "treatment for crossties was changed from 50-50 creosote-petroleum to 30-70 creosote-petroleum. In February 1945, treatment was changed back to 50-50 creosote-petroleum." As of 1951 they were treating ties with 8 lb/ft^3. [WPN 8-51, 99-100]

Tie marking and record keeping

The UP, OSL, and LA&SL used their own nails through 1920. Presumably nails found on the OWRR&NCo. are the same as OSL's. Beginning 1921, with the exception of the LA&SL square 25 and 26 and the OSL 29 variation, the sets are identical. Even before 1921 there are similarities in the sets. This may be due to one railroad supplying ties to another, or to the UP reusing ties from one railroad on another after 1936. It is really impossible now to determine exactly which pre-1921 nails were used by which railroad.

Beginning with the opening of the new Laramie plant in 1903 date nails were driven into each treated tie at the plant. In 1903 J. Berry of the UP wrote "Nails, such as we would use, No. 3 galvanized wire, 2 1/2 in. long, with a head 1/2 in. in diameter, and a number on it..." [AREA '04, 99, 102][DNC, 12] Later, in 1907, he said "We use a dating nail, two to a tie, about six inches from the end on opposite sides, so that we cannot get it wrong. We put the dating nails in at the tie plant." ['07, 43]

Many spurious nails have been attributed to the UP, and I have hopefully eliminated the vast majority of them from the nail list. In the process all the 1903 nails went. They were rnd I (01) 3, rnd I (18B) 03, and rnd I (07) 3. I do not know which of these, if any, the UP used.

(continued)

It was probably about 1910 that the UP established a series of test sections on the model of those on the CB&Q and Santa Fe. One test section was established on each of six divisions. Given the absence of these tests from the test section lists, they were probably styled after the Santa Fe's 'renewal' tests. On the Santa Fe: "When the ties in these sections reach the limit of their service life, the replacement ties are taken into the records and these test installations are therefore perpetual in nature." ['41, 190]['14, table] [DNC, 290]

Even after instituting these tests, the UP continued to put date nails in all treated ties. Untreated ties were not marked. ['14, table][DNC, 290]

In [Feb '74, 6] is a UP diagram titled "Common Standard Tie Dating Nail." It was adopted December 10, 1920 and was revised August 18, 1927. Nails were to be driven into Burnettized (zinc-chloride treated) ties 10" outside the rail, and for creosote-oil treated ties 10" inside the base of the rail. The drawing indicates that nails are to be 2 × 1/4" rnd R. This diagram is also shown in [Shaw, 137] and in [J-A '98, 11].

In [S-O '77, 3] are two letters by Union Pacific officials. Each of these shows just how misinfomed a railroad man can be about his own company. From the first (undated) letter: "...I find that marking of railroad ties with date nails was employed on Union Pacific from about 1903 to 1936, and was used to determine which wood varieties and which treatments provided the greatest longevity. The plus sign (+) on the head of a date nail indicated zinc chloride treatment while the "×" identified one treated with a 50-50 mixture of creosote and oil." Besides contradicting the 1927 document, this seems difficult to believe. Can you imagine trying to determine whether a nail reads × or +? No such nails have been found, and he may have been confusing the marks used in foremen's notes with the marks on date nails.

The second letter also appears in [Feb '74, 4], and was written by the Director of Public Relations in 1969: "As far as the Union Pacific is concerned, the practice of using date nails was initiated in 1903." "We stopped using date nails in 1936 and since that time have been stamping the necessary informaton on the ends of the ties." "A raised date figure on the nail was used for treated ties and a depressed figure was used for untreated ties." "All date nails were installed 10" outside the rail by section foremen." This last rule was modified in 1927 to account for creosoted ties, as seen above.

"In 1927 our standard was revised to eliminate the use of depressed figures and all nails used 1927 to 1936 had the raised figures." This statement deserves some commentary. The standard, as mentioned above, was revised in 1927 to account for creosoted ties by specifying the location of the nail in the tie, not to eliminate the use of depressed figures. Besides, the last year for depressed figures was 1921, not 1927. If "1927" in the letter is a misprint for "1920," the statement can make sense. It is likely that the UP gave meaning to indented vs. raised figures. Both were in use 1912-1921. If it is true that indented = "untreated" and raised = "treated," then the 1914 report which claimed that nails were used only in treated ties was a couple years out of date. Then the Standard Plan for date nails was re-drawn in 1920 to eliminate indented nails. Perhaps untreated ties on the UP were dated only in the period 1912-1921.

Continuing with the letter: "Our records indicate that switch ties were date nailed as far back as 1944. Since 1944 we have hammer stamped the ends of switch ties imprinting the year the tie was treated." This statement is also odd. Probably he was confusing switch nails with date nails. Interpolating backwards from his misreading of the documents, we can guess that switch nails were used up to 1944, after which the ties were stamped.

Certainly there was a difference between ties with square nails and ties with round nails, but the meanings are unknown.

Glenn Wiswell advertized several rare UP nails he acquired at an auction of a deceased UP maintenance-of-way man. Included was the rnd I (01) 04, which has probably not been found elsewhere. In his 1983 flyer, Wiswell advertized a rnd I (01) 8.

A few 1 3/4" rnd I (01) 15's have been found. They are probably factory errors.

The UP may have used a sqr I stl (18) 17. Charles Sebesta got one from a collector in Oregon.

Only one 2" rnd R (18A) 28 has been found.

Nails before 30 are difficult to find. The 2" (17) 30-33, 36, 2" (07) 34 (including variations), and 2" (18B) 35 are fairly common. Switch nails are now scarce.

(continued)

The letter nails A-L have only recently surfaced (2002). They were probably used in a single test section. Nothing more is known about them. [Summer 2002, 3-4][Fall 2002, 6]

The 64 and the letters L and V are found together, each tie having a 64 and one letter nail. On the main line west of Evanston, WY the 64 and V are found in the middle of the tie. [S-O '88, 3]

The single-digit 7/40" nails are code nails. The date nails of this series run 12-22, and the 18-22 have gm. Because the code nails also have gm, they were probably used in 1918 or later. They are common on the OSL, so they may actually date from 1921 or later. This is also true of the other code nails, which are found on both UP and OSL.

Code Set #6 is very old. [DNC, 177]

Mel Smith found the 1/4" rnd R gm 5 inside the rail in switch ties. [N-D '88, 9]

Switch nails were driven into the ends of overlength ties at the treating plant to easily distinguish the various lengths of ties when inserting them at switches. After they were placed in the track they served no purpose.

Dates 26 through 28 are common in poles along the UP, and Arnold Smith found 06 and 07 in poles. [N-D '78, 2]

For an article on plastic date marks on concrete ties from the 1980's and 1990's, see Jerry Penry's article in [J-A '94, 9].

Articles: [N-D '78, 2],[S-O '80, 1-4], [J-F '86, 8] (a reprint), [M-J '86, 10-13], [S-O '88, 3], [N-D '88, 9-10], [M-J '89, 1-2], [M-A '90, 4]. See especially [Winter 2000, 6-11]

Treating plants

— Omaha, NE, 1865. This plant treated primarily cottonwood ties with zinc chloride for ties in the construction of the Transcontinental Railroad. With three retorts the plant was too small for the job, could not accept most ties because of their size, and too strong a solution was used. Some secondary sources give the years of operation as 1866-1867, but a contemporary account published in *Railway Record*, June 15, 1865, p. 205 stated that the plant was nearly ready to begin treating. It was abandoned Sometime October-December 1866. [RG 10-29-86, 737][WPN 8-51, 97][Trat II, 235][UP, 108-110]

For more comments and a photo of the plant in operation, see [Summer 2000, 11-12]. The photo can be seen better at

http://CPRR.org/Museum/Burnetizing.html

— Laramie, WY, 1886. This two cylinder plant was built by Octave Chanute's Chicago Tie Preserving Co. to treat primarily mountain pine ties by the Wellhouse process. It went into operation July 26, 1886. "Work was suspended in 1887 for reasons of temporary economy" [AREA '01, 106] The plant was "finally dismantled after a fire which destroyed one of the buildings." The fire occurred before August 10. [AREA '01, 106][AREA '05, 776][RG 10-29-86, 736-737][RA 2-3-05, 151]

According to [AREA '01, 106], about 250,000 ties were treated in 1886-1887. From ['16, 317] is a record of 242,000 Burnettized pine ties in Wyoming for 1886. "Burnettized" is surely a misprint for the Wellhouse process, but the number is close to 250,000. [Trat II, 235] says that 207,878 ties were treated at Laramie in 1886-1887. Perhaps Tratman's number is for pine only, and the 242,000 is the total number of ties treated.

— Rawlins, WY / North Topeka, KS, 1902. In the latter part of 1902 this two retort portable plant went into operation at Rawlins, WY. It was used to treat ties by the Burnett process, and was moved to N. Topeka, KS in 1909, where it was abandoned in 1916. [WPN 8-51, 97][AREA '04, 75] Because UP tie records begin in 1903, this plant may have treated only piles or other timbers in its first year.

— Laramie, WY, 1903. On the site of the 1887 plant the UP built a new one in 1903. Here ties, primarily pine, were treated in two retorts with straight zinc chloride. The plant went into operation sometime in the latter part of 1903. [AREA '04, 98][RA 2-3-05, 151]['10, 139]

The two retorts from the N. Topeka plant were moved to Laramie in 1916. In 1921 the two 1903 retorts were replaced with new ones. One of these was itself replaced in 1924, and in 1929 a fifth retort was added. The two N. Topeka retorts were abandoned sometime 1930-1934. ['22, 485]['24, 315]['30, 423] ['34, 474]

Sometime 1934-1940 the plant was farmed out to the Forest Products Treating Co. ['40, 452]

— The Dalles, OR, 1903. Originally at Wyeth, OR, this was the Oregon RR & Navigation Co.'s two-retort portable plant. In 1905 two cylinders were added for treating ties and maybe other timbers by

(continued)

Boultonizing (boiling in creosote), and in 1910 its ownership transferred to OSL. ['12, 285] The plant was moved to The Dalles, OR in 1923, when it became a UP plant. [WPN 8-51, 97-98][AREA '04, 75]

In 1933 a fire destroyed the works, and the following year it was sold to the Forest Products Treating Co., which operated three new retorts. A fourth, from Pocatello, was added in 1941, and between 1945 and 1952 the plant came into the hands of Baxco Corp., later J.H. Baxter. Later the plat was sold to Kerr-McGee Chemical Corp. [WPN 8-51, 97-98]['34, 474]['44, 430]['52, 394]

— Pocatello, ID, 1921-1922. This OSL plant was built with one retort in 1921 and was enlarged to two the following year. It became a UP plant in 1923, and in 1925 a third treating cylinder was added. In 1941 the 1922 and 1925 retorts were moved to The Dalles. (But only one was added at The Dalles that year according to the lists.) The last retort was abandoned in 1948. ['22, 484]['30, 423]['44, 433] [WPN 8-51, 98]

Early test sections

- Between Omaha and Columbus, NE, 1865-1866.

  "Burnettizing works were erected at Omaha by [the UP] in 1867-8 (sic), and run about one year on cottonwood ties... The works were abandoned as impracticable, as not one-tenth of the ties used could be put through the machine. Some difficulty was also found from the brittleness of the prepared ties, probably...from the use of too strong a solution in order to hasten the process." The plant really operated 1865-1866. [UP, 108-110][ASCE 7-85, 262][WPN 8-51, 97][Trat II, 235]

- Wyoming Territory, 1868.

  "Some years ago it was discovered that there was a strip of road in the track of the Union Pacific Railroad, in Wyoming Territory, about 10 miles in length, where the ties do not decay at all. The Chief Engineer, Mr. Blinkinsderfer, kindly took up a cottonwood tie in 1882, which had been laid in 1868, and sent a piece of it to the committee. It is as sound and a good deal harder than when first laid, 14 years before, while on some other parts of the road cottonwood ties perish in 2 or 5 years." [ASCE 7-85, 254]

  The ties were untreated and did not decay because of the high amounts of sodium, potassium chloride, calcium, and iron in the soil.

- West of Rawlins, WY, 1886.

  Some Wellhouse treated mountain pine ties, .78 lb/ft^3. ['16, 322][AREA '01, 106][AREA '04, 98]

- Other sites, 1886.

  These references are too sketchy to list as separate tests.

  — Some Wellhouse treated fir ties, .78 lb/ft^3. ['16, 293]

  — 150,000 Wellhouse treated hemlock ties, .3 lb/ft^3. [AREA '09, 618]['15, table]['16, 300] ['20, 106] (The latter source wrongly says NP, not UP.)

  The species cannot be solely hemlock, because mainly pine was treated at Laramie.

  From [RG 10-29-86, 736] the exact number of ties treated from July 26 to August 31, 1886 is given, and from it I estimate that the plant produced about 146,066 ties by the end of the year. Thus the number 150,000 might represent the production of the Laramie plant for 1886.

  — Wyoming: 242,000 Burnett treated pine ties. Also included in this number are spruce, Oregon fir, elm, ash, maple, and oak. ['16, 317]

  This must be a misprint for the Wellhouse process. According to [RA 2-3-05, 151], a total of about 250,000 ties were treated at Laramie in 1886-87, so 242,000 might reflect the total output of the plant.

Test sections 1902-1910.

- ?, 1902.

  Some Burnett treated fir and pine ties were laid. [AREA '09, 619]['16, 293]

- Nebraska, 1903.

  105 Burnett treated lodgepole pine ties. ['20, 122]

- Kansas, 1903.

  22 Burnett treated lodgepole pine ties. ['20, 122]

(continued)

...**Union Pacific**

- Colorado, 1905.
  292 Burnett treated lodgepole pine ties. ['20, 122]
- Nebraska, 1905.
  508 and 510 Burnett treated lodgepole pine ties in two locations. ['20, 122]
- Colorado, 1907.
  752 Burnett treated lodgepole pine ties. ['20, 122]
- Wyoming, 1908.
  3,428 Burnett treated lodgepole pine ties. ['20, 122]
- Norfolk, NE, 1908.
  81 .4 lb/ft^3 Burnett treated Southern yellow pine ties. ['20, 112]
- Nebraska, 1908.
  233 .4 lb/ft^3 Burnett treated Douglas fir ties. ['20, 102]
- Kansas, 1910.
  164 .4 lb/ft^3 Burnett treated Douglas fir ties. ['20, 103]

The system of test sections, ca. 1910.

One test section was placed on each of these divisions: Nebraska, Wyoming, Western, Kansas, Central, and Colorado. The ties included both $ZnCl_2$ and untreated pine ties. It is impossible to determine when the test sections were established, because all we are given are the numbers of ties removed for 1922 and the average life in track. It is possible that they included some of the 1903-1910 tests above, but more likely they are tests established about 1910 in response to CB&Q and Santa Fe experiments. They were definitely in place as of 1914. ['14, table]['24, 251]

Tests beginning 1923

- Between Hammett and Reverse, ID, 1923-1924 (OSL).
  Full cell 30%-7.5%-62.5% creosote-coal tar-fuel oil treated ties.
  720 white fir and Engelmann spruce, laid December, 1923.
  741 Western yellow pine, laid December, 1923.
  633 mountain Douglas fir and western tamarack, laid November, 1923.
  625 lodgepole pine, laid December, 1923.
  766 Douglas fir, laid December, 1923.
  1/2 lb/ft^3 zinc chloride treated ties.
  782 white fir and Engelmann spruce, laid December, 1923.
  757 Western yellow pine, laid January, 1924.
  452 mountain Douglas fir and western tamarack, laid November, 1923.
  626 lodgepole pine, laid December, 1923.
  950 coast Douglas fir, laid December, 1923.
  80%-20% creosote-coal tar 10 lb/ft^3 full cell treated ties.
  170 lodgepole pine, laid December, 1923.
  64 Western yellow pine ties, laid December, 1923. ['25, 166]['31, 32]['37, 183]['53, 190, 193] [AREA '30, Table]
- Between Rogerson, ID and Wells, NV, 1924-1925 (OSL).
  Ties were installed in the construction of this new track from June through December, 1924.
  Two movement $ZnCl_2$-fuel oil (.5 lb/ft^3 $ZnCl_2$ and 3.5-4 lb/ft^3 oil, 8 hours between treatments) treated ties.
  3,147 Western yellow pine.
  3,169 Western fir and Engelman spruce (Dec. 1924).
  3,171 coast Douglas fir (Dec. 1924).
  5,743 mountain Douglas fir (1924-1925).
  2,303 lodgepole pine (Feb. 1925).

(continued)

.5 lb/ft^3 zinc chloride treated ties.
5,131 lodgepole pine.
3,203 white fir and spruce.
5,713 mountain Douglas fir.
3,216 coast Douglas fir.
3,196 Western yellow pine.
8 lb/ft^3 full cell creosoted ties.
3,159 coast Douglas fir. ['26, 217]

- From Orchard to Boise, ID, 1924 (OSL).
  In the main line the following ties were laid in May, 1924.
  780 4 lb/ft^3 creosote-4 lb/ft^3 fuel oil Lowry treated coast fir.
  782 3.6 lb/ft^3 creosote-8.4 lb/ft^3 fuel oil Lowry treated white fir.
  3,131 8.6 lb/ft^3 creosote-4 lb/ft^3 fuel oil Lowry treated white fir and spruce.
  3,081 8 lb/ft^3 creosote Lowry treated Idaho red fir.
  3,331 8 lb/ft^3 creosote Lowry treated lodgepole pine.
  2,579 8 lb/ft^3 creosote Lowry treated Western yellow pine.
  3,028 8 lb/ft^3 creosote Lowry treated coast fir.
  3,069 .5 lb/ft^3 zinc chloride treated Western yellow pine.
  2,915 .5 lb/ft^3 zinc chloride treated white fir and spruce.
  2,375 .5 lb/ft^3 zinc chloride treated lodgepole pine.
  3,145 .5 lb/ft^3 zinc chloride treated red fir.
  767 .401 lb/ft^3 zinc chloride treated lodgepole pine.
  3,037 .418 lb/ft^3 zinc chloride treated coast fir. ['31, 31]['37, 185]['53, 190-193]

- Wells Branch (Twin Falls, ID to Wells, NV), 1924-1925 (OSL).
  All are sawn ties, except as noted.
  .5 lb/ft^3 zinc chloride treated ties.
  3,197 white fir and spruce, laid December, 1924.
  3,210 west coast fir, laid September, 1924.
  3,186 Western yellow pine, laid December, 1924.
  3,150 Idaho red fir, laid July and August, 1924.
  2,538 hewn lodgepole pine, laid September, 1924.
  3,175 lodgepole pine, laid January, 1925.
  3,166 white fir and spruce, laid December, 1924.
  2,562 hewn Idaho red fir, laid January, 1925.
  .5 lb/ft^3 $ZnCl_2$-3.5 lb/ft^3 fuel oil, two movement treated ties.
  3,171 west coast fir, laid December, 1924.
  3,142 Western yellow pine, laid January, 1925.
  3,209 Idaho red fir, laid January, 1925.
  2,297 hewn lodgepole pine, laid February, 1925.
  2,526 hewn Idaho red fir, laid December, 1924.
  8.5 lb/ft^3 full cell creosoted ties.
  3,148 west coast fir, laid August, 1924. ['31, 32]['37, 182]['53, 190-192]

- Between Dietrich and Shoshone, ID, 1927 (OSL).
  In the second main track, the following lodgepole pine ties were laid in January, 1927. ['31, 34] ['37, 184]
  780 .4 lb/ft^3 Burnett treated ties.
  799 .5 lb/ft^3 $ZnCl_2$, followed by 6 mo. seasoning, then 7.909 lb/ft^3 fuel oil treated ties.

- Near Laramie, WY, 1927.
  In cooperation with the U.S. Forest Service, the following ties, treated with .4 lb/ft^3 zinc chloride were laid in October, 1927. ['41, 277]
  100 hewn Engelmann spruce.
  400 lodgepole pine, both hewn and sawed.

(continued)

- Wyoming, 1942.
  1,766 lodgepole pine ties, Rueping process, 50-50 creosote-petroleum mixture at 8 lb/ft^3. ['53, 193]
- Wyoming, 1946.
  932 lodgepole pine ties, Lowry process, 50-50 creosote-petroleum mixture at 8 lb/ft^3. ['53, 193]
- Oregon, 1946.
  657 Douglas fir ties treated with a creo-petro-Penta solution by the Lowry process. ['53, 194]
- Northern Idaho, 1947.
  874 Douglas fir ties treated with a creo-petro-Penta solution by the Lowry process. ['53, 194]
- West of Evanston, WY, 1964.
  The 64 and V were found in the middle of each tie in this stretch of track. [S-O '88, 3]

U.S. Government

2 1/2 × 1/4	sqr R	stl	(05)	51
2 1/2 × 1/4	rnd I	stl	(06)	52,55,57
2 1/2 × 1/4	sqr I	stl	(05)	58
2 × 3/16	rnd I	alm	(61)	59
2 1/2 × 1/4	rnd R	stl	(18C)	61,70
2 1/2 × 1/4	rnd R	stl	(06)	63,68
1 1/4 × 3/16	rnd I	alm	(61)	64
3/4 × 3/16	rnd I	alm	(61)	64
2 × 1/4	rnd R	stl	(07)	65
2 × 1/4	rnd I	alm	(61)	67,68
2 1/2 × 1/4	rnd R	alm	(61)	72
2 × 3/16	rnd I	alm	(61)	71,79,82-84,92,95,98
2 1/2 × 3/16	rnd R	stl	(10)	99
From second hand ties?				
1 1/2 × 1/5	rnd R	stl	(07)	42,45
2 1/2 × 1/4	rnd R	stl	(07)	41,46,49,51,52

All are from the U.S. Navy Ammunition Depot in Earle, NJ, except the sqr R 51, which can be found in every tie on the line through Brandywine, MD.

Both George Oliva and Russ Hallock have discovered recently that this line is still using nails! George has recovered metal tags used to date ties in 54, 55, and 57. The 01 / BPB / P is a nail normally found in fenceposts. BPB = Burke Parson Bowlby Corp., the treating company. [Summer 2000, 16-17] [Winter 2001, 14-15][Winter 2002, 12-13]

Utah

2 1/2 × 1/4	sqr I	stl	(18)	19
2 1/2 × 1/4	sqr R	stl	(18)	20-41,46-49
2 1/2 × 1/4	rnd R	stl	(18A)	24,25,34
2 1/2 × 1/4	rnd R	stl	(18B)	26-36
2 1/2 × 1/4	rnd I	stl	(18B)	27
2 1/2 × 1/4	rnd R	stl	(18C)	37-49
From second hand UP ties				
2 × 1/4	rnd R	stl	(18B)	28,29,35

The Utah RR was incorporated January 24, 1912 and was completed in 1914. It was operated by the Rio Grande until 1917 when it assumed independent operation. For a history of the Utah with map, see [M-A '92, 4-6].

"Before 1932 all the nails were placed on the outside of the rail to the right hand side of the track in the direction of the milepost markers. After 1932 they were placed on the same side, but just [6"] inside the rail, except on switch ties, in which case they continued to place them on the outside of the rail." In 1932 the nails can be found in both positions.

(continued)

Square nails were used in untreated ties and round nails in treated ties. Because the Utah received federal aid during the war, no untreated ties were used in the period 1942-1945.

Nails through 1928, except the 26's, were ungalvanized. The 43, 44, and 45 were also ungalvanized, and are somewhat scarce. The following are even rarer: the square 19, 25-29, 38-41, 46, and the round 24-27. Only 13 square 40's are known, and they were found in switch ties. One 39 has been found. Nails in the late twenties and early thirties are scarce.

This information is mostly from V. Arnold Smith's article in [M-A '79, 3, 6] (with a picture of the set). See also Al Nielsen's article in [M-A '94, 5-6].

Vermont

From second hand ties

1 1/4 × 3/16	rnd I	cop	(60)	23:b
2 1/2 × 1/4	sqr R	stl	(05)	25
2 1/2 × 1/4	rnd R	stl	(07)	26,39,49
2 1/2 × 1/4	sqr I	stl	(05)	31
2 1/2 × 3/16	rnd R gm	stl	(07)	31
2 1/2 × 1/5	rnd R	stl	(04)	32
2 1/2 × 1/4	rnd I	stl	(07)	34,37,38,43
2 1/2 × 1/5	rnd R gm	stl	(09)	35,36
2 1/2 × 1/5	rnd R gm	stl	(18B)	36
1 1/2 × 1/4	rnd R os cp	stl	(38)	37,38,40,41,47
2 1/2 × 1/5	rnd R gm	stl	(04)	38-42
1 1/2 × 1/5	rnd R	stl	(07)	42
1 1/2 × 1/5	rnd R	stl	(39)	42-45
1 1/2 × 1/4	rnd R	stl	(05)	43
2 1/2 × 1/4	rnd R	stl	(17)	47
2 1/2 × 1/4	rnd R	stl	(06)	48,63
2 1/2 × 1/5	rnd R	stl	(18C)	50,51
1 1/2 × 1/4	rnd R cp	stl	(38)	51,54-57
1 1/2 × 1/5	rnd R ts	stl	(37)	58,59
1 1/2 × 1/4	rnd R ts	stl	(37)	62

The Vermont Ry was created in January, 1964 and operates former Rutland track from Burlington, VT to Bennington, VT. They also now operate a former branch of the Clarendon & Pittsford.

The nails listed above were pulled from ties on former Rutland track in Vermont. These ties may have been inserted by the Rutland. Also, the second hand rnd I (07) 29 and 41 listed under Rutland may have been inserted by the Vermont. See John Iacovino's article in [Summer 2003, 22-24].

Sources for second hand nails

Boston & Maine

2 1/2 × 1/4	rnd R	stl	(07)	39,49
1 1/2 × 1/5	rnd R	stl	(07)	42

Canadian National

1 1/2 × 1/4	rnd R ts	stl	(37)	62

Central Vermont

1 1/2 × 1/4	rnd R	stl	(05)	43

Erie or Lehigh & Hudson River

2 1/2 × 1/4	rnd I	stl	(07)	34,37,38,43 (The 43 is Erie)

M&NJ shadow set

1 1/4 × 3/16	rnd I	cop	(60)	23:b

(continued)

New York Central

2 1/2 × 1/4	sqr R	stl (05)	25 (or possibly Rutland)
2 1/2 × 1/4	sqr I	stl (05)	31

Southern Pacific, Texas and Louisiana Lines

2 1/2 × 3/16	rnd R gm	stl (07)	31
2 1/2 × 1/5	rnd R	stl (04)	32
2 1/2 × 1/5	rnd R gm	stl (09)	35,36
2 1/2 × 1/5	rnd R gm	stl (18B)	36
2 1/2 × 1/5	rnd R gm	stl (04)	38-42
2 1/2 × 1/5	rnd R	stl (18C)	50,51

Toronto, Hamilton & Buffalo

1 1/2 × 1/4	rnd R os cp	stl (38)	37,38,40,41,47
1 1/2 × 1/5	rnd R	stl (39)	42-45
1 1/2 × 1/4	rnd R cp	stl (38)	51,54-57
1 1/2 × 1/5	rnd R ts	stl (37)	58,59

The 37, 38, 40, 41, and 59 may be from Canadian National ties.

Article: [M-J '86, 25].

Virginian

2 1/2 × 1/4	rnd R	stl (04)	40,41
2 1/2 × 1/4	rnd R	stl (05)	42-44,44:b,45-52
2 1/2 × 1/4	rnd R	stl (09)	50:b,51:b,52-57
2 1/2 × 1/4	rnd R	stl (07)	58

The Virginian was acquired by the Norfolk & Western December 1, 1959. See Dave Parmalee's article in [J-F '82, 1], reprinted in [M-A '88, 9].

As of 1934 the Virginian had an inspector of wood preserving in Norfolk, VA. ['34, 504]

All nails were driven about 2" to 4" inside the north rail. See Steve Worboy's article in [J-F '90, 4-5].

N&W nails can be found in second hand ties on the Virginian. These nails were placed by the N&W after the 1959 takeover.

Wabash

2 1/2 × 1/4	rnd R	stl (07)	16-21,24,25,28:b,29,29:b,30
2 1/2 × 1/8+	rnd R	stl (07)	20,22,24-26
1 1/2 × 1/8+	rnd R	stl (07)	23,27,28
2 1/2 × 1/4	rnd R	stl (06)	30-37,38:b,39-41,48
2 1/2 × 1/4	rnd R	stl (09)	38,38:b,38:c,40
2 1/2 × 1/4	rnd R	stl (17)	42,47,49
2 1/2 × 1/4	rnd R	stl (05)	43,44,44:b,45,45:b,46,46:b

The Wabash was leased to the Norfolk & Western beginning October 16, 1964.

In 1877 and 1878 the Wabash tested ties treated with copper sulphate by the Thilmany process. They were a failure. [ASCE 7-85, 279]['16, 328]

From 1903 to 1905 the Wabash used large numbers of Burnett treated ties. A report published in 1919 is titled "Statement of Zinc Treated Ties Furnished to the Wabash Railway per Their Record, and Total Treated Ties Marked with Dating Nails in Track, January 1, 1918."

(continued)

Eastern division (Detroit to Peru)		Western division (Decatur to Springfield)	
Year	No. inserted	Year	No. inserted
1903	31,398	1903	146,047
1904	324,171	1904	322,715
1905	91,211	1905	228,006 [AREA '19, 156]

From a 1905 inspection: "It was noted that many [Burnett] treated red oak ties had nails in them, which indicated that they were untreated white oak. Mistakes of this kind can only arise when the nails are driven into the ties only after the same have been laid for various lengths of time. In view of the fact that the use of the dating nails is one of the most important factors in connection with accurate records, too much stress cannot be laid upon the instructions that all nails should be driven the same day that the tie is laid, and under no circumstances afterwards. All section men should have a sufficient supply on their handcars to be ready for any emergency." [AREA '07, 495] This quote tells us, among other things, that date nails were being used in untreated ties as well as in treated ties. It comes at the end of a four page article titled "Report of inspection of track, consisting of treated red oak, Wabash Railroad. Inspection made April 10, 1905, near Custer Park, IL."

Does the 1918 record indicate that the Wabash stopped using treated ties in 1905, or just that their record with date nails stopped that year? It would have been unusual for a railroad to have stopped using treated ties, and as of 1905 it would have been just as unusual for a line to quit using date nails.

In [J-F '80, 1, 3] Dave Parmalee described the Wabash set. He included a rnd R (07) 23 but not the 24.

Ken Gronewald found 43's two to a tie, and at another site he found seven ties, each with a 43 and a 44 about 4" apart. [M-J '92, 1][M-J '93, 10]

Mel Smith found an ex-Santa Fe sqr R (17) 49 in a tie. It may be the result of a nail factory mix-up, though. [M-A '85, 2]

Nail hunts: [S-O '88, 10], [S-O '89, 4], [S-O '93, 1].

Warrenton

Short line code set				
2 × 1/4	rnd I	stl (07) 34		
Code nails				
1 1/2 × 1/4	rnd I	stl (07) 4,8		(Set #28)
From second hand ties				
2 1/2 × 1/4	rnd R	stl (18B) 28		
2 × 1/4	rnd R	stl (18B) 30		
2 1/2 × 1/4	rnd R	stl (07) 30		
2 1/2 × 1/4	rnd R	stl (07) 34		
Code nails from second hand ties				
1 1/2 × 1/4	rnd I	stl (01) 1-5,6,7		(Set #27)

This 3 mile long North Carolina railroad connected with the SAL.

See page 346 for a description of the short line code set.

The 2 1/2" 34 is from an ex-Seaboard Air Line tie. The (18B) nails appear to be from ex-Colorado & Southern ties.

The code nails from second hand ties were found two to a tie, determining a line parallel with the tie. They were used to date the ties. Dates 27 (2 and a 7) to about 36 (3 and a 6) were found by Dave Parmalee. Only one 4 is known.

Washington Railway & Electric

2 1/2 × 1/4	rnd I	stl (07) 30,33,40:b	

In 1933 the WR&E, a Washington, DC electric railroad, became Capital Transit, and in 1954 became part of the East Washington, a steam railroad. It was abandoned in February, 1978.

(continued)

The 30's and 33's came from trestle ties. The 40's came from ties in the bed. All nails were found between the rails.

Wellsville, Addison & Galeton

From second hand ties

2 1/2 × 1/4	sqr I	stl	(05)	28
2 1/2 × 1/4	sqr I	stl	(07)	30
2 1/2 × 1/4	rnd I	stl	(07)	35,45

Code nails from second hand ties

2 1/2 × 1/4	rnd I			
B	Beech	stl	(05)	#1
M	Maple	stl	(05)	#2
RO	Red Oak	stl	(05)	#3
X	Substandard tie	stl	(05)	#1

The WA&G was created in January, 1956 and was abandoned in January, 1980. It operated about 90 miles of former B&O track in Pennsylvania and New York. The railroad was built by the Buffalo & Susquehanna and was acquired by the B&O in January, 1932.

The 45 is now lost. It may have been (08).

The letter nails, originally from the Buffalo, Rochester & Pittsburgh, were probably reinserted on the future WA&G when the B&O owned both lines.

Article: [M-J '89, 8].

Sources for second hand nails

Erie

2 1/2 × 1/4	rnd I	stl	(07)	35,45

New York Central

2 1/2 × 1/4	sqr I	stl	(05)	28
2 1/2 × 1/4	sqr I	stl	(07)	30

West Jersey & Seashore

2 1/2 × 1/4	rnd I	stl	(07)	14
2 1/2 × 1/4	rnd R	stl	(07)	15,17,21,22,26

This railroad was created in 1896 by the Pennsylvania RR to consolidate several smaller railroads. It was merged into the PRR in July, 1930, and in 1933 the line came under control of Pennsylvania-Reading Seashore Lines.

Glenn Wiswell pulled these nails from the abandoned branch running south of Pleasantville, NJ. He wrongly attributed them to the Atlantic City RR. [Wiswell 77]

West Pittston-Exeter

2 1/2 × 1/4	rnd R	stl	(07)	28,32-34,36
2 1/2 × 1/4	sqr R	stl	(07)	34
2 1/2 × 1/4	sqr I	stl	(07)	35
2 × 1/4	rnd R	stl	(07)	38
2 1/2 × 1/4	rnd R-I hs	stl	(07)	42-44
2 1/2 × 1/4	sqr I	stl	(05)	47,48,52,55,56
2 1/2 × 1/4	rnd I hs	stl	(07)	50,51
1 1/4 × 3/16	rnd I gm	cop	(60)	53
1 1/4 × 3/16	rnd I	cop	(60)	60

The WP-E was a 3 mile railroad in Pennsylvania, and connected with the LV and DL&W.

(continued)

Many nails found here were hand re-stamped after one or both digits were filed down. The 42-44 have a raised 4 with a hand stamped second digit.

Western Maryland

1 1/2 × 1/5	rnd R	stl	(05)	56,57,59,61
1 1/2 × 1/5	rnd R	stl	(07)	58,58:b
1 1/2 × 1/5	rnd R	stl	(06)	60

Date nails were driven into the ends of ties. However, two 56's were found on the top of the tie outside the rail among other 56's normally placed in Oldtown, MD, and one 58:a was found similarly at Carrollton, MD.

Hubbard nails are found in WM poles. One of these is copper, 2" long, with a 1 1/4" head. It reads WM / RY. / CO.

See Dave Parmalee's article in [N-D '81, 1].

Winston-Salem Southbound

2 1/2 × 1/4	rnd R	stl	(07)	47-49,51

The W-SS is a 90 mile railroad in North Carolina.

This list is from DNC.

Yreka Western

2 1/2 × 1/4	rnd I	stl	(07)	39-41
2 1/2 × 1/4	rnd I	stl	(06)	40,44,48
2 1/2 × 1/4	rnd R	stl	(06)	45

The YW operates 6 miles of track in California. The 41 is the most common nail.

Index of railroads without their own entries

Treatment Company Sets

Sometimes treatment companies which supplied ties to several different railroads drove nails into their ties. The two sets so far detected are listed here. Companies which used monogram nails, like International Creosoting & Construction, are not listed here.

Short line code set

2 × 1/4	rnd I	stl (07) 34		
Code nails				
1 1/2 × 1/4	rnd I	stl (07) 0,1,3,4,7,8	(Set #28)	
1 1/2 × 1/4	rnd I	stl (07) 0,7,8	(Set #29)	

I do not know which treatment company used these nails, or even what the nails stand for. The code nails seem to be from the same type of tie as the 34. All were found between the rails, closer to one rail. I have never found the 34 together with a code nail in the same tie.

In the lists below, numbers in parentheses are the number of nails found. "(12) 4" means that twelve 4's were found.

Dansville & Mount Morris

34	lots
Set #28	(12) 4, (2) 8
Set #29	(10) 8

The ties from which the code nails were pulled are slightly undersize. All nails were pulled from ties in service except one Set #28 8, which was found in a twice-used discard.

Fonda, Johnstown & Gloversville

34	9
Set #28	(1) 8
Set #29	(1) 7, (2) 8

All were found in the bottom of ties used once.

Lackawanna & Wyoming Valley

Set #28	0, 1, 3, 4, 7, 8
Set #29	0

Lowville & Beaver River

34	
Set #28	4, 8
Set #29	0

St. Johnsbury & Lamoille County

The 34 was found here.

Warrenton

The 34 and Set #28 4, 8 were found here.

Southern Wood Piedmont

Date nails

2 1/2 × 1/4	rnd R	stl (19)	70,72	
1 1/2 × 1/4	rnd R	stl (19)	73,74	
3/4 × 1/8	rnd I	stl ( )	$\overset{S}{77}$, $\overset{S}{78}$, $\overset{S}{79}$	(date tacks)

Code nails

2 × 1/4	rnd R	stl (19)	CAS #10

Switch nails

See pages 139-141 of the photo section. There are too many types to legibly write here.

There is also an aluminum 10, not (19), found by Tom Meyer in Deland, FL in CSX track. [Winter 2000, 18]

Most SWP ties are not dated. The $\overset{S}{77}$-$\overset{S}{79}$ are not type (19). Sometimes a date tack and switch nail are found together. The 72 was found in Tampa, FL. The 73 was found on the SCL, and the 74 on the Southern.

On the Florida East Coast John Iacovino found many switch nails in normal length ties, not near switches. I do not have an explanation for this.

SWP switch nails are fairly new. The oldest sets cannot be earlier than the 1960's, and were probably first used in the early 70's. They are probably still being used today, and are found in the ends of ties on several Southeast railroads. These include

Atlantic Coast Line
Florida East Coast
Interstate (controlled by the Southern since 1961)
Louisville & Nashville
Seaboard Air Line
Southern

The CAS #4 is probably a Southern Wood Piedmont nail, since it has been found on the Louisville & Nashville and the Seaboard Air Line, and only in switch ties. Parmalee wrote of the nails found on the L&N "I doubt if it means 'Clearance at switch' though these are found in switch ties. They are found in the center of every tie, once a switch with them is discovered, which is not often." [J-F '79, 1-2]

Shadow Sets

A shadow set is a set of nails, found in second hand ties, which were clearly used by the same railroad. Further, the railroad which originally used the nails is unknown. Often when a branch of a railroad was abandoned, the usable ties were sold to other railroads, usually short lines. These ties have the nails of the original owners.

When a set of nails is found in second hand ties, and the nails are from some known railroad, the set is not a shadow set. For example, when ex-NC&StL nails are found on the Arcade & Attica, we know who used the nails. What you see below are sets from *unidentified* railroads.

Many single odd nails turn up in second hand ties, such as the rnd I copper (60) 26 found on some shortlines. The railroad which used this nail is uknown. Here I list *sets* of nails only.

Enigma set

2 1/2 × 1/4	rnd I	stl (64)	18,18:b,19

Fonda, Johnstown & Gloversville

At least four 18's were found here, one together in a tie with an FJ&G 32.

(continued)

Jamestown, Westfield & Northwestern
One enigma nail was found, but the head is too rusty to read the date.

Marcellus & Otisco
Two 18's and six 19's were found in one short stretch.

Middletown & New Jersey
One 18 was found.

Norwood & St. Lawrence
One 18 was found.

Unadilla Valley
A few 18's and an 18:b were pulled by Leo Johnson.

Notes on the set
When I found the 18 from this set on the M&NJ, not only did I not know who used the nail, but the manufacturer of the nail was also a mystery. Steve Worboys and I then called it an enigma nail, a name which remains attached the the set.

All enigma nails were found between the rails. The line from which they originated was possibly dismantled in or shortly before 1932, making the Rochester, Syracuse & Eastern a candidate. See the Stubby shadow set notes below.

M&NJ shadow set

1 1/4	×	3/16	rnd I	cop (60)	23:b,24
1 1/2	×	1/4	rnd I	stl (03)	30,31
2	×	1/4	cut R	stl (03)	34,34:b,35-37
2	×	1/4	cut R	stl (07)	35

Bath & Hammondsport

date	23	24	30	31	34	34:b	35	36	37
quantity	2	2	1	0	2	0	0	1	1

All were found in one short stretch of track, both in discards and in ties in service.

Central Vermont
[Shaw, 119-120] claimed that the 23:b was found on the Central Vermont.

Maryland & Pennsylvania
George Ehle pulled the 30, 31, and 36 from second hand ties.

Middletown & New Jersey

date	23	24	30	31	34	34:b	35	36	37
quantity	4	4	5	7	4	1	1	5	6

The 35 is (03). Steve Worboys and I found more nails than we pulled, so the count is low on the common nails. These nails are found throughout the M&NJ. Also, John Iacovino pulled 23 and 31 here.

New York, Ontario & Western

date	23	24	30	31	34	34:b	35	36	37
quantity	2	0	2	2	0	2	0	2	2

Possibly one more was found for 23, 36, or 37. All found in one short stretch. In addition to these, John Iacovino found (03) 34-37. His (03) 34-36 were found in the center of the tie. Our 23 was found between the rails, close to one rail.

St. Johnsbury & Lamoille County
John Iacovino found one (03) 35 in the middle of the tie.

(continued)

...M&NJ shadow set

Stewartstown

date	23	24	30	31	34	34:b	35	36	37
quantity	3	1	2	0	2	1	0	3	0

Excepting one tie, all were found along one short stretch of track.

Notes on the set

All nails are found between the rails. Sometimes two nails are found in the same tie, driven very close to each other. The shadow railroad probably re-dated its second hand ties, like the FJ&G and the AT&SF. Here is a list of such finds:

B&H	24, 34
M&NJ	23, 34; 24, 34
NYO&W	23, 34:b
SRR	23, 34:b; 30, 34.

Stubby shadow set

1 3/4 × 5/16	rnd I	stl	(01)	11-15
1 3/4 × 5/16	rnd I	stl	(05)	16,17
2 1/2 × 1/4	sqr I	stl	(07)	18
and possibly				
2 1/2 × 1/4	rnd R	stl	(07)	19,24
2 1/2 × 1/4	rnd I	stl	(07)	25,25:d,26:c

In the Spring 2000 issue of *Nailer News*, 13-15, I published an article which solves the stubby shadow set question. These nails were used by the Public Service Railway Co. of New Jersey. See the PSC section on page 270 of this volume for info on their tie treating policy. I will leave my old "Notes on the set" here (page 350) intact, though it is now out of date.

Arcade & Attica

date	11	12	13	14	15	16	17	18	19	24	25	26:c
quantity	3	6	15	64	26	53	19	lots	1	8+	>1	lots

(16's count may be 1 or 2 too high.)

Stubbies are found throughout the system both between the rails and outside the rail (See Arcade & Attica). Two ties near Varysburg, each with a stubby 16 between the rails, and four ties south of Curriers each with a 16 outside the rail had a screw spike at each end in the same face as the date nail.

In one tie outside the rail we found a stubby 14 and stubby 17. The 19 and 26:v[1] have been found outside the rail. One tie held a sqr I 18 and a rnd I 25, both outside the rail. 2 of the rnd R 24's were found outside the rail, the positions of the other nails are unknown.

Fonda, Johnstown & Gloversville

date	11	12	13	14	15	16	17	18	24	25:d	26:c
quantity	3	1	2	0	0	4	2	5	2	1	1

All were found outside the rail. 3 11, 12, 13, 3 16, 17, 18, 2 24, and 26:v[1] were found together with an FJ&G 33 in the same face. Shaw found stubby 11-17 on the FJ&G.

General Crushed Stone (Oaks Corners, NY)

date	11	12	13	14	15	16	17	18	25
quantity	5	0	1	0	2	13	0	0	1

The count on 16's may be 1 or 2 too low.

Stubbies were found outside the rail.

(continued)

Jamestown, Westfield & Northwestern

date	11	12	13	14	15	16	17	18
quantity	0	1	1	2	11	7	5	1

All stubbies were found between the rails. Two others were pulled, too rusty to read. By their shanks they are one of 11, 13, or 15, almost certainly 15.

New York Central

date	11	12	13	14	15	16	17	18	19
quantity	0	2	4	0	5	12	2	0	1

These nails were found in a siding in Ontario, NY, and in discarded ties nearby. Stubbies were generally found between the rails. The 19 was found lying on a tie between the rails.

A rnd I (07) 25 was found in a second hand tie on the NYC, but it was not found in Ontario. We have no reason to believe it belongs with the stubby set.

Middletown & New Jersey

Steve Worboys and I found the 25, and one 16 was found outside the rail by John Iacovino.

Norwood & St. Lawrence

One 16, one 17, and three 18's were found outside the rail. Eight rnd R 24's were found here, 7 outside the rail and one between.

Unadilla Valley

Steve Worboys and I pulled one 16 from a fragment at North Berlin. The nail was probably driven outside the rail. Leo Johnson found 13, 15-17, 25, 25:d, and 26:c on the UV.

Notes on the set

Nails are found both between the rails and outside the rail, so the position of the nail may have held some significance.

Because it was found in the same tie as a sqr I 18 on the A&A, the rnd I (07) 25 has a strong case for belonging to the set.

The rnd R 19 was found among the 25 stubbies in Ontario, NY on the NYC, and has been found on the A&A. In Ontario stubbies were found between the rails, as was the 19. On the A&A, the 19 was found outside the rail, like the majority of stubbies.

The rnd I 25:d was found outside the rail on the FJ&G, which we admit is pretty weak evidence for its inclusion in the set. It was also found on the UV.

The rnd R (07) 24 and rnd I (07) 26:c were each found together with an FJ&G 33, just like the stubbies. These may be from some shadow set which was acquired by the FJ&G at the same time as the stubby nails, but the fact that the rnd R 24 has been found both between and outside the rails on other stubby-laden lines further supports its inclusion. This opens the possibility that the other rnd R (07) dates from the 20's found on the A&A and N&StL also belong to the set. These nails were found also both between and outside the rails.

The rnd I 26:c is common on the A&A, and has been found on the UV.

Our best guess as to the source of the stubby shadow set, a railroad which is probably the source of some shadow set, is the Rochester, Syracuse & Eastern, an electric line which ran between Rochester and Syracuse. Construction was finished in 1906, and the line was torn out in 1931. Our evidence rests on the following quotes from The Rochester Syracuse and Eastern: "Travelectric" 1906-1931, by William R. Gordon and James R. McFarlane.

"Originally the crossties were untreated long-leaf yellow pine." (p. 12)

"For many years, the RS&E maintenance standards were on a par with those of first class steam roads." "For some years the Company's tie replacement program included a generous portion of creosoted ties since their life was considered to be much longer than the untreated ones. Later on, most replacements were made of the latter variety so that by 1931, only a quarter of the ties in the track were treated." (p. 20) If the rnd R (07) nails from the 1920's do belong to the set, then this statement is evidence against the RS&E being the source of the stubby set.

(continued)

The trackage on private right of way totaled 147.07 miles, which, at a scanty 2,000 crossties per mile, yields 73,535 creosoted ties in the bed in 1931. Certainly a good portion of these would have been suitable for use on New York's short lines.

On the FJ&G the stubbies are usually found with a 1933 FJ&G nail, an appropriate date, as the RS&E was scrapped two years earlier. There is also the NYC connection: all sources of the stubby set are either linked to the NYC or have a generous portion of second hand NYC ties. The RS&E followed the same route as the main line of the NYC and the West Shore, making an NYC-based distribution likely.

From the quotes above, it seems likely that the RS&E used dating nails. Besides the stubby shadow set, the enigma 18 and 19 have a substantial bid for an RS&E origin. The (64) 18 found on the FJ&G was accompanied by an FJ&G 32, and the NYC connection is also solid.

Texas shadow set

2 1/2 × 1/4 rnd I stl (07) 7,09,10

Jeff Slosser found these nails. Five of the 7's were found in massive bridge timbers at Chillicothe, TX. The 09 and 10 were found outside the rail in ties re-used as fenceposts. The 09 was found in Chillicothe, and the 10 was found just south of Goree, TX along the Colorado & Southern, which here in 1910 was the Wichita Valley RR.

The placement of the 09 excludes the possibility that it is from the SP, and the Santa Fe did not use the nail. The CB&Q, who owned the Fort Worth & Denver City, drove their nails between the rails.

About the author

(Where, following custom, he writes about himself in the third person.)

Jeff Oaks became interested in date nails in 1970 at the age of nine when his father introduced him to the hobby. He became an ardent collector in 1980 when he and Steve Worboys began combing western New York State for these rusty artefacts, and since 1991 he has been working on this book.

Oaks received his B.A. from Hobart College in 1984 and his Ph.D. in mathematics from the University of Rochester in 1991. He is now an Associate Professor of Mathematics at the Univesity of Indianapolis. Oaks is married, with three small to medium children, a hamster and a cat.

He is also interested in Roman history and archaeology.