Northern Pacific Railway Company. Engineering Department Records.

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Version 3
August 20, 2018

Form 1757 4-4-21 5M RP

Northern Pacific Railway Co.

OFFICE OF Chief Engineer

FILE NO. 3659 "B"

SUBJECT:

Ties Weight of

[1920 - 1935]

3659

3659

Saint Paul, December 2, 1935

Mr. F. W. Stotekluh:

Your letter of November 25, file 207-1088-2-b, about objections raised by the Great Northern Accounting Department to weights on switch ties:

On November 5, 1928 I wrote you about agreement reached between the Valuation Departments of the two railroads covering weights of ties. In that letter I told you that I agreed we should use the weights as shown on the statement. That statement was made from actual weights of ties shipped to the Brainerd treating plant in the year 1926 and is probably as good an average as could be obtained.

The weights shown on that statement were average weights for all types of hardwood and based on the actual weight of cross ties 1 to 5A inclusive. The weight per M FBM figures up, as stated in the Great Northern's letter to you, namely 4350# for untreated and 4500# for creosoted treated hardwood ties per M feet.

Weights that we have taken of oak and hard maple ties show that the untreated oak ties weigh more than hard maple, which is contrary to the inference made in your letter of November 25th. I do not question that you may have some scale weights of carloads of hard maple switch ties which produced a weight of 5.05# per FBM but they were undoubtedly green and wet. You can get almost any weight, within certain limits, for timber depending on its condition, and I do not think that such isolated weights should be used.

It is my recommendation that you accede with the Great Northern's contention in this case.

BB h

Saint Paul, December 2, 1935

Mr. F. W. Stetekluh:

Your letter of November 25, file 207-1088-2-b, about objections raised by the Great Northern Accounting Department to weights on switch ties:

On November 5, 1928 I wrote you about agreement reached between the Valuation Departments of the two railroads covering weights of ties. In that letter I told you that I agreed we should use the weights as shown on the statement. That statement was made from actual weights of ties shipped to the Brainerd treating plant in the year 1926 and is probably as good an average as could be obtained.

The weights shown on that statement were average weights for all types of hardwood and based on the actual weight of cross ties 1 to 5A inclusive. The weight per M FBM figures up, as stated in the Great Northern's letter to you, namely 4350# for untreated and 4500# for creosoted treated hardwood ties per M feet.

Weights that we have taken of oak and hard maple ties show that the untreated oak ties weigh more than hard maple, which is contrary to the inference made in your letter of November 25th. I do not question that you may have some scale weights of carloads of hard maple switch ties which produced a weight of 5.05# per FBM but they were undoubtedly green and wet. You can get almost any weight, within certain limits, for timber depending on its condition, and I do not think that such isolated weights should be used.

It is my recommendation that you accede with the Great Northern's contention in this case.

BB h

3659-C

Mr. Bernard Blum:

Based on schedules for hardwood cross ties the weights per M FBM figure

Untreated	4400 lbs.
Creosote Treated	4500

so that we are committed to these weights under the present agreement.

J H R 11 30 35

N. P. 1344/5-25

~~Hardwood~~

Average of all Woods

		Std		Creo Tdd.	
1	32.27	140#	4338.39	145#	4493.33
2	35.62	155	4351.48	160	4491.85
3	43.60	190	4357.79	195	4472.47
4	47.49	210	4421.98	215	4527.26
5A	54.71	245	4478.15	250	4569.54
	213.69	940	21947.79	965	22554.45
			4389.56		4510.89
		4398.89		4515.88	

3659-C

St. Paul, Minn., November 25, 1935.

File 207-1088-2-B

Mr. Bernard Blum:

Referring to your letter of November 5, 1928, with which you submitted a statement of the weights to be used in assessing freight on ties in our joint facility bills, this statement covering weights that had been agreed to between the Great Northern and this company.

You will note that the ties indicated on this statement are all cross ties and we have used these weights only in arriving at the weight of cross ties and for hardwood switch ties we have used the weights of 5 lbs. per f.b.m. for untreated and 5.5 lbs. per f.b.m. for treated. The Great Northern Accounting Department has taken exception to our weights on switch ties, and quotes the following from their Chief Engineer:

"'I talked with Mr. Stout, Assistant Valuation Engineer of the Northern Pacific and he agrees with me that no further agreement should be necessary than that agreement which covers weights of cross ties arrived at in 1928. The weights given in that agreement are as follows:

checks for same 5 lbs

Soft Wood Ties	Untreated	3300# per MBM
	Creosote Treated	3500# " "
	Zinc Chloride Treated	3700# " "
	Cedar Untreated	2700# " "
Hard Wood Ties	Untreated	4350# per MBM
	Creosote Treated	4500# " "

"'The weights per MBM for hard wood ties are not given in the statement but the volume per tie and the weight is given for hardwood ties of different sizes. The average per MBM is as stated above.

"'If different weights than these are being used by the Northern Pacific, I think their attention should be called to the fact and that they should be asked to use the weights shown in the agreement.'"

Mr. Bernard Blum:

I believe that for a considerable period we purchased white oak switch ties; however, at the present time we appear to be purchasing hard maple ties, and in both cases the weights of 5 lbs. per f.b.m. for such untreated and 5.5 lbs. per f.b.m. for treated switch ties are conservative. In fact I find that the scale weight of eight carloads of hard maple switch ties produces a weight of green 5.05 lbs. per f.b.m.

If we were buying switch ties consisting of the various kinds of hardwood used in arriving at the average weight of hardwood cross ties, then there would be no objection to the use of weights contended for by the Great Northern; however, as the switch ties we buy are of the woods that weigh more than the average contended for, it seems to me that we should continue to use the weights on hardwood switch ties that we have used in the past.

Will you please advise if you are of the same opinion?

F W Steteklun

GEL:k

Auditor Disbursements.

3659 v-12

Saint Paul, May 29, 1929.

Mr. F. W. Stetekluh:

Your letter of the 17th, File 314-1250-C, in regard to weights for softwood ties involved in Great Northern joint accounts:

This was referred to Mr. A. C. Terrell, Valuation Engineer, and I am attaching copy of his letter and also the blueprint statement to which he refers.

LS-s
encl

Chief Engineer

Saint Paul, Minnesota,
May 28th, 1929.

Mr. Lowry Smith -

Your notation on Mr. Stetekluh's letter to Mr. Blum of May 17th, and papers next attached, relative to arriving at an average weight to be used by the Accounting Department for soft wood ties, treated and untreated:

The Valuation Departments of the Great Northern and Northern Pacific, have agreed upon weights of individual ties and signed up a statement as per my letter to Mr. Blum of September 27th, 1928.

At that time we saw no necessity of having an average weight of ties, as our instructions to cover preparation of Valuation Order No. 3, called for the engineers to state the sizes of all types of ties. This is being done in most all cases and is on record in our completion reports. However, if an average weight is necessary, I am attaching herewith blue print copy of the statement referred to above. What the Great Northern appears to have done, is to use this statement and rounded off the weights, which probably is OK if averages are to be used.

Valuation Engineer

ACT:FJ
Encl.

3655 C

St. Paul, Minnesota,
May 17, 1929.

File 314-1250-C.

Mr. Bernard Blum:

Attached hereto is a copy of a letter received from the Joint Facility Accountant of the Great Northern Railway regarding an average weight for softwood ties.

Will you kindly advise if their proposal is acceptable?

[signature]

GEL:s

Auditor Disbursements.

ACT
2
5/24

(COPY)

GREAT NORTHERN RAILWAY COMPANY

St. Paul, Minn., March 27, 1929.

File 2554-4036.

Mr. F. W. Stetekluh,
Auditor Disbursements,
Northern Pacific Ry.Co.,
St. Paul, Minnesota.

Dear Sir:

Referring to weight list of cross ties which is being used by our respective companies in billing freight charges under joint arrangements:

You will note that there was no average weight furnished for softwood ties. As it will be necessary to use an average weight in some cases when we are unable to determine the actual size and grade, I took matter up with our Engineering Department for such average weights. The following reply was received:

"If an average weight is to be used, I think you should use a simple average of the weights shown on my statement of October 10, 1928. We have no data on which to base a more definite figure.

The simple averages are as follows:

		G.N.	N.P.* Actual From Blue Print
Hewn Softwood ties -	Untreated	145#	- 143 6/8
	Creo.treated	150#	- 152
	Zinc treated	160#	- 160
Sawed Softwood ties -	Untreated	115#	- 113 6/8
	Creo. treated	120#	- 120
	Zinc treated	125#	- 127 8/8
Hewn Cedar		120#	- 117
Sawed Cedar		90#."	- 92

Upon receipt of the above I made inquiry as to whether such average weights had been agreed to by the Engineering Department of the Northern Pacific Railway Company to which the following reply was received:

> "I have discussed this matter with the Engineering Department of the Northern Pacific Ry.Co. and it is their suggestion that you transmit the tie statement showing average weights of softwood ties, which I have furnished you, to the Accounting Department of that road, where it will in turn receive the consideration of the Engineering Department in co-operation with this office."

Will you kindly take matter up along the lines suggested and advise if it will be satisfactory to use such average weights?

Yours truly,

(Signed) A. R. Simon,

Joint Facility Accountant.

B

3659 4-16

Saint Paul, Nov. 5, 1928.

Mr. F. W. Stetekluh:

Referring to question of weights of ties to be used in joint bills between the Northern Pacific and Great Northern:

Our respective Valuation Departments have been working on this for some time and have finally reached agreement. A joint statement has been prepared and signed by Mr. Terrell for the N.P. and Mr. Bowen for the G. N. Chief Engineer Davis of the G.N. advises that these weights are satisfactory to his Company.

It is a difficult matter to come to an agreement on weights of ties as tie conditions change from year to year. At the present time we are using a large portion of big hardwood ties which raises the average weight. Conditions may vary in the next few years which might put the present weights out of line, but for the present I agree that we should use the weights as shown on the statement.

I am handing you herewith six prints of this statement which I presume you will desire to have issued to your Division Accountants. If additional copies are required, they can be obtained from Mr. Terrell's office.

Chief Engineer.

BB h

GREAT NORTHERN RAILWAY COMPANY

OFFICE OF THE CHIEF ENGINEER

J. R. W. DAVIS,
CHIEF ENGINEER

ST. PAUL, MINN.

October 30th, 1928.

File - JBM-LS

Mr. Bernard Blum,
Chief Engineer,
Northern Pacific Ry.Co.
St. Paul, Minnesota.

Dear Sir:

Replying to your letter of October 2nd relative to weights of ties used in bills on joint facility accounts, with which you submitted statements showing weights of various kinds of ties, certified to by Mr. Terrell.

The weights shown in these statements were worked out jointly by Mr. Terrell and Mr. Bowen and are satisfactory to this company.

I am returning one copy which has been signed by Mr. Bowen. One copy has been handed directly to Mr. Terrell.

Yours truly,

J R W Davis

R. C. T.

What did you do with your copy

B.B. 11/1

Mr. Blum:- We have in our possession the master Carbon backed copy signed - Carbon copies made.
11/1/28 A.G.

R.E.S.
attach file
S.B.

11/4

NORTHERN PACIFIC RAILWAY COMPANY

Shipping Weights of various kinds of track ties on the Northern Pacific and Great Northern Railway Company.

Softwood Ties -- Pine, Hemlock, Fir.
Weights each

Grade	Size	Hewed Untr. Lbs	Hewed Creosote Trtd. Lbs	Hewed Zinc Trtd. Lbs.
#1	6"x6"x8'	105#	115#	120#
#2	6"x7"x8'	120	125	130
#3	6"x8"x8'	130	135	145
#3	7"x7"x8'	145	155	160
#4	7"x8"x8'	155	165	175
#5	7"x9"x8'	170	180	190
#5-A	7"x9"x8½'	180	190	200
		Sawed		
#1	6"x6"x8'	80	85	90
#2	6"x7"x8'	90	100	105
#3	6"x8"x8'	105	110	120
#3	7"x7"x8'	110	115	120
#4	7"x8"x8'	125	130	140
#5	7"x9"x8'	140	145	155
#5-A	7"x9"x8½'	145	155	165

Softwood Ties Cedar -- Hewed Untr.

#1	6"x6"x8'	85#
#2	6"x7"x8'	95
#3	6"x8"x8'	105
#3	7"x7"x8'	120
#4	7"x8"x8'	130
#5	7"x9"x8'	140
#5-A	7"x9"x8½'	145

Softwood Ties Cedar -- Sawed Untr.

#1	6"x6"x8'	65#
#2	6"x7"x8'	75
#3	6"x8"x8'	85
#3	7"x7"x8'	90
#4	7"x8"x8'	100
#5	7"x9"x8'	110
#5-A	7"x9"x8½'	120

Hardwood Ties--Mixed Hewed & Sawed Ties,
Ash, Rock Elm, Birch, Hard Maple & Oak.

#1	6"x6"x8'	140	145
#2	6"x7"x8'	155	160
#3	7"x7"x8'	190	195
#4	7"x8"x8'	210	215
#5-A	7"x9"x8½'	245	250
Average all woods and Grades		190	195

Note:- The above weight for hard wood ties are actual weights of ties shipped to the Brainerd Treating Plant in the year of 1926. For details of various woods see detail statement.
The above weights represent the shipping weights of the various grades of ties and do not represent the weight of a season tie in the track.

Correct:- N. Terrell
Valuation Engineer, N.P. Ry. Co.

Correct:- Albert J. Barrow
Valuation Engineer, G.N. Ry. Co.

NORTHERN PACIFIC RAILWAY COMPANY

- - SHIPPING WEIGHTS OF CROSS TIES USED ON NORTHERN PACIFIC & GREAT NORTHERN RAILWAYS - -

Eastern District - Minnesota, Wisconsin & Michigan Ties

- - Pine and Hemlock Ties - -

Hewed Ties						Sawed Ties			
	Size			F.B.M	Weight Each			F.B.M.	Weight Each
Grade	Small End	Large End	Length	Per Tie	Untr.	Grade	Size	Per Tie	Untr.
1	6"x6"	6"x7"	8'	32.27	105#	1	6"x6"x8'	24	80#
2	6"x7"	6"x8"	8'	35.62	120#	2	6"x7"x8'	28	90#
3	6"x8"	6"x9"	8'	39.09	130#	3	6"x8"x8'	32	105#
3	7"x7"	7"x8"	8'	43.60	145#	3	7"x7"x8'	32-2/3	110#
4	7"x8"	7"x9"	8'	47.49	155#	4	7"x8"x8'	37-1/3	125#
5	7"x9"	7"x10"	8'	51.50	170#	5	7"x9"x8'	42	140#
5A	7"x9"	7"x10"	8½'	54.71	180#	5A	7"x9"x8½'	44.625	145#

- - Cedar Ties - -

Hewed Ties						Sawed Ties			
1	6"x6"	6"x7"	8'	32.27	85#	1	6"x6"x8'	24	65#
2	6"x7"	6"x8"	8'	35.62	95#	2	6"x7"x8'	28	75#
3	6"x8"	6"x9"	8'	39.09	105#	3	6"x8"x8'	32	85#
3	7"x7"	7"x8"	8'	43.60	120#	3	7"x7"x8'	32-2/3	90#
4	7"x8"	7"x9"	8'	47.49	130#	4	7"x8"x8'	37-1/3	100#
5	7"x9"	7"x10"	8'	51.50	140#	5	7"x9"x8'	42	110#
5A	7"x9"	7"x10"	8½'	54.71	145#	5A	7"x9"x8½'	44.625	120#

- - SHIPPING WEIGHTS OF HARDWOOD TIES SHIPPED TO BRAINERD TREATING PLANT AND SHIPPING WEIGHTS OF TREATED TIES - -

- - Mixed, Hewed & Sawed Ties for the year 1926 - -

- - Weights per Tie - -

					Ash & Rock Elm		Birch		Hard Maple		Red & White Oak		Average All Woods	
	Size			F.B.M.		Creosote		Creosote		Creosote		Creosote		Creosote
Grade	Small End	Large End	Length	Per Tie	Untr.	Trtd.	Untr.	Trtd.	Untr.	Trtd.	Untr.	Trtd.	Untr.	Trtd.
1	6"x6"	6"x7"	8'	32.27	135#	140#	145#	150#	130#	135#	160#	165#	140#	145#
2	6"x7"	6"x8"	8'	35.62	150#	155#	160#	165#	145#	150#	175#	180#	155#	160#
3	7"x7"	7"x9"	8'	43.60	185#	190#	195#	200#	175#	180#	215#	225#	190#	195#
4	7"x8"	7"x9"	8'	47.49	200#	205#	210#	220#	190#	200#	235#	245#	210#	215#
5A	7"x9"	7"x10"	8½'	54.71	235#	240#	245#	250#	220#	230#	270#	280#	245#	250#
Average All Grades					170#	175#	190#	195#	175#	180#	235#	245#		
Average All Grades - All Woods													190#	195#

Office of Valuation Engineer,
St. Paul, Minnesota.
September 26, 1928.

NORTHERN PACIFIC RAILWAY COMPANY

SHIPPING WEIGHTS OF CROSS TIES SENT TO THE PARADISE & SEATTLE PLANTS OF THE NOR. PAC. RY. AND THE SOMERS PLANT OF THE GREAT NORTHERN RY. CO.
-- TOGETHER WITH THE TREATED SHIPPING WEIGHT OF THESE TIES --

Central and Pacific District - Montana, Idaho & Washington Ties

Hewed Ties - Fir

Grade	Size Small End	Size Large End	Length	F.B.M. Per Tie	Weight Each Untr. 3300# Per FBM	Weight Each Treated Creosoted 3500# Per FBM	Weight Each Zinc 3700# Per FBM
1	6"x6"	6"x7"	8'	32.27	105#	115#	120#
2	6"x7"	6"x8"	8'	35.62	120#	125#	130#
3	6"x8"	6"x9"	8'	39.09	130#	135#	145#
3	7"x7"	7"x8"	8'	43.60	145#	155#	160#
4	7"x8"	7"x9"	8'	47.49	155#	165#	175#
5	7"x9"	7"x10"	8'	51.50	170#	180#	190#
5A	7"x9"	7"x10"	8½'	54.71	180#	190#	200#

Sawed Ties - Fir

Grade	Size	F.B.M. Per Tie	Weight Each Untr. 3300# per FBM	Weight Each Treated Creosoted 3300# Per FBM	Weight Each Zinc 3700# per FBM
1	6"x6"x8'	24	80#	85#	90#
2	6"x7"x8'	28	90#	100#	105#
3	6"x8"x8'	32	105#	110#	120#
3	7"x7"x8'	32-2/3	110#	115#	120#
4	7"x8"x8'	37-1/3	125#	130#	140#
5	7"x9"x8'	42	140#	145#	155#
5A	7"x9"x8½'	44.625	145#	155#	165#

Note -
All of the above weights represent the shipping weight of the various kinds of ties shown and are not the weight of a seasoned track tie in place.

Office of Valuation Engineer,
St. Paul, Minnesota.
September 26, 1928.

3659

October 2, 1928.

Mr. J. R. W. Davis, C. E.,
Great Northern Railway,
Saint Paul, Minnesota

Dear Sir:

Referring to your letter of May 4, 1927 to this office relative to weights of ties used in bills on joint facility accounts:

Our Valuation Engineer has been in conference with your Valuation Engineer and I am advised they have come to an agreement as to the weights of ties, based on field data, etc. Statements have been prepared, one in detail and one consolidated, for the use of the Auditors of the two Railways, giving the weights of the various classes of ties used.

I am handing you herewith copies of these statements in quadruplicate, which have been certified to by Mr. Terrell. If satisfactory to the Great Northern, will you have executed, retaining two copies for your use and returning two copies to me. On receipt of executed copies I will advise our Accounting Department that these weights are to be used in joint bills with the Great Northern.

Yours truly,

BB h

3659 c

St. Paul, Minn., Sept. 27, 1928.

Mr. Bernard Blum,
Chief Engineer.

Referring to Mr. Stevens' letter to Mr. Thian of May 7, 1927, and my letter to Mr. Stevens of July 11, 1927, and subsequent correspondence in regard to weights of railroad cross ties to be used in joint facility accounts between the Northern Pacific and Great Northern Railway:

This matter has been in controversy for a long while. We have made various attempts to arrive at these weights and have had various conferences with the Great Northern people. We have now come to an agreement with them and I submit herewith two statements - one statement in detail, and one consolidated statement for the use of the auditors of the different railways, giving the weights of the various classes of ties used. This has been derived from the best information that we and the Great Northern have, and I think is fairly accurate.

I have signed the consolidated statement as Valuation Engineer of the Northern Pacific trusting that if you approve these weights that they will be sent to the Great Northern for their approval.

A. C. Trumbull.
Valuation Engineer.

ACT-d
Encl.

St. Paul, Minn., March 7, 1928.

File 264-1200-C.

MR. H. E. STEVENS:

Under the date of July 12th you wrote the Chief Engineer of the Great Northern that you were in accord with his suggestion that it would be advisable for the two Companies to reach an agreement on the weights on ties.

Will you kindly advise if such an agreement has as yet been reached. In the meantime we are paying the Great Northern bills containing freight charges on ties based upon an apparently excessive weight.

H O Steckbeck

AUDITOR DISBURSEMENTS.

GEL:K

St. Paul, Minn.,
March 3, 1928.

Mr. A. F. Stotler,
Mr. P. E. Thian,
Mr. H. M. Tremaine,
Mr. C. A. Christofferson,
Mr. J. T. Derrig,
Mr. F. J. Taylor,
Mr. H. M. Tremaine,
Mr. G. I. Hayward,
Mr. M. W. Beach.

Mr Stevens
Presume OK to
amd. all this
circular. See
your letter or
marker
JHR 3/5

Dear Sirs:

The Auditor advises "Commencing with the bills rendered for the month of January, 1928 and until further advised, the following weights and distances should be used in setting up freight on treated ties in joint facility bills:

Average weight of all ties treated at Brainerd	203 # each
" " " " untr. ties shipped to Brainerd for treatment	194 # "
" haul on untr. ties to Brainerd	84 Miles
" weight of sawed ties treated at Paradise and Seattle	3.5 # FBM
" " " sawed ties shipped to Paradise and Seattle for treatment	3.3 " "
" haul on untr. ties to Paradise	198 Miles
" " " " " " Seattle	134 "

The following weights should be used in assessing freight on untreated ties applied in tracks:

Oak, main line ties, hewn	215 # Each
" side track ties, hewn	177 # "
Fir, pine and tamarack ties, main line, hewn	191 # "
" " " " " side track "	135 # "
Oak sawed ties	5 # FBM
Fir, pine and tamarack sawed ties	3.3 # "

The above weights and distances should be also used in assessing freight on cross ties charged to Additions & Betterments.

Yours truly,

JHR:M

Chief Engineer.

St. Paul, Minn., Feb. 7, 1928.

File 8555-C-728.

DIVISION ACCOUNTANTS:

Commencing with the bills rendered for the month of January 1928 and until further advised, the following weights and distances should be used in setting up freight on treated ties in joint facility bills:

Average weight of all ties treated at Brainerd	203 lbs. ea.
Average weight of all untreated ties shipped to Brainerd for treatment	194 " "
Average haul on untreated ties to Brainerd	84 miles
Average weight of sawed ties treated at Paradise and Seattle	303 lbs. FBM
Average weight of sawed ties shipped to Paradise and Seattle for treatment	303 " "
Average haul on untreated ties to Paradise	198 miles
Average haul on untreated ties to Seattle	124 "

The following weights should be used in assessing freight on untreated ties applied in tracks:

Oak, main line ties, hewn	215 lbs. ea.
Oak, side track ties, hewn	177 " "
Fir, pine and tamarack ties, main line, hewn	191 " "
Fir, pine and tamarack ties, side track, hewn	135 " "
Oak sawed ties	5 " FBM
Fir, pine and tamarack sawed ties	303 " "

The above weights and distances should also be used in assessing freight on cross ties charged to Additions and Betterments.

AUDITOR DISBURSEMENTS.

GEL:K

St. Paul, Minn.,
March 2, 1928.

Mr. A. F. Stotler,
Mr. P. E. Thian,
Mr. H. M. Tremaine,
Mr. C. A. Christofferson,
Mr. J. T. Derrig,
Mr. F. J. Taylor,
Mr. H. M. Tremaine,
Mr. G. I. Hayward,
Mr. M. W. Beach.

Dear Sirs:

The Auditor advises "Commencing with the bills rendered for the month of January, 1928 and until further advised, the following weights and distances should be used in setting up freight on treated ties in joint facility bills:

Average weight of all ties treated at Brainerd	203 # each
" " " " untr. ties shipped to Brainerd for treatment	194 # "
" haul on untr. ties to Brainerd	84 Miles
" weight of sawed ties treated at Paradise and Seattle	3.5 # FBM
" " " sawed ties shipped to Paradise and Seattle for treatment	3.3 " "
" haul on untr. ties to Paradise	198 Miles
" " " " " " Seattle	124 "

The following weights should be used in assessing freight on untreated ties applied in tracks:

Oak, main line ties, hewn	215 # Each
" side track ties, hewn	177 # "
Fir, pine and tamarack ties, main line, hewn	191 # "
" " " " " side track "	135 # "
Oak sawed ties	5 # FBM
Fir, pine and tamarack sawed ties	3.3 # "

The above weights and distances should be also used in assessing freight on cross ties charged to Additions & Betterments.

Yours truly,

JHR:M

Chief Engineer.

St. Paul, Minn.,
March 2, 1928.

Mr. A. F. Stotler,
Mr. P. E. Thian,
Mr. H. M. Tremaine,
Mr. C. A. Christofferson,
Mr. J. T. Derrig,
Mr. F. J. Taylor,
Mr. H. M. Tremaine,
Mr. G. I. Hayward,
Mr. M. W. Beach.

Dear Sirs:

The Auditor advises "Commencing with the bills rendered for the month of January, 1928 and until further advised, the following weights and distances should be used in setting up freight on treated ties in joint facility bills:

Average weight of all ties treated at Brainerd	203 # each
" " " " untr. ties shipped to Brainerd for treatment	194 # "
" haul on untr. ties to Brainerd	84 Miles
" weight of sawed ties treated at Paradise and Seattle	3.5 # FBM
" " " sawed ties shipped to Paradise and Seattle for treatment	3.3 " "
" haul on untr. ties to Paradise	198 Miles
" " " " " " Seattle	124 "

The following weights should be used in assessing freight on untreated ties applied in tracks:

Oak, main line ties, hewn	215 # Each
" side track ties, hewn	177 # "
Fir, pine and tamarack ties, main line, hewn	191 # "
" " " " " side track "	135 # "
Oak sawed ties	5 # FBM
Fir, pine and tamarack sawed ties	3.3 # "

The above weights and distances should be also used in assessing freight on cross ties charged to Additions & Betterments.

Yours truly,

JHR:M

Chief Engineer.

St. Paul, Minn.,
March 3, 1928.

Mr. A. F. Stotler,
Mr. P. E. Thian,
Mr. H. M. Tremaine,
Mr. C. A. Christofferson,
Mr. J. T. Derrig,
Mr. F. J. Taylor,
Mr. H. M. Tremaine,
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Chief Engineer.

St. Paul, Minn.,
March 8, 1928.

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Mr. P. E. Thian,
Mr. H. M. Tremaine,
Mr. C. A. Christofferson,
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March 2, 1928.

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JHR:M

Chief Engineer.

3659 w 6

July 12, 1927.

Mr. J. R. W. Davis,
Chief Engineer,
Great Northern Ry. Co.,
St. Paul, Minnesota

Dear Sir:

Your letter of May 4th enclosing tabulation of estimated weights of ties to be used in preparation of bills in joint facility accounts:

I am heartily in accord with your suggestion that it would be advisable for the two Companies to reach an agreement which could be used in items of this character without the constant referring back and forth between the Engineering and Accounting Departments.

Both Companies have made a number of lists from time to time, none of which have checked out exactly, and naturally so, as the weight of ties depends upon so many variable factors as to be impossible of exact determination. It seems, however, we ought to be able to reach an agreement which would represent average conditions close enough for all practical purposes, and I suggest you assign a representative from your Department and ask your Accounting Department to assign a representative, and I will do likewise for the Northern Pacific; these four representatives then to hold a conference and set up a final tabulation covering weights of all classes and species of ties.

Mr. Terrell of our Valuation Department has gone over the data which has been accumulated to date and I am attaching in duplicate two statements; one showing a set up of his estimated weights based on this accumulated data and other data, and the other showing a comparison of the weights heretofore used and their origin.

Yours truly,

HES:H

cc Mr. E. O. Parks
Mr. A. C. Terrell
Mr. F. C. Sharood

St. Paul, Minn., July 11, 1927.

Mr. H. E. Stevens,
Chief Engineer,

Dear Sir:-

As per your letter of May 7th, 1927, relative to weights of Ties to be used in joint facility accounts as suggested in Mr. Davis' letter of May 4th, 1927 and Mr. Parks' circular under date of February 2nd, 1927, attach find in duplicate, two statements, one showing weights of cross ties and the other a comparative statement.

In preparing this statement, we have followed along the lines used by the Great Northern Railway in preparation of their tabulation. First the F.B.M. timber for the various grades of different Ties was computed for both hewn and sawed ties. In making their computation for F.B.M. timber in Hewn Ties the Great Northern has assumed that a hewn tie would have a two (2) inch larger face on the large end than on the small end. In order to check this assumption, a field check has been made of different sized hewn ties in our tracks in the St. Paul Yard. This check showed that a hewn tie had approximately a one (1) inch larger face on the large end than on the small end and this difference was used in attached tabulation. The weights per M.B.M. for different kinds of woods are determined from hand books and tabulations showing same.

Weights as shown in the G. N. Statement for Hardwood and Oak ties appear to be excessively high. Mr. Sharrood shows

the average weight of a No. 1 (Old Classification) untreated Hewn Oak Tie to be 207 lbs. while Mr. Parks shows 215# for same. Against these weights, we get 218# while the G. N. claims 240#. For a No. 2 (Old Classification) Untreated Hewn Oak, Mr. Sharood shows 167#, Mr. Parks 177#, the Great Northern 185#, while we get 164#.

As you know, various weights have been assigned to the different kinds of cross ties at different times during the progress of valuation work. The weights thus assigned have always varied with each other, due in most cases to the erroneous classification of the different kinds of ties.

In the attached statement of weights, we are at least consistent; the weights shown, checking very closely with the weights as shown by Mr. Sharood as actual weights, which is the best evidence that we have on actual weights of cross ties.

I would suggest that copy of attached tabulation be furnished to the G. N. Ry. for further discussion.

Yours truly,

P. E. Thian
VALUATION ENGINEER.

WHF-RW.

NORTHERN PACIFIC RAILWAY COMPANY

STATEMENT OF WEIGHTS OF VARIOUS KINDS OF CROSS TIES

(HEWN OR SLABBED TIES ASSUMED TO HAVE A ONE INCH LARGER FACE ON THE LARGE END THAN ON THE SMALL END)

UNTREATED HEWN OR SLABBED TIES

Grade	SIZE Small End	SIZE Large End	Lgth.	F.B.M.	Cedar 2700# per M.B.M.	Fir, Pine & Hemlock 3300# per M.B.M.	Tam., Ash, Elm, Birch & Larch. 3800# per M.B.M.	Oak 4600# per M.B.M.
1	6"x6"	6"x7"	8'	32.27	87#	106#	123#	148#
2	6"x7"	6"x8"	8'	35.62	96#	118#	135#	164#
3	6"x8"	6"x9"	8'	39.09	106#	129#	149#	180#
3	7"x7"	7"x8"	8'	43.60	118#	144#	166#	201#
4	7"x8"	7"x9"	8'	47.49	128#	157#	180#	218#
5	7"x9"	7"x10"	8'	51.50	139#	170#	196#	237#
5A	7"x9"	7"x10"	8½'	54.71	147#	180#	207#	251#

UNTREATED SAWED TIES.

Grade	Size	Lgth.	F.B.M.	Cedar 2700# per M.B.M.	Fir, Pine & Hemlock 3300# per M.B.M.	Tam., Ash, Elm, Birch & Larch 3800# per M.B.M.	Oak 4600# per M.B.M.
1	6"x6"	8'	24	65#	79#	91#	110#
2	6"x7"	8'	28	76#	92#	106#	129#
	6"x8"	8'	32	86#	106#	122#	147#
3	7"x7"	8'	32 2/3	88#	108#	124#	150#
4	7"x8"	8'	37 1/3	101#	123#	142#	172#
5	7"x9"	8'	42	113#	139#	160#	193#
5A	7"x9"	8½'	44.625	120#	147#	170#	205#

For Creosoted Treated Ties add 0.25# per F.B.M.

CREOSOTED TREATED HEWN OR SLABBED TIES

1	6"x6"	6"x7"	8'	32.27	-	114#	131#	156#
2	6"x7"	6"x8"	8'	35.62	-	127#	144#	173#
3	6"x8"	6"x9"	8'	39.09	-	139#	159#	190#
3	7"x7"	7"x8"	8'	43.60	-	155#	177#	212#
4	7"x8"	7"x9"	8'	47.49	-	169#	192#	230#
5	7"x9"	7"x10"	8'	51.50	-	183#	209#	250#
5A	7"x9"	7"x10"	8½'	54.71	-	194#	221#	265#

CREOSOTED TREATED SAWED TIES

1	6"x6"	8'	24	-	85#	97#	116#
2	6"x7"	8'	28	-	99#	113#	136#
	6"x8"	8'	32	-	114#	130#	155#
3	7"x7"	8'	32 2/3	-	116#	132#	158#
4	7"x8"	8'	37 1/3	-	132#	151#	181#
5	7"x9"	8'	42	-	150#	171#	204#
5A	7"x9"	8½'	44.625	-	158#	181#	216#

For Zinc Treated Ties add 0.5# per F.B.M.

ZINC TREATED HEWN OR SLABBED TIES

1	6"x6"	6"x7"	8'	32.27	-	122#	139#	164#
2	6"x7"	6"x8"	8'	35.62	-	136#	153#	182#
3	6"x8"	6"x9"	8'	39.09	-	149#	169#	200#
3	7"x7"	7"x8"	8'	43.60	-	166#	188#	223#
4	7"x8"	7"x9"	8'	47.49	-	181#	204#	242#
5	7"x9"	7"x10"	8'	51.50	-	196#	222#	263#
5A	7"x9"	7"x10"	8½'	54.71	-	207#	234#	278#

ZINC TREATED SAWED TIES

1	6"x6"	8'	24	-	91#	103#	122#
2	6"x7"	8'	28	-	106#	120#	143#
	6"x8"	8'	32	-	122#	138#	163#
3	7"x7"	8'	32.2/3	-	124#	140#	166#
4	7"x8"	8'	37 1/3	-	142#	161#	191#
5	7"x9"	8'	42	-	160#	181#	214#
5A	7"x9"	8½'	44.625	-	169#	192#	227#

Office of Valuation Engineer,
St.Paul, Minnesota.
July 6, 1925

NORTHERN PACIFIC RAILWAY COMPANY

COMPARATIVE STATEMENT SHOWING WEIGHTS OF VARIOUS CROSS TIES

Grade	Size	Per N.P. Statement Untr.	Per N.P. Statement Treated Creosote	Per N.P. Statement Treated Zinc	Per E.C. Sharood Untr.	Per E.O. Parks Untr.	Per letter of H.E. Stevens-10-31-24 :Trtd. Untr.	Per letter of H.E. Stevens-10-31-24 :Trtd. Creosote	Per G.N. Statement Untr.	Per G.N. Statement Trtd. Zinc	Per NP Statement Trtd. Untr.	Per NP Statement Trtd. Creqsote	Per NP Statement Trtd. Zinc	Per F.C. Sharood Untr.	Per E.O. Parks Untr.	Per letter of H.E. Stevens-11-31-24 Untr.	Per letter of H.E. Stevens-11-31-24 Trtd. Creosote	Per GN Statement Trtd. Untr.	Per GN Statement Trtd. Zinc.
		WEIGHTS OF HEWN OR SLABBED FIR, PINE & HEMLOCK TIES									WEIGHTS OF SAWED FIR, PINE & HEMLOCK TIES								
1	6"x6"x8'	106#	114#	122#	-	-	-	-	115#	125#	79#	85#	91#	-	79#	79#	84#	-	-
2	6"x7"x8'	118#	127#	136#	-	-	-	-	125#	140#	92#	99#	106#	-	92#	92#	98#	-	-
3	6"x8"x8'	129#	139#	149#	-	-	-	-	140#	155#	106#	114#	122#	-	106#	106#	112#	-	-
3	7"x7"x8'	144#	155#	166#	-	-	-	-	-	-	108#	116#	124#	-	108#	108#	114#	105#	130#
4	7"x8"x8'	157#	169#	181#	-	-	-	-	165#	185#	123#	132#	142#	-	123#	123#	131#	125#	150#
5	7"x9"x8'	170#	183#	196#	-	-	-	-	180#	200#	139#	150#	160#	-	139#	139#	147#	140#	170#
5A	7"x9"x8½'	180#	194#	207#	-	-	-	-	190#	210#	147#	158#	169#	-	147#	147#	156#	145#	180#
		WEIGHTS OF HEWN OR SLABBED TAM., ASH, ELM, BIRCH & LARCH TIES									WEIGHTS OF SAWED TAM., ASH, ELM, BIRCH & LARCH TIES								
1	6"x6"x8'	123#	131#	139#)#2	)#2		135#	-	145#	185#	91#	97#	103#	-	79#	79#	84#	-	-
2	6"x7"x8'	135#	144#	153#)	130)	135	135#	143#	160#	185#	106#	113#	120#	-	92#	92#	98#	-	-
3	6"x8"x8'	149#	159#	169#)	)		135#	143#	175#	200#	122#	130#	138#	-	106#	106#	112#	-	-
3	7"x7"x8'	166#	177#	188#)#1	)#1		135#	143#	-	-	124#	132#	140#	-	108#	108#	114#	-	-
4	7"x8"x8'	180#	192#	204#)	178)	191	180#	189#	210#	240#	142#	151#	161#	-	123#	123#	131#	-	-
5	7"x9"x8'	196#	209#	222#)	)		180#	189#	230#	260#	160#	171#	181#	-	139#	139#	147#	-	-
5A	7"x9"x8½'	207#	221#	234#			-	-	245#	280#	170#	181#	192#	-	147#	147#	156#	-	-
		WEIGHTS OF HEWN OR SLABBED OAK TIES									WEIGHTS OF SAWED OAK TIES								
1	6"x6"x8'	148#	156#	164#)#2	)#2		177#	-	165#	185#	110#	116#	122#	-	120#	120#	-	-	-
2	6"x7"x8'	164#	173#	182#)	167)	177	177#	-	185#	210#	129#	136#	143#	-	140#	140#	-	-	-
3	6"x8"x8'	180#	190#	200#)	)		177#	-	200#	225#	147#	155#	163#	-	160#	160#	-	-	-
3	7"x7"x8'	201#	212#	223#)#1	)#1		177#	-	-	-	150#	158#	166#	-	163#	163#	-	-	-
4	7"x8"x8'	218#	230#	242#)	207)	215	215#	-	240#	270#	172#	181#	191#	-	187#	187#	-	-	-
5	7"x9"x8'	237#	250#	263#)	)		215#	-	260#	290#	193#	204#	214#	-	210#	210#	-	-	-
5A	7"x9"x8½"	251#	265#	278#			-	-	280#	315#	205#	216#	227#	-	223#	223#	-	-	-
		WEIGHTS OF HEWN OR SLABBED CEDAR TIES									WEIGHTS OF SAWED CEDAR TIES.								
1	6"x6"x8'	87#	-	-	)#2		100#	-	95#	-	65#	-	-	-	-	65#	-	-	-
2	6"x7"x8'	96#	-	-	)	96	100#	-	100#	-	76#	-	-	-	-	76#	-	-	-
3	6"x8"x8'	106#	-	-	)		100#	-	110#	-	86#	-	-	-	-	86#	-	-	-
3	7"x7"x8'	118#	-	-	)#1		100#	-	-	-	88#	-	-	-	-	88#	-	-	-
4	7"x8"x8'	128#	-	-	)	119	128#	-	130#	-	101#	-	-	-	-	101#	-	-	-
5	7"x9"x8'	139#	-	-	)		128#	-	140#	-	113#	-	-	-	-	113#	-	-	-
5A	7"x9"x8½'	147#	-	-			-	-	150#	-	120#	-	-	-	-	120#	-	-	-

Office of Valuation Engineer
St.Paul, Minnesota.
July 6, 1927

NORTHERN PACIFIC RAILWAY COMPANY

STATEMENT OF WEIGHTS OF VARIOUS KINDS OF CROSS TIES

(HEWN OR SLABBED TIES ASSUMED TO HAVE A ONE INCH LARGER FACE ON THE LARGE END THAN ON THE SMALL END)

UNTREATED HEWN OR SLABBED TIES

Grade	SIZE Small End	SIZE Large End	Lgth.	F.B.M.	Cedar 2700# per M.B.M.	Fir, Pine & Hemlock 3300# per M.B.M.	Tam., Ash, Elm, Birch & Larch. 3800# per M.B.M.	Oak 4600# per M.B.M.
1	6"x6"	6"x7"	8'	32.27	87#	106#	123#	148#
2	6"x7"	6"x8"	8'	35.62	96#	118#	135#	164#
3	6"x8"	6"x9"	8'	39.09	106#	129#	149#	180#
3	7"x7"	7"x8"	8'	43.60	118#	144#	166#	201#
4	7"x8"	7"x9"	8'	47.49	128#	157#	180#	218#
5	7"x9"	7"x10"	8'	51.50	139#	170#	196#	237#
5A	7"x9"	7"x10"	8½'	54.71	147#	180#	207#	251#

UNTREATED SAWED TIES.

Grade	Size	Lgth.	F.B.M.	Cedar 2700# per M.B.M.	Fir, Pine & Hemlock 3300# per M.B.M.	Tam., Ash, Elm, Birch & Larch 3800# per M.B.M.	Oak 4600# per M.B.M.
1	6"x6"	8'	24	65#	79#	91#	110#
2	6"x7"	8'	28	76#	92#	106#	129#
	6"x8"	8'	32	86#	106#	122#	147#
3	7"x7"	8'	32 2/3	88#	108#	124#	150#
4	7"x8"	8'	37 1/3	101#	123#	142#	172#
5	7"x9"	8'	42	113#	139#	160#	193#
5A	7"x9"	8½'	44.625	120#	147#	170#	205#

For Creosoted Treated Ties add 0.25# per F.B.M.

CREOSOTED TREATED HEWN OR SLABBED TIES

1	6"x6"	6"x7"	8'	32.27	-	114#	131#	156#
2	6"x7"	6"x8"	8'	35.62	-	127#	144#	173#
3	6"x8"	6"x9"	8'	39.09	-	139#	159#	190#
3	7"x7"	7"x8"	8'	43.60	-	155#	177#	212#
4	7"x8"	7"x9"	8'	47.49	-	169#	192#	230#
5	7"x9"	7"x10"	8'	51.50	-	183#	209#	250#
5A	7"x9"	7"x10"	8½'	54.71	-	194#	221#	265#

CREOSOTED TREATED SAWED TIES

1	6"x6"	8'	24	-	85#	97#	116#
2	6"x7"	8'	28	-	99#	113#	136#
	6"x8"	8'	32	-	114#	130#	155#
3	7"x7"	8'	32 2/3	-	116#	132#	158#
4	7"x8"	8'	37 1/3	-	132#	151#	181#
5	7"x9"	8'	42	-	150#	171#	204#
5A	7"x9"	8½'	44.625	-	158#	181#	216#

For Zinc Treated Ties add 0.5# per F.B.M.

ZINC TREATED HEWN OR SLABBED TIES

1	6"x6"	6"x7"	8'	32.27	-	122#	139#	164#
2	6"x7"	6"x8"	8'	35.62	-	136#	153#	182#
3	6"x8"	6"x9"	8'	39.09	-	149#	169#	200#
3	7"x7"	7"x8"	8'	43.60	-	166#	188#	223#
4	7"x8"	7"x9"	8'	47.49	-	181#	204#	242#
5	7"x9"	7"x10"	8'	51.50	-	196#	222#	263#
5A	7"x9"	7"x10"	8½'	54.71	-	207#	234#	278#

ZINC TREATED SAWED TIES

1	6"x6"	8'	24	-	91#	103#	122#
2	6"x7"	8'	28	-	106#	120#	143#
	6"x8"	8'	32	-	122#	138#	163#
3	7"x7"	8'	32.2/3	-	124#	140#	166#
4	7"x8"	8'	37 1/3	-	142#	161#	191#
5	7"x9"	8'	42	-	160#	181#	214#
5A	7"x9"	8½'	44.625	-	169#	192#	227#

Office of Valuation Engineer.
St.Paul, Minnesota.
July 6, 1927

NORTHERN PACIFIC RAILWAY COMPANY

COMPARATIVE STATEMENT SHOWING WEIGHTS OF VARIOUS CROSS TIES.

Grade	Size	Per N.P. Statement Untr.	Per N.P. Statement Trtd. Creosote	Per N.P. Statement Trtd. Zinc	Per E.O. Sharood Untr.	Per E.O. Parks Untr.	Per letter of H.E. Stevens-10-31-24 Trtd. Untr.	Per letter of H.E. Stevens-10-31-24 Trtd. Creosote	Per G.N. Statement Trtd. Untr.	Per G.N. Statement Trtd. Zinc	Per NP Statement Trtd. Untr.	Per NP Statement Trtd. Creosote	Per NP Statement Trtd. Zinc	Per F.C. Sharood Untr.	Per E.O. Parks Untr.	Per letter of H.E. Stevens-11-31-24 Trtd. Untr.	Per letter of H.E. Stevens-11-31-24 Trtd. Creosote	Per GN Statement Trtd. Untr.	Per GN Statement Trtd. Zinc
		WEIGHTS OF HEWN OR SLABBED FIR, PINE & HEMLOCK TIES									WEIGHTS OF SAWED FIR, PINE & HEMLOCK TIES								
1	6"x6"x8'	106#	114#	122#	-	-	-	-	115#	125#	79#	85#	91#	-	79#	79#	84#	-	-
2	6"x7"x8'	118#	127#	136#	-	-	-	-	125#	140#	92#	99#	106#	-	92#	92#	98#	-	-
3	6"x8"x8'	129#	139#	149#	-	-	-	-	140#	155#	106#	114#	122#	-	106#	106#	112#	-	-
3	7"x7"x8'	144#	155#	166#	-	-	-	-	-	-	108#	116#	124#	-	108#	108#	114#	105#	130#
4	7"x8"x8'	157#	169#	181#	-	-	-	-	165#	185#	123#	132#	142#	-	123#	123#	131#	125#	150#
5	7"x9"x8'	170#	183#	196#	-	-	-	-	180#	200#	139#	150#	160#	-	139#	139#	147#	140#	170#
5A	7"x9"x8½'	180#	194#	207#	-	-	-	-	190#	210#	147#	158#	169#	-	147#	147#	156#	145#	180#
		WEIGHTS OF HEWN OR SLABBED TAM., ASH, ELM, BIRCH & LARCH TIES									WEIGHTS OF SAWED TAM., ASH, ELM, BIRCH & LARCH TIES								
1	6"x6"x8'	123#	131#	139#)#2		)#2		135# -	145#	185#	91#	97#	103#	-	79#	79#	84#	-	-
2	6"x7"x8'	135#	144#	153#)	130)	135		135# 143#	160#	185#	106#	113#	120#	-	92#	92#	98#	-	-
3	6"x8"x8'	149#	159#	169#)		)		135# 143#	175#	200#	122#	130#	138#	-	106#	106#	112#	-	-
3	7"x7"x8'	166#	177#	188#)#1		)#1		135# 143#	-	-	124#	132#	140#	-	108#	108#	114#	-	-
4	7"x8"x8'	180#	192#	204#)	178)	191		180# 189#	210#	240#	142#	151#	161#	-	123#	123#	131#	-	-
5	7"x9"x8'	196#	209#	222#)		)		180# 189#	230#	260#	160#	171#	181#	-	139#	139#	147#	-	-
5A	7"x9"x8½'	207#	221#	234#				- -	245#	280#	170#	181#	192#	-	147#	147#	156#	-	-
		WEIGHTS OF HEWN OR SLABBED OAK TIES									WEIGHTS OF SAWED OAK TIES								
1	6"x6"x8'	148#	156#	164#)#2		)#2		177# -	165#	185#	110#	116#	122#	-	120#	120#	-	-	-
2	6"x7"x8'	164#	173#	182#)	167)	177		177# -	185#	210#	129#	136#	143#	-	140#	140#	-	-	-
3	6"x8"x8'	180#	190#	200#)		)		177# -	200#	225#	147#	155#	163#	-	160#	160#	-	-	-
3	7"x7"x8'	201#	212#	223#)#1		)#1		177# -	-	-	150#	158#	166#	-	163#	163#	-	-	-
4	7"x8"x8'	218#	230#	242#)	207)	215		215# -	240#	270#	172#	181#	191#	-	187#	187#	-	-	-
5	7"x9"x8'	237#	250#	263#)		)		215# -	260#	290#	193#	204#	214#	-	210#	210#	-	-	-
5A	7"x9"x8½"	251#	265#	278#				- -	280#	315#	205#	216#	227#	-	223#	223#	-	-	-
		WEIGHTS OF HEWN OR SLABBED CEDAR TIES									WEIGHTS OF SAWED CEDAR TIES.								
1	6"x6"x8'	87#	-	-	)#2			100# -	95#	-	65#	-	-	-	-	65#	-	-	-
2	6"x7"x8'	96#	-	-	)	96	-	100# -	100#	-	76#	-	-	-	-	76#	-	-	-
3	6"x8"x8'	106#	-	-	)			100# -	110#	-	86#	-	-	-	-	86#	-	-	-
3	7"x7"x8'	118#	-	-	)#1			100# -	-	-	88#	-	-	-	-	88#	-	-	-
4	7"x8"x8'	128#	-	-	)	119	-	128# -	130#	-	101#	-	-	-	-	101#	-	-	-
5	7"x9"x8'	139#	-	-	)			128# -	140#	-	113#	-	-	-	-	113#	-	-	-
5A	7"x9"x8½"	147#	-	-				- -	150#	-	120#	-	-	-	-	120#	-	-	-

Office of Valuation Engineer,
St.Paul, Minnesota.
July 6, 1927.

Saint Paul, May 7th, 1927.

Mr. P. E. Thian:

I am attaching copy of Mr. Davis' letter of May 4th with blueprint tabulation of suggested weights of ties to be used in joint facility accounts.

I am also attaching copy of a circular issued by Mr. Parks under date of February 2nd, giving weights to be used for that purpose.

We have had quite a little correspondence about weights of ties and I wish you would check over the two statements and let me have your opinion as to the figures which most fairly represent the average weight for the different classes.

Chief Engineer.

HBS:H
enc

Brainerd, Minn., May 10th, 1927.

Mr. H. E. Stevens,
Chief Engineer,
St. Paul, Minn.

Dear Sir:

In reply to your letter of May 7th with reference to the suggested weights of ties to be used in Joint Facility Accounts.

It is impossible for me to check the figures submitted by Mr. Davis and Mr. Parks. Would respectfully refer you to my letter to you of September 30th, 1926, enclosing statement covering weights of 98,750 cross ties and four carloads of switch ties which were weighed at Paradise. This letter gives the exact weight per tie as we found them and the statement gives the detail showing that there were number 1, 2, 3, 4 and 5 green and seasoned ties weighed. At the foot of the statement I show the average weight per thousand feet board measure of the different wood weighed.

In my letter to yourself and Mr. Yager, dated April 28th, 1927, I give you weights on 7x8 - 8' Birch, Maple and Red Oak Ties. These weights are absolutely correct but if we were to weigh the ties that we are receiving this year we would find that they are very much heavier than anything we ever received at the Plant heretofore.

For your information I attach hereto a statement, showing weights of Birch, Red Oak and Maple ties of different grades, which weights were obtained last month from a number of ties coming into the Brainerd Plant. The Paradise ties, except the 7x9 - 8' and the 7x9 - 8½' are fairly represented in the weights shown in my letter to you of September 30th, 1926.

I can not understand how Mr. Parks arrived at an average weight of all ties treated at Brainerd as 200#. You will note in my letter of April 28th that the average green weight of Birch ties was 187#, the dry weight 141#, and the treated weight 180.8# The green weight of Maple ties 223.2#, the dry weight 184# and the treated weight 226.3#. The green weight of Red Oak ties 250#, the dry weight 194.3# and the treated weight 243.5#. This would give considerable more weight, it seems to me, than that shown by Mr. Parks. You will also note on the statement enclosed, showing the weights of green hardwood ties, being received at the Brainerd Plant

now will average a great deal more than 200# so that I believe Mr. Parks is too light in his weights, and if he desires to make any correction and would send any of his representatives here I will be very glad to help him dig out all the weights he may need.

I can not check Mr. Davis' weights as the treatment is of zinc chloride and zinc treated ties are thoroughly saturated with water and I could not estimate just what the additional weight would be by this treatment.

Mr. Davis' statement shows the weight of Cedar and we do not use Cedar and can not say anything as to the weights. He does not state in his letter what he means by hardwood so that this is also somewhat of a mystery.

Yours truly,

Supt. T.P.& T.T. Plants

Enc

Weights of Green Hardwood Ties Received at the Brainerd Tie Treating Plant, April 1927.

#1	Birch -	(hewed)	177#
#1	"	(slabbed)	168#
#1	Red Oak -	(hewed)	201#
#1	Maple -	(slabbed)	193#
#2	Birch -	(hewed)	194#
#2	Red Oak -	"	207#
#2	Maple -	(Slabbed)	200#
#3	Birch- 6x8 -square sawed		170#
#3	Red Oak " " "		184#
#3	Maple " " "		194#
#3	Birch	(hewed)	186#
#3	Maple -	(slabbed)	269#
#4	Birch- 7x8 -square sawed		227#
#4	Red Oak " " "		200#
#4	Maple " " "		212#
#4	Birch-	(hewed)	212#
#4	Red Oak-	"	266#
#4	Maple -	(slabbed)	259#
#5	Birch- 7x9 -square sawed		226#
#5	Red Oak " " "		257#
#5A	Birch-7x9-8½'- sq. sawed		226#
#5A	Red Oak " " "		259#
#5A	Birch - 8½'	(hewed)	321#
#5	Birch - 8'	(hewed)	305#
#5	Red Oak - 8'	"	263#

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Saint Paul, May 7th, 1927.

Mr. Andrew Gibson:

I am attaching copy of Mr. Davis' letter of May 4th with blueprint tabulation of suggested weights of ties to be used in joint facility accounts.

I am also attaching copy of a circular issued by Mr. Parks under date of February 2nd, giving weights to be used for that purpose.

We have had quite a little correspondence about weights of ties and I wish you would check over the two statements and let me have your opinion as to the figures which most fairly represent the average weight for the different classes.

Chief Engineer.

HES:H
end

GREAT NORTHERN RAILWAY COMPANY

OFFICE OF THE CHIEF ENGINEER

3659

J. R. W. DAVIS,
CHIEF ENGINEER

ST. PAUL, MINN. May 4, 1927.

Mr. H. E. Stevens,
Chief Engineer,
Northern Pacific Ry.Co.,
St. Paul, Minnesota.

Dear Sir:

Our Accounting Department is questioning the weights of ties used in bills on joint facility A.F.E.s for work carried out by our respective companies, and I think it would be advisable, if possible, to agree on a list of weights of ties to be used for these bills.

I am attaching hereto a statement showing weights of ties, which has been made up from data that we have in our files on the subject.

I would like to have you check this statement and advise me as to your opinion of the weights shown.

Yours truly,

J. R. W. Davis B

JBM/BA

See Circular E O Parks Feb 2, 1927 - for N.P. weights used in setting up charges in joint facility Bills A.O.B. 5/5-

WEIGHTS OF TIES

Cross Ties

Size	Class	Fir - Larch - Tamarac				Cedar	Oak		Hardwood	
		Hewn or Slabbed		Sawed		Hewn or Slabbed	Hewn or Slabbed		Hewn or Slabbed	
		Untr.	Trtd. Zinc Cl.	Untr.	Trtd. Zinc Cl.	Untr.	Untr.	Trtd.	Untr.	Trtd. Creos.
6"x 6"-8'	1	115	125			95	165	185	145	165
6"x 7"-8'	2	125	140			100	185	210	160	185
6"x 8"-8'	3	140	155	105	130	110	200	225	175	200
7"x 8"-8'	4	165	185	125	150	130	240	270	210	240
7"x 9"-8'		180	200	140	170	140	260	290	230	260
7"x 9"-8½'	5	190	210	145	180	150	280	315	245	280

Weights per M.B.M.

Fir Untreated	3300# per M.B.M.
Fir Zinc Treated	4000# " "
Tamarac	4000# " "
Oak Untreated	4800# " "
Oak Treated	5400# " "
Hardwoods Mixed Untreated	4200# " "
Hardwoods Mixed Treated	4800# " "
Cedar Untreated	2700# " "

Great Northern Railway Company,
Office of Asst. to Chief Engineer,
May 4, 1927.

COPY

GREAT NORTHERN RAILWAY COMPANY

Saint Paul, May 4, 1927.

Mr. H. E. Stevens, C.E.,
Northern Pacific Ry. Co.,
St. Paul, Minnesota

Dear Sir:

Our Accounting Dept is questioning the weights of ties in bills on joint facility AFEs for work carried out by our respective companies, and I think it would be advisable, if possible, to agree on a list of weights of ties to be used for these bills.

I am attaching hereto a statement showing weights of ties, which has been made up from data that we have in our files on the subject.

I would like to have you check this statement and advise me as to your opinion of the weights shown.

Yours truly,

(sgd) J.R.W. Davis

WEIGHTS OF TIES

Cross Ties

Size	Class	Fir - Larch - Tamarac: Hewn or Slabbed: Untr.	Fir - Larch - Tamarac: Hewn or Slabbed: Zinc Cl.	Fir - Larch - Tamarac: Sawed: Untr.	Fir - Larch - Tamarac: Sawed: Zinc Cl.	Cedar: Hewn or Slabbed: Untr.	Oak: Hewn or Slabbed: Untr.	Oak: Hewn or Slabbed: Trtd.	Hardwood: Hewn or Slabbed: Untr.	Hardwood: Hewn or Slabbed: Creos.
6"x 6"-8'	1	115	125			95	165	185	145	185
6"x 7"-8'	2	125	140			100	185	210	160	185
6"x 8"-8'	3	140	155	105	130	110	200	225	175	200
7"x 8"-8'	4	165	185	125	150	130	240	270	210	240
7"x 9"-8'		180	200	140	170	140	260	290	230	260
7"x 9"-8½'	5	190	210	145	180	150	280	315	245	280

Weights per M.B.M.

Fir Untreated	3300#	per M.B.M.
Fir Zinc Treated	4000#	" "
Tamarac	4000#	" "
Oak Untreated	4800#	" "
Oak Treated	5400#	" "
Hardwoods Mixed Untreated	4200#	" "
Hardwoods Mixed Treated	4800#	" "
Cedar Untreated	2700#	" "

Great Northern Railway Company,
Office of Asst. to Chief Engineer,
May 4, 1927.

COPY

St. Paul, February 2, 1927.

Division Accountants:

Commencing at once and until further advised, the following weights and distances should be used in setting up freight on treated cross ties in joint facility bills and A&B.

Average weight of all ties treated at Brainerd	200 lbs ea.
Average weight of all untreated ties shipped Brainerd for treatment	191 " "
Average haul on untreated ties to Brainerd	75 miles
Average weight of sawed ties treated at Paradise	3.5 lbs FBM
Average weight of sawed ties shipped to Paradise for treatment	3.3 lbs FBM
Average haul on untreated ties to Paradise	343 miles

The following weights should be used in assessing freight on untreated ties applied in tracks:

Oak, main line ties, hewn	215 lbs ea.
Oak, side track ties, hewn	177 " "
Fir, pine and tamarack ties, main line, hewn	191 " "
Fir, pine and tamarack ties, side track, hewn	135 " "
Oak sawed ties	5 lbs FBM
Fir, pine and tamarack sawed ties	3.3 " "

The above weights and distances should also be used in assessing freight on cross ties charged to Additions and Betterments.

(sgd) E.O. Parks

Auditor Disbursements

25 3659-16

St.Paul, Minn., March 30, 1927.

File 8555-C

MR. H. E. STEVENS:

Replying to your letter of March 25th in connection with weights to be used in figuring freight on treated cross ties in joint facility bills:

Hereafter when issuing instructions regarding the weights of cross ties we will arrange to submit an advance copy to you for approval, and will also furnish you with additional copies for distribution to your engineers.

For your information, the weight of the particular ties that you mention is based upon scale weights of 625,920 ties purchased on foreign lines, shipped to Brainerd during the year 1926 for treatment.

The tenant lines are continually questioning the weights used in our joint bills, and it has been possible to satisfy them that our weights are equitable when arrived at on this basis.

Gel-Gmw

E. L. Clark
AUDITOR DISBURSEMENTS.

3659-b1

Saint Paul, March 25, 1927.

Mr. E. O. Parks:

Your circular of February 2, 1927 to Division Accountants, setting up weights to be used in figuring freight on treated cross ties in joint facility bills, has just come to my attention. I note the weights check with data furnished you with my letter of October 5, 1926, with the exception of fir, pine and tamarack hewn main line ties.

In issuing circulars of this character in which the Engineering Department are directly interested, I should appreciate your furnishing additional copies for distribution to the Engineers whose duties require the preparation of estimates which are affected by the circular stipulations.

In fact, in the issuance of circulars which bear so directly upon engineering data as the one in question, I think it would be desirable for you to furnish us with an advance copy for check prior to issuance.

Chief Engineer.

HES:H

noted R.

Saint Paul, March 23, 1927.

Mr. H. E. Stevens:

The attached circular from Mr. Parks regarding weights for ties used in A. & B. work.

This checks with weights in circular letter of Oct. 31, 1924 with the exception of fir, pine and tamarack used in main line. Understand these weights are arrived at in the Accounting Dept. from information shown on connecting line freight bills on which are shown the net weights of contents of each car shipped to tie plant.

Please advise if O.K. to use these weights in setting up freight to A. & B.

JHR-w

COPY

File 3659 C

St.Paul, Minnesota,
February 2, 1927.

File 8555-C-577

DIVISION ACCOUNTANTS:

Commencing at once and until further advised, the following weights and distances should be used in setting up freight on treated cross ties in joint facility bills: and AFB

Average weight of all ties treated at Brainerd	200 Lbs. ea.
Average weight of all untreated ties shipped Brainerd for treatment	191 " "
Average haul on untreated ties to Brainerd	75 Miles
Average weight of sawed ties treated at Paradise	3.5 Lbs.FBM
Average weight of sawed ties shipped to Paradise for treatment	3.3 Lbs.FBM
Average haul on untreated ties to Paradise	343 Miles

The following weights should be used in assessing freight on untreated ties applied in tracks:

Oak, main line ties, hewn	215 Lbs.ea.
Oak, side track ties,hewn	177 " "
Fir, pine and tamarack ties, main line,hewn 180	191 " "
Fir, pine and tamarack ties, side track, hewn	135 " "
Oak sawed ties	5 Lbs. FBM
Fir, pine and tamarack sawed ties	3.3 " "

The above weights and distances should also be used in assessing freight on cross ties charged to Additions & Betterments.

(Signed) E.O.Parks,
AUDITOR DISBURSEMENTS

Gel-Gmw

J.H. Rochon

St. Paul, Minnesota.
February 2, 1927.

File 8555-C-577

DIVISION ACCOUNTANTS:

Commencing at once and until further advised, the following weights and distances should be used in setting up freight on treated cross ties in joint facility bills:

Average weight of all ties treated at Brainerd	200 Lbs. ea.
Average weight of all untreated ties shipped to Brainerd for treatment	191 " "
Average haul on untreated ties to Brainerd	75 Miles
Average weight of sawed ties treated at Paradise	3.5 Lbs. F.B.M.
Average weight of sawed ties shipped to Paradise for treatment	3.3 Lbs. F.B.M.
Average haul on untreated ties to Paradise	343 Miles.

The following weights should be used in assessing freight on untreated ties applied in tracks:

3.5 # treated

Oak, main line ties, hewn	215 Lbs. ea.
Oak, side track ties, hewn	177 " "
3.3 Fir, pine and tamarack ties, main line, hewn	191 " "
Fir, pine and tamarack ties, side track, hewn	135 " "
Oak sawed ties	5 Lbs. F.B.M.
Fir, pine and tamarack sawed ties	3.3 " "

The above weights and distances should also be used in assessing freight on cross ties charged to Additions & Betterments.

E. Peron
AUDITOR DISBURSEMENTS.

Col-Cmw

Mr. Feyder :- For your files
2/22/27 A.G.T.

3659 "6"

On #42, Seattle Division,
October 5, 1926.

Mr. [redacted]. O. Parks:

Your letter of September 3rd about weight of treated fir ties used by other Companies in freight billings against the Northern Pacific:

The question of average weight of ties is one which cannot be accurately determined account of difference in specific gravity of the various timbers used in tie manufacture; varying sizes of hewed ties and various degrees of seasoning at time of shipment. The Northern Pacific established weights for the various classes were given in my joint letter of October 31, 1924 to Engineers of Maintenance and Timber Department, copy of which was sent you.

These weights were based on compilation of freight bills made by Mr. Sharood and data from the Valuation Department of this and other Railways - as outlined in Mr. Thian's letter to me of November 21, 1921, copy of which is attached.

You will note the compilation shows the Great Northern were allowed by the Bureau of Valuation an average weight of 180#, and this probably accounts for their using that weight in their bills against the Northern Pacific. This probably covers hewed ties, and, as you know, there are wide variations in the cubical volume of hewed ties, particularly on the east end of the line. As a general rule the hewed ties in Minnesota run over-size.

In 1921 we made a series of tests of actual weights

of ties as shipped, same being covered by copy of Mr. Gibson's letter to me of September 30 and attached statement.

You will note Mr. Gibson's average green weights are approximately 3.83 per M FBM and treated weights 3.69 per M FBM. This indicates that our established weights are perhaps a little low, but not substantially so on the average, and in my judgment it would be advisable to continue the unit weights we have heretofore been using.

The weight of zinc treated tie is so dependent upon local conditions as to make it impossible to fix an average figure which can be indisputably proven. When fresh from the treatment the ties are water soaked. In a short time this water dries out, leaving but a very small additional weight of zinc. The increase in weight over untreated tie ought not to be in excess of 0.8 of a pound per FBM, providing the tie is given a reasonable opportunity to dry out before shipment from the plant.

The excess weights which you mention as being used by the Great Northern and OWRR&N are probably based on zinc treated ties loaded out direct from the plant, and it may well be that these Companies have actual weight figures which will sustain the figures used.

Chief Engineer.

HES:h
enc

On #42, Seattle Division,
October 5, 1926.

Mr. L. O. Parks:

Your letter of September 3rd about weight of treated fir ties used by other Companies in freight billings against the Northern Pacific:

The question of average weight of ties is one which cannot be accurately determined account of difference in specific gravity of the various timbers used in tie manufacture; varying sizes of hewed ties and various degrees of seasoning at time of shipment. The Northern Pacific established weights for the various classes were given in my joint letter of October 31, 1924 to Engineers of Maintenance and Timber Department, copy of which was sent you.

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of ties as shipped, same being covered by copy of Mr. Gibson's letter to me of September 30 and attached statement.

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The excess weights which you mention as being used by the Great Northern and OWRR&N are probably based on zinc treated ties loaded out direct from the plant, and it may well be that these Companies have actual weight figures which will sustain the figures used.

Chief Engineer.

HES:h
enc

Brainerd, Minn., Sept. 30th, 1926.

Mr. H. E. Stevens,
Chief Engineer,
St. Paul, Minn.

Dear Sir:

Replying to your letter of September 16th, and returning Mr. Thian's letter to you in regard to weights of ties. We have prepared a tabulated statement which is hereto attached, showing the weight of 98,750 cross ties and four cars of switch ties weighed at Paradise in 1921. On the basis of standard ties and using the weights on the attached sheet tie weights would be as follows:

Kind of Timber	Tie-7"x8"x8'	Green Wt.	Seasoned Wt.	Treated Wt.
Mont. - Idaho Fir & Tamarack)	" "	140.4#	124.9#	150.4#
Yellow Pine	" "	147.3	101.8	127.3
Coast Fir	" "	139.8	112.6	138.1
Fir & Tamarack	Tie 7"x9"x8'	158.1#	140.6#	166.1#
Yellow Pine	" "	165.9	114.6	140.1
Coast Fir	" "	157.4	126.8	152.3

Mont. - Idaho Fir & Tamarack lost in Seasoning per M.Ft.B.M. 416#
Yellow Pine " " " " " " 1222#
Coast Fir " " " " " " 729#

These are as exact as it is possible to get as when these weights were taken great care was taken in getting the gross, tare, and net weights on each car and the exact number of ties that it contained of the different grades. The grades which we have used on this statement are the present standard.

You will probably think that there is a discrepancy in the green and seasoned weight of Pine but such is not the case. Pine loses very nearly 50% of its weight in seasoning and, referring to seasoning the weights shown as seasoned do not, by any means represent what the oven dry weight of these ties would be. You never get timber or ties down below 15 to 20% above oven dry weight or what you might get by kiln drying the timber. When the moisture of the timber is down to 15 to 20% it considered generally throughout the United States that the material is ~~not~~ thoroughly conditioned for treatment.

I hope these weights may give you the information you desire.

Yours truly,

Supt. T. P. & T. T. Plants.

COPY

Brainerd, September 30, 1926.

Mr. H. E. Stevens:

Replying to your letter of September 16 and returning Mr. Thian's letter to you in regard to weights of ties. We have prepared a tabulated statement which is hereto attached, showing the weight of 98,750 cross ties and four cars of switch ties weighed at Paradise in 1921. On the basis of standard ties and using the weights on the attached sheet, tie weights would be as follows:

Kind of Timber	Tie 7"x8"x8'	Green Wt.	Seasoned Wt.	Treated Wt.
Mont. - Idaho)				
Fir & Tamarack)	" "	140.4#	124.9#	150.4#
Yellow Pine	" "	147.3	101.8	127.3
Coast Fir	" "	139.8	112.6	138.1
Fir & Tamarack	Tie 7"x9"x8'	158.1#	140.6#	166.1#
Yellow Pine	" "	165.9	114.6	140.1
Coast Fir	" "	157.4	126.8	152.3

Mont - Idaho Fir & Tamarack lost in seasoning per M FBM		416#
Yellow Pine	ditto	1322#
Coast Fir	"	729#

These are as exact as it is possible to get as when these weights were taken great care was taken in getting the gross, tare and net weights on each car and the exact number of ties that it contained of the different grades. The grades which we have used on this statement are the present standard.

You will probably think that there is a discrepancy in the green and seasoned weight of Pine but such is not the case. Pine loses very nearly 50% of its weight in seasoning and, referring to seasoning the weights shown as seasoned do not by any means represent what the oven dry weight of these ties would be. You never get timber or ties down below 15 to 20% above oven dry weight or what you might get by kiln drying the timber. When the moisture of the timber is down to 15 to 20% it is considered generally throughout the United States that the material is thoroughly conditioned for treatment.

I hope these weights may give you the information you desire.

(sgd) Andrew Gibson

Supt. Tie Plants

3) 4814
42) 1605 (3821
126
345
336
90
84
60

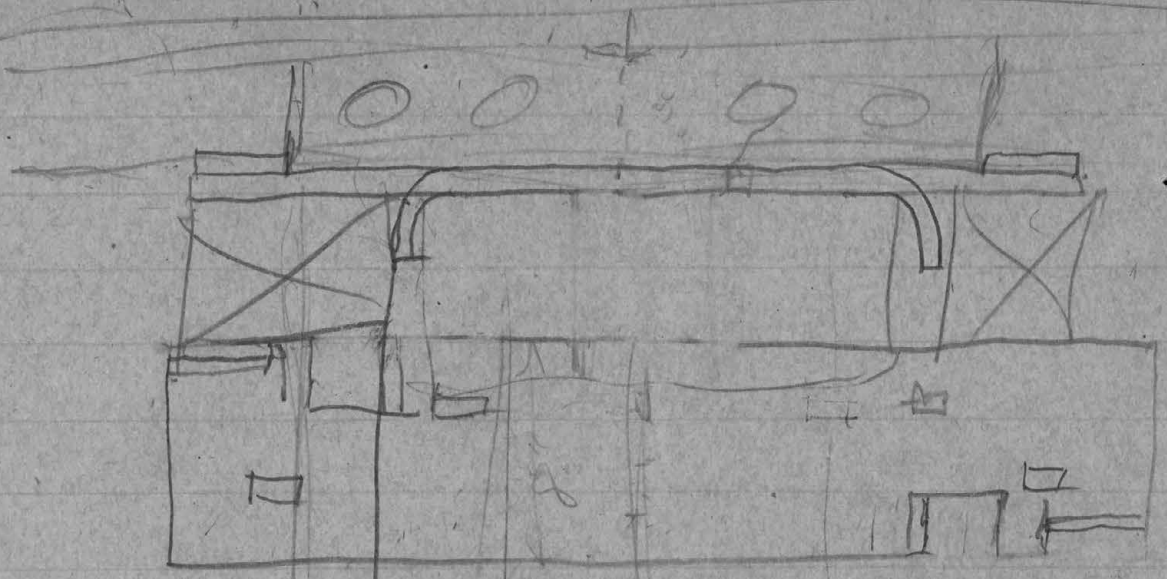
2) 4585
153

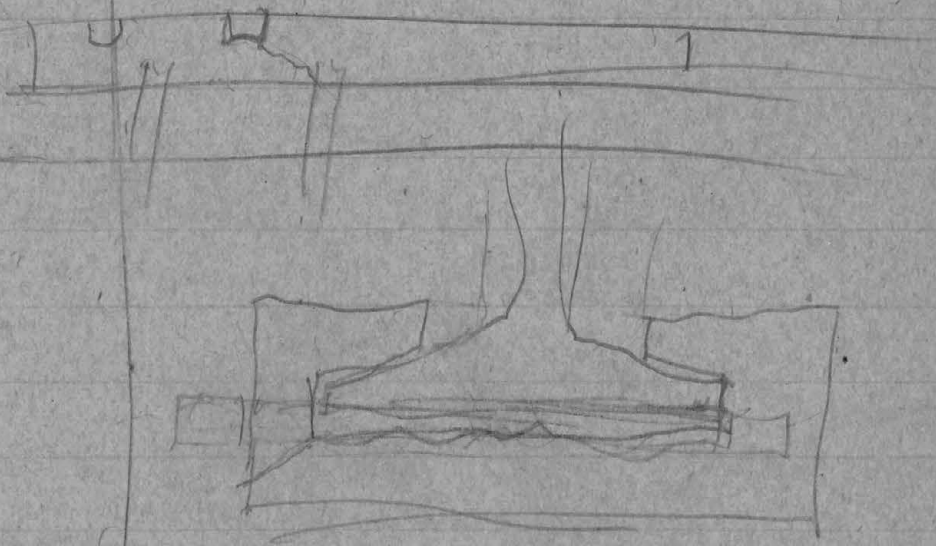
63
2
3) 126
42

42) 153 (3643
126
270
252
180
168
120

3821
3830
9) 7671
3835

3643
3740
2) 7383
3690





98750 Cross ties and Four Carloads Switch ties weighed at Paradise in Year - 1921

Kind of wood	Grade	No. of Ties Weighed	F.B.M.	Weight	Avg. Wt. Per "M" F.B.M.
Fir & Tamarack-Green	1,2&3	10,452	334,464	1,294,040	3869
" " " "	4 & 5	29,578	1,104,244	4,121,470	3732
TOTAL		40,030	1,438,708	5,415,510	3764
Fir & Tamarack-Seasoned	1,2&3	4,598	147,136	514,240	3495
" " " "	4 & 5	10,794	402,976	1,327,260	3294
TOTAL		15,392	550,112	1,841,500	3348
Pine - Green	1,2&3	8,295	265,440	1,134,440	4273
" "	4 & 5	8,868	331,072	1,221,660	3690
TOTAL		17,163	596,512	2,356,100	3950
Pine - Seasoned	1,2&3	N O N E			
" "	4 & 5	7,050	263,200	718,060	2728
Coast Fir - Green	1,2&3	2,022	64,704	272,280	4208
" " - " Sw.Ties	Sw.T.	4 Cars	96,530	331,860	3438
TOTAL		2,022 4 Cars	161,234	604,140	3747
Coast Fir - Seasoned	1,2&3	6,479	207,328	602,180	2904
Coast Fir - Seasoned	4 & 5	10,614	396,256	1,219,440	3077
TOTAL		17,093	603,584	1,821,620	3018
	Sw.T.	4 Cars			
Total Green Ties		59,215	2,196,454	8,375,750	3813.3
Total Seasoned Ties		39,535	1,416,896	4,381,180	3092.1
	Sw.T.	4 Cars			
Total Green and Seasoned		98,750	3,613,350	12,756,930	3530.5

Fir & Tamarack-Green	Average Weight per M Ft. B.M.	3,764
" " " Seasoned	" " " " "	3,348
Yellow Pine - Green	Average Weight per M Ft. B.M.	3,950
" " Seasoned	" " " " "	2,728
Coast Fir - Green	Average Weight per M Ft. B.M.	3,747
Coast Fir - Seasoned	" " " " "	3,018

3659 C

St. Paul, September 16, 1926.

(See also 3659A)

Mr. Andrew Gibson:

Your letter of September 9th about weights for creosoted treated ties:

As you will perhaps recall, we made a very extensive study of this matter two or three years ago, after which we issued instructions as to weights which should be used - see my letter to you of October 31, 1924.

In these instructions we fixed 3300# per M FBM for the untreated and 3500# per M FBM for the treated. It does not necessarily follow that you should add to the 3300# the full weight of the treatment, as the 3300# weight is based on an average tie condition, or, in other words, a green or partially seasoned tie.

I question very much if the average weight of timber per M FBM when seasoned for treatment at the Brainerd and Paradise plants is more than twenty-six or twenty-eight hundred pounds per M FBM. Have you any data bearing on that point?

The Bureau of Valuation, after reviewing all of the data furnished by the Carriers, finally agreed to allow 3500# per M FBM as the average weight of creosoted timber, and inasmuch as all of our outstanding instructions have been based on this weight, I do not like to suggest a change without conclusive evidence that the previous figure is incorrect. Will you please review this matter further and advise.

Mr. Andrew Gibson #2

In this connection I am attaching copy of Mr. Thian's letter to me of November 21, 1921, which please return with your reply.

Chief Engineer.

HES:h

enc

St. Paul, September 16, 1926.

Mr. E. O. Parks:

Your letter of the 3rd about weight of treated and untreated ties:

The Northern Pacific weights for the various classes were given in my joint letter to the Engineers of Maintenance and Timber Department, dated October 31, 1924, copy of which was sent you.

These weights were based on compilation of freight bills made by Mr. Sharood and data from the Valuation Department of this and other Railways - as outlined in Mr. Thian's letter to me of November 21, 1921, copy of which is attached.

You will note the compilation shows the Great Northern were allowed by the Bureau of Valuation an average weight of 180#, and this probably accounts for their using that weight in their bills against the Northern Pacific. This probably covers hewed ties, and, as you know, there are wide variations in the cubical volume of hewed ties, particularly on the east end of the line. As a general rule the hewed ties in Minnesota run over-size.

The weight of 3500# per M FBM for creosoted treated ties is the figure fixed by the Bureau of Valuation, but in my judgment it is too low. Four pounds (4#) per foot would more nearly represent the average weight of treated ties as shipped from the Brainerd and Paradise plants. We have, however, been using $3\frac{1}{2}$# per foot for some little time, and this being the figure allowed by the Bureau of Valuation, I am inclined to think we

should continue to use it in our joint bills as it is one that can easily be sustained.

The weight of zinc treated tie is so dependent upon local conditions as to make it impossible to fix an average figure which can be indisputably proven. When fresh from the treatment the ties are water soaked. In a short time this water dries out leaving but a very small additional weight of zinc. The increase in weight over untreated tie ought not to be in excess of 0.8 of a pound per FBM, providing the tie is given a reasonable opportunity to dry out before shipment from the plant.

The excess weights which you mention as being used by the Great Northern and OWRR&N are probably based on zinc treated ties loaded out direct from the plant, and it may well be that these Companies have actual weight figures which will sustain the figures used.

Chief Engineer.

HES:h
enc

St. Paul, Minnesota,
September 15, 1926.

Mr. H. E. Stevens,
Chief Engineer,
Building.

Dear Sir:

Your letter of the 10 inst. re Mr. Parks' letter of the 3rd inst. weight of tie treatment in which he asks:

(1) Fair weight per F.B.M. for zinc treated fir ties.

(2) Is 3.5 pounds per F.B.M. a fair weight for fir ties given a creosote treatment.

The O.W.RR.& N. bill a 7x9x8 untreated tie @ 3.3# F.B.M. sawed at 139#. Same tie treated @ 4.2# per F.B.M. or 177#, a gain of 38# for zinc treatment.

The Great Northern use 180# for a #1 untreated sawed tie which is 4.285# F.B.M. and 210# for treated which is 5.0# F.B.M., a gain of 30# for zinc treatment.

The C.R.I.&P. in a pamphlet on zinc treatment give for pine ties 6"x8"x8' in Arkansas & Missouri districts 146# untreated which is 4.56# F.B.M. and 208# treated which is 6.50# F.B.M., a gain of 62# for zinc treatment.

The Western Group Sub Committee published on August 18th, 1923, a report on shipping weights for fir ties zinc treated. This was developed that Deduced from O. & W., O. S.L., and S.P. experience and a 7x9x8 tie 42 ft. B.M. @ 3228# per F.B.M. equals 135.58

lbs. untreated. Treated @ 3.889# per F.B.M. equals 163.34 lbs., a gain of 27.76# for zinc treatment.

Mr. Andrew Gibson's estimate from letter of September 9, 1926, gives 7"x8"x8' tie @ 3.3# per F.B.M. sawed tie 123.2# untreated. A treated tie @ 4.263# per F.B.M. equals 159.2#, a gain of 36# for zinc treatment, which shows Mr. Gibson's added weight is very near correct.

S U M M A R Y

		ZINC TREATED TIES		
	SIZE	WEIGHT UNTREATED	WEIGHT TREATED	INCREASE WEIGHT
O&W	7x9-8	139	177	38 = 0.9 per ft
G N		180	210	30
C R I & P	6x8-8	146	208	62
Western Group	7x9-8	135	163	28 = 0.7 per ft
Mr. Gibson	7x8-8	123	159	36 = 1# per FBM.

average 0.8# per FBM

The Great Northern apparently are using a hewed tie weight which is far in excess for sawed ties.

(2) I find you answered second question about weight of creosote treatment in your letter of October 31, 1924. This was based on my letter in which I quoted Pacific District practice of 3300# M F.B.M. for untreated and 3500# M F.B.M. (Rueping process).

Our Paradise and Brainerd records show an added weight Paradise 21. 769# and Brainerd 22. 428# per tie using 42# per F.B.M. average for treated sawed and hewn ties. This was on a straight creosote treatment. The present creosote

and crude oil treatment give added weight quoted in Mr. Gibson's letter as 27# per tie for treatment.

In view of this 3½# per F.B.M. is now as charged by Mr. Parks too low for creosoted ties. Untreated tie 37 1/3 F.B.M. 123# plus 27 lbs. for treatment equals 150# or 4.023# per F.B.M.

Yours truly,

P. E. Shaw.

VALUATION ENGINEER.

PET:AP

St. Paul, Minnesota,
September 15, 1926.

Mr. H. E. Stevens,
Chief Engineer,
Building.

Dear Sir:

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S U M M A R Y

		ZINC TREATED TIES		
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In view of this 3½# per F.B.M. is now as charged by Mr. Parks too low for creosoted ties. Untreated tie 37 1/3 F.B.M. 123# plus 27 lbs. for treatment equals 150# or 4.023# per F.B.M.

Yours truly,

VALUATION ENGINEER.

PET:AP

3659 C

St. Paul, September 10, 1926.

Mr. P. E. Thian:

Regarding attached about weights of treated and untreated ties:

It is my recollection you worked up considerable data on this matter and also had field check made of a substantial number of ties. There is also something on my file. Please look up and advise.

Chief Engineer.

HES:h
enc

3657 C

Brainerd, Minn., Sept. 9, 1926.

Mr. H. E. Stevens,
Chief Engineer,
St.Paul, Minn.

Dear Sir:

Replying to your letter of the 8th and returning Mr. Parks' letter to you relative to weights of Creosote and Zinc treated ties.

Unless I misunderstood Mr. Parks' letter, there is a mistake in the weights used for Creosote treated ties. My understanding is that 3,3 pounds per foot is what is used for computing the weight of timber and in a 7" x 8" - 8'0" tie are 37-1/3 Ft. Board Measure which would be 123.2 pounds per tie, to which should be added 27 pounds per tie for Creosote treatment, making a tie 150.2 pounds or 4.023 pounds per foot Board Measure.

42

The figures used by the O.W.R. & N. are also low unless they give the benefit of letting the ties dry out after treating before weighing. With Zinc treatment they inject one-half pound of Zinc per Cubit Foot of timber but in order to do this the tie is thoroughly saturated with water so that the excess over the natural weight of the tie would probably be when treated somewhere near 36 pounds or almost one pound per foot Board Measure.

On the basis of a tie weighing 123.2 pounds and allowing 36 pounds for Zinc and water, a tie would weigh 159.2 pounds or 4.263 pounds per Foot Board Measure. If they allow the ties to partially season before weighing I think the weights they use are about right.

Yours truly,

Supt. T. P. & T. T. Plants.

enc

37.5
2.800
3000
230
105.00

St. Paul, September 8, 1926.

Mr. Andrew Gibson:

Herewith letter from Mr. Parks about weight of zinc and creosote treated ties. With return of same will you please let me have such data as you have covering this matter.

Chief Engineer.

HES:h
enc

St. Paul, Minn., Sept. 3, 1926

File 264-1200

Mr. H. E. Stevens:

The Great Northern and OWR&N appear to be using an excessive weight on treated fir ties included in their bills against this company.

Both companies' fir ties used in the coast territory are given a zinc chloride treatment and the OWR&N Co. in assessing freight on these ties uses a weight of 4.2 pounds per foot board measure, while the Great Northern uses a weight considerably in excess of this figure. In billing against these companies we use a weight of 3.5 pounds per foot board measure for assessing freight on ties given the creosote treatment.

As we desire to call upon these companies for an adjustment of the overcharges, will you kindly advise what is a fair weight per foot board measure for fir ties given a zinc chloride treatment? Also, do you consider that our weight of 3.5 pounds per foot board measure is a fair weight for fir ties given a creosote treatment?

E. O. Parks,

Auditor Disbursements.

GEL-m

3659 @

Saint Paul, August 18, 1925.

Mr. E. O. Parks:

In reply to your letter of the 13th, file 8555-C-3448:

Your question in regard to the weight of ties received and shipped from the Paradise treating plant is best answered by a letter of instructions to the Engineering Department, dated November 25, 1921 and revised October 31, 1924 to fit the new classification for tie grades, - copies of which are attached.

The information given you in my letter of July 24th was taken from these instructions.

Chief Engineer.

LS:h

enc

3659C

St.Paul, Minn. Aug. 13, 1925

file 8555 C- 3448

Mr. H.E.Stevens :

In your letter of July 24, in reply to my letter of July 9, file 8555- you furnished the weights on treated ties from the Brainerd Tie Treating Plant.

Can you also furnish an average weight on the ties treated at Paradise Plant, and can you also advise what would be a fair average weight of untreated ties shipped to Paradise for treatment?

2

E C Clark

gel mm

Auditor Disbursements.

3659 C

Saint Paul, July 24, 1925.

Mr. E. O. Parks:

In reply to your letter of the 9th, file 8555-C-3448, in regard to weight of treated ties from the Brainerd Treating Plant:

We made an exhaustive analysis of this question in connection with our valuation work, and at that time I decided that we would use 189# for treated main line ties and 143# for treated side track ties. I believe that this represents a fair average and should be satisfactory for your purpose.

Chief Engineer.

LS:h

St.Paul, Minn. July 9, 1925

file 8555- C 3448

Mr. H.E. Stevens,
Chief Engineer- Bldg.

Dear Sir :

For the purpose of assessing freight over our own line on joint facility bills it is desired to establish a fair average weight on treated ties from the Brainerd Tie Treating Plant.

We have found that our average weight of the untreated ties going to the plant is about 181 pounds each, this weight being determined from the waybill weights of ties purchased on foreign lines.

Is the weight of the untreated tie before seasoning approximately the same as the treated tie, if not will you kindly advise what weight should be used in assessing freight on treated ties.

Yours truly,

gel mm

Auditor Disbursements.

3457 "6"

St. Paul, Minn., Oct. 31, 1924.

Mr. A. R. Cook,
Mr. B. Blum,
Mr. P. E. Thian,
Mr. F. V. Weisenberger,
Mr. Andrew Gibson.

Referring to my circular letter of November 25th, 1921, giving weights of ties. In as much as the classes have been changed a revised list of weights has become necessary.

Below is a table showing the old classification and the new classification with the proper weights:

New Classification	Old Classification	Hewed Ties - Untreated	
5 and 4	1	Oak	215#
5 and 4	1	Fir, Pine and Tamarack	180#
5 and 4	1	Cedar	198#
3, 2 and 1	2 and 3	Oak	177#
3, 2 and 1	2 and 3	Fir, Pine and Tamarack	135#
3, 2 and 1	2 and 3	Cedar	100#
5 and 4	1	Av.Vol - Hewed =	46' B.M.
3, 2 and 1	2	" " "	38' "

Sawed Ties - Untreated	
Oak	5000# per MBM
Fir, Tamarack etc	3300# " "
Cedar	2700# " "

Treated Ties

5 and 4	1	Hewn	189#
3 and 2	2	"	143#

For treated ties SAWED 3500# per MBM.

WSC:wp

Chief Engineer.

St. Paul, Minn., Oct. 31, 1924.

Mr. J. V. McGuire:

Referring to your letter of October 10th, I hand you herewith copy of circular letter showing weights of ties according to the old and new classifications.

REC:wp
encl.

Chief Engineer.

3659-16

Spokane, Washington,
October 10, 1924.

Mr. H. E. Stevens,
Chief Engineer,
St. Paul, Minn.

Referring to your letter of November 25th, 1921, covering weights on ties as furnished by the Bureau of Valuation.

Inasmuch as the classes have been changed, will you kindly let me have a revised list covering weights. This is for use in the computation of freight charges in connection with Addition and Betterment projects.

J.V.McGuire
Division Accountant.

Saint Paul, December 1, 1921.

Mr. Andrew Gibson,
Supt. Tie Treating Plants.

Mr. F. V. Weisenburger,
Timber Agent.

Your letters of November 28th and 26th respectively about tie specifications used in the weight classification covered by my circular letter of November 25th.

I think it is quite obvious that the old classification was used in compiling these weights.

If we later on [redacted] revise the specifications the weight circular will be supplemented with the necessary information.

Chief Engineer.

HES-ar

cc-Mr. Thian

3659 "6"

Saint Paul, Minn., December 1st, 1921.

Mr. H. E. Stevens,

Chief Engineer.

Dear Sir:-

Yours of the 30th ultimo re weight of ties:

I understand the official designation of the classification is now under consideration by the First Vice-President, and that a ruling may be expected very shortly.

After official specifications are approved, I think a supplementary instruction as to weight, giving the classification should be issued, as weights as shown in previous letter of instruction were on the basis of the old standard.

Yours truly,

P. E. Thin

VALUATION ENGINEER.

PET:jl

3659 "L"

Saint Paul, November 30, 1921.

Mr. P. E. Thian:

Please note the attached file and letters from Messrs. Gibson and Weisenburger, about weights of cross ties.

I assume the Government classification was on the old basis; the #1 being the best tie, and that no weights were determined for the new Government classification in which the #1 is the poorest tie and the #3 and #4 is the highest grade.

Will you please advise if you think supplementary instructions should be issued.

Chief Engineer.

HES-ar

Encl.

3659 "6"

Brainerd, Minn., Nov. 28th, 1921.

Mr. H. E. Stevens,

Chief Engineer,

St.Paul, Minn.

Dear Sir:

Referring to your circular letter of Nov. 25th, in regard to weights of ties.

The weights given, I assume are on the basis of the old standard. The #1 tie is now the poorest tie and the #4 is the best tie used, so that if the new tie specifications are to be adopted, the weights given by the Bureau of Valuation should be corrected in accordance with the new specifications, I assume.

Yours truly,

[signature]

Supt. T.P. & T.T. Plants.

PET
Revise letter per ABG ...
12/1/21

3659 "6"

St. Paul, Minn., November 26, 1921.

Mr. H.E. Stevens,

Chief Engineer.

Dear Sir:

I have your letter of November 25th, in reference to Bureau of Valuation weights on ties.

While your letter shows the average volume of No. 1 ties to be the larger tie it says nothing about the No. 3 ties. There is a possibility of some of the departments confusing the classification as shown in this letter with the Government classification which shows No. 3 ties to be the larger tie. It might be well to advise all concerned that your letters refers to the old classification of ties.

Yours truly,

F. W. Eisenberger

Timber Agent.

FVW/FW

Saint Paul, November 25, 1931.

Mr. A. R. Cook,
Mr. Bernard Blum,
MM. P. E. Thien,
Mr. T. C. Winger,
Mr. F. V. Weisenberger,
Mr. Andrew Gibson.

3689-6

In making up tentative engineering report, the Bureau of Valuation have used the following weights on ties:

Hewed Ties - Untreated

No. 1 Oak	215#
No. 1 Fir, Pine and Tamarack	180#
No. 1 Cedar	138#
No. 2 and 3 Oak	177#
No. 2 and 3 Fir, Pine and Tamarack	135#
No. 2 and 3 Cedar	100#

No. 1 Average Volume - Hewed = 46 Ft. B.M.
No. 2 " " " 36 "

Sawed Ties - Untreated

Oak	5,000#	per M.Ft. B.M.
Fir, Tamarack, etc.	3,300#	" "
Cedar	2,700#	" "

Treated Ties

No. 1 Hewn	180#
No. 2 "	143#

For treated ties SAWED 3,500# per M. Ft. B. M.

After an exhaustive analysis of data obtained on this and other roads, we have found the weights used by the Bureau of Valuation are very close to our records of actual weights, and in the interest of uniformity, we will adopt the weights furnished by the Bureau of Valuation in future estimates involving weights of cross ties.

Chief Engineer.

EMG-ar

St. Paul, November 25, 1921.

Messrs: A.R. Cook
Bernard Blum
P.E. Thian
W.C. Pinger
F.V. Weisenberger
Andrew Gibson

COPY

In making up tentative engineering report, the Bureau of Valuation have used the following weights on ties:

Hewed Ties-Untreated

No. 1 Oak	215#
No. 1 Fir, Pine & Tamarack	180#
No. 1 Cedar	128#
No. 2 and 3 Oak	177#
No. 2 and 3 Fir, Pine and Tamarack	135#
No. 2 and 3 Cedar	100#

No. 1 Average Volume - Hewed = 46 ft. B.M.
No. 2 do 36 ft. B.M.

Sawed Ties-Untreated

Oak	5,000#	Per M Ft. B.M.
Fir, Tamarack, etc.	3,300#	do
Cedar	2,700#	do

Treated Ties

No. 1 Hewn	189#
No. 2 "	143#

For Treated ties SAWED 3,500# per M Ft. B.M.

After an exhaustive analysis of data obtained on this and other roads, we have found the weights used by the Bureau of Valuation are very close to our records of actual weights, and in the interest of un iformity, we will adopt the weights furnished by the Bureau of Valuation in future estimates involving weights of cross ties.

(sgd) H.E. Stevens

Chief Engineer.

HES:ar

3659 "6"

Saint Paul, Minn., November 21st, 1921.

Mr. H. E. Stevens,
Chief Engineer.

Dear Sir:-

Under date of December 24th, 1920,, you wrote me giving weights of hewn ties.

Under date of October 6th Mr. Bryan handed you weights of hewn ties in Wisconsin and Minnesota, as compiled by Mr. Sharood from records of Freight and Accounting Departments.

We also have a compilation from statements of weights as received from several Northwest Carriers. Below is a table of these weights; also Great Northern weights and those allowed by the Pacific District.

WEIGHTS OF GREEN HEWED TIES

	Letter HES 12-24-20	Summary N. W. Carriers	Compiled by Sharood	G. N.	Pacific District Allow for System.
No. 1 Oak			207		215
No. 1 Fir, Pine, Tamarack, etc.	180	177	178	181	180
No. 1 Cedar			119	129	128
No. 2 Oak			167		177-#2& #3.
No. 2 Fir, Pine, Tamarack, etc.	148	133	130	130	135-#2& #3
No. 2 Cedar			96	94	100-#2& #3
Weight after treatment & drying out period #1	189				
ditto #2	155				

		Pacific District Allow
Average Volume of #1 Hewed Tie	3.5 cu.ft. = 42' BM	46
" " " #2 " "	2.75 " = 33' "	38

Pacific District allow weights for Untreated Sawn ties:

Oak - - - - - - - - 5,000# per M.Ft.B.M.
Cedar - - - - - - - 2,700# " " "
Fir, Tamarack, Larch, etc. -- - 3,300# " " "

Pacific District Allow

Treated Ties - Sawed ~~xxdxMxxx~~ per M. F.B.M. 3500

In view of above tabulations, I suggest that the Pacific District weights be accepted as official figures to be used in all future tie tabulations:

Pacific District Weights of Ties:

Hewed Ties - Untreated

No. 1 Oak - - - - - - -	215#
No. 1 Fir, Pine and Tamarack - - - -	180#
No. 1 Cedar - - - - - -	128#
No. 2 and 3 Oak - - -	177#
No. 2 and 3 Fir, Pine and Tamarack- - -	135#
No. 2 and 3 Cedar - -	100#

No. 1 Average Volume - Hewed = 46 Ft. B. M.
No. 2 " " - " = 38 "

Sawed Ties - Untreated

Oak - - - - -	5,000#	per M.Ft.	B.M.
Fir, Tamarack, etc. - - -	3,300#	" "	"
Cedar - - - -	2,700#	" "	"

TREATED TIES

No. 1 Hewn - - - - - -	189#
No. 2 " - - - - - -	143#

For treated ties Sawed 3,500# per M. Ft. B. M.

Yours truly,

P. E. Shiaw.

PET:jl

VALUATION ENGINEER.

3659 "6"

Saint Paul, Minn., October 6, 1921.

Mr. H. E. Stevens,
Chief Engineer.

Dear Sir:

I hand you herewith blue print sheets of tie weights for the Eastern District, that is, ties purchased in Wisconsin and Minnesota. The weights shown hereon are taken from the way bills between the years 1916 and 1920 inclusive, and the classification was obtained from the invoice. These are actual scale weights of ties on which were paid revenue tariff rates for transporting.

Mr. Sharood has compiled this information from the records of the Freight and Accounting Departments, and same is correct. There are some 1330 cars of ties represented.

You will note in the Summary I have shown comparison between the weights of our ties with those of the Great Northern, viz:

No. 1 Pine, fir, tamarack, etc. N.P. 178# G.N. 181#
Bureau of Valuation has allowed
the G.N. an average of 180#.
No. 2 - same ties, N.P. and G.N. both average 130#
ICC allows Great Northern 135#
No. 1 Cedar Ties - N.P. 119#, G.N. 129#
ICC Allows G.N. 128#.
No. 2 Cedar N.P. 96#, G.N. 94#
ICC allows G.N. 100#.

Above for your information and file.

Yours truly,

P. E. Thian
VALUATION ENGINEER.

HB:jl
CC - Mr. Andrew Gibson
Mr. P. E. Thian.
encl.

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

ACCOUNT NO. 8 - CROSS TIES

SUMMARY
OF
AUTHENTICATED SHIPPING WEIGHTS OF CROSS TIES 1916 - 1920 INCLUSIVE.

OAK TIES EASTERN DISTRICT					CEDAR TIES EASTERN DISTRICT					FIR, TAMERACK, PINE, BIRCH & HEMLOCK EASTERN DISTRICT					
GRADE OF TIES	NUMBER OF CARS	NUMBER OF TIES	WEIGHT OF TIES	AVERAGE WEIGHT OF TIES	GRADE OF TIES	NUMBER OF CARS	NUMBER OF TIES	WEIGHT OF TIES	AVERAGE WEIGHT OF TIES	GRADE OF TIES	NUMBER OF CARS	NUMBER OF TIES	WEIGHT OF TIES	AVERAGE WEIGHT OF TIES	REMARKS.
No. 1	12	2513	519500	206.8	No. 1	89	32174	3822[illegible]	118.9	No. 1	764	230894	41133100	178.0	Weighted Av. N.P. Ry.
No. 1 G.N.							13282	1716010	129.0	No. 1		80265	14563230	181.0	" " G.N.Ry.
No. 2	5	1271	212700	167.4	No. 2	29	13844	1327010	96.0	No. 2	521	186753	24317330	130.0	" " N.P. Ry.
No. 2 G.N.					No. 2		8511	792800	94.0	No. 2		84169	10969020	130.0	" " G.N. Ry.

The ties shown in the tabulation of which the above is a summary, were shipped to the Northern Pacific Railway Company for use on its lines. All way bills covering ties tabulated are for the years 1916 and 1920 inclusive. Waybills prior to 1916 have been destroyed. The same specifications governing the classification and purchase of ties during these years were in effect from 1916 to 1920, and the ties were obtained from the same localities as from 1916 to 1920, both inclusive.

The weights shown in the tabulation are actual scale weights taken from way bills and represent weights of ties received over foreign line carriers on which revenue tariff rates were paid.

The tabulation does not include record covering cars in which more than one grade of ties were shipped.

No data is available as to the time ties were seasoned before shipment. All ties were shipped under normal conditions and in most cases were for immediate use.

The Great Northern statistics are added to summary merely as a matter of comparison.

Office of Valuation Engineer,
St. Paul, Minnesota, September 26th, 1921.

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

EASTERN DISTRICT
MINNESOTA & WISCONSIN

SHIPPING WEIGHTS OF CROSS TIES.

NO. I. HEWN PINE, TAMARACK, BIRCH, HEMLOCK AND FIR CROSS TIES

Point of Original Shipment	Date of Waybill	Way-Bill No.	CAR NUMBER		NO. OF TIES IN CARS	TOTAL WEIGHT OF TIES IN CAR LBS.
McGregor	4-15-16	133	N.P.	34200	366	67000
Ashland	3-30-16	308	"	90002	317	49700
"	4-26-16	329	"	204302	230	35800
"	3- 7-16	80	"	28604	414	69400
Ashland	5- 4-16	56	"	204004	233	41000
McGregor	4-4 -16	42	"	25906	354	71000
Ashland	3-30-16	306	"	204208	302	48100
"	4-24-16	267	"	90608	205	36100
McGregor	5-18-16	95	"	10509	242	41000
Ashland	7-27-16	280	"	46809	203	33000
"	4-15-16	185	"	41010	405	67100
Duluth	5 -3-16	238	"	10610	200	34300
Ashland	4-12-16	156	"	19312	283	51000
McGregor	4-15-16	128	"	38412	335	53000
Duluth	5 -1-16	80	"	5212	210	36800
Ashland	3-23-16	249	"	90113	252	54700
McGregor	3-28-16	211	"	41414	360	62200
Ashland	4-29-16	370	"	90114	225	43600
McGregor	4-17-16	158	"	36317	272	42000
Ashland	5- 1-16	11	"	90518	245	48500
Duluth	5 -7-16	RP 475	"	28419	276	55600
McGregor	2-26-16	124	"	45320	405	88000
Duluth	4-28-16	RP1827	"	5320	215	38800
Lawler	4-18-16	167	"	28321	336	55000
Ashland	4-25-16	298	"	44021	291	49000
"	3-30-16	305	"	90821	230	42200
"	5- 8-16	92	"	35621	254	40900
"	4-24-16	282	"	33922	211	40100
McGregor	5- 1-16	6	"	23722	425	71000
Duluth	6-25-16	RF1526	"	34723	300	52400
McGregor	4-15-16	149	"	15724	250	38000
Ashland	6-21-16	222	"	29626	315	49800
Ashland	4-26-16	335	"	48527	219	36200
McGregor	4- 1-16	13	"	46527	325	50000
Ashland	4- 4-16	44	"	90927	231	41600
Ashland	4-24-16	273	N.P.	91127	250	39700
"	5- 4-16	57	"	34827	218	38000
McGregor	4- 4-16	40	"	47428	350	60000
"	4-15-16	147	"	33028	351	54500
Duluth	5- 5-16	RP 363	"	46328	275	49400
Ashland	3-16-16	172	"	91029	250	51700
"	4-27-16	345	"	26633	244	47400
"	4-29-16	367	"	90033	250	40000
"	4-24-16	266	"	91334	217	48900
"	3-23-16	250	"	91034	187	36100
Duluth	5-21-16	RP 1394	"	6134	210	37900
McGregor	3-29-16	218	"	2336	250	39000
"	3- 8-16	55	"	90837	200	40000
Duluth	6-15-16	RP 778	"	19137	260	49100
Ashland	6-16-16	179	Soo	11844	229	37200
"	5-26-16	269	"	103044	214	37100
Central Ave.	5-19-16	246	"	19056	320	55800
Central Ave.	7-25-16	251	"	4558	220	43200
McGregor	5-17-16	191	"	19672	292	48900
Central Ave.	8- 7-16	57	"	12576	219	40000
" "	5-19-16	245	"	131878	276	47500
Ashland	6-16-16	180	"	100082	262	44200
McGregor	5-17-16	192	"	36484	203	31400
Central Ave.	5-25-16	305	"	17284	233	38600
" "	6-20-16	265	"	7586	220	40200
" "	7-28-16	285	"	5286	205	35500
" "	6-24-16	317	"	4294	225	45300
Central Ave.	6-20-16	264	"	12198	225	45500
" "	6-20-16	263	"	9498	215	44400
Cloquet	5-15-16	177	G.N.	11426	341	58100
McGregor	4- 6-16	71	"	18192	300	52700
McGregor	4-10-16	91	N.P.	44203	414	79500
"	3-28-16	206	"	38313	320	59600
"	4- 6-16	69	"	91413	223	39400
"	5- 8-16	102	"	42620	400	62000

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN, PINE, TAMERACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONT'D).

EASTERN DISTRICT
MINNESOTA AND WISCONSIN

Point of Original Shipment	Date of Waybill	Way-Bill No.		CAR NUMBER	NO. OF TIES IN CARS	TOTAL WEIGHT OF TIES IN CAR LBS.
Ashland	7- 6-16	49	N.P.	44421	243	48000
"	7- 6-16	53	"	39728	304	58800
"	4-24-16	265	"	47031	245	48900
"	4-11-16	139	"	19448	415	81100
"	5- 1-16	10	"	90394	225	61300
McGregor	3-28-16	200	"	11096	250	44000
Ashland	4- 1-16	20	"	90499	359	55900
"	6-1 -16	13	Soo	105410	259	47600
McGregor	6-24-16	109	"	104412	210	37600
Ashland	6- 2-16	32	"	29517	281	55000
Ashlamd	6-21-16	219	"	25939	282	49000
Ashland	5-30-16	306	"	21854	249	39800
Ashland	6- 1-16	10	"	10366	232	38200
Ashland	5-29-16	296	"	17076	250	40000
McGregor	6-26-16	113	"	16682	233	45000
"	2- 5-16	22	M.&I.	72671	183	36300
Duluth	6-18-16	RP 970	C.&W.	19782	278	47800
McGregor	2-26-16	125	N.P.	10002	260	43000
"	4-10-16	178	"	2702	180	29000
"	4- 3-16	26	"	204205	324	49400
Duluth	3- 5-16	RP 584	"	91124	225	38100
McGregor	4- 3-16	31	"	2424	302	52000
"	4-18-16	168	"	36642	216	34300
Cloquet	6-13-16	272	"	5283	246	38300
McGregor	4- 8-16	92	"	35935	374	56700
"	2-16-16	38	Soo	8520	258	41900
Ashland	6- 2-16	33	"	29491	328	50800
Mcgregor	3-18-16	130	N.P.	204138	250	48000
Ashland	4- 6-16	71	"	22938	275	46700
McGregor	4- 3-16	20	"	90740	243	43000
Ashland	5- 1-16	30	"	91040	200	36500
"	5- 2-16	31	"	19740	220	41400
"	5-6- 16	76	"	204240	220	38600
"	7- 1-16	46	"	48740	310	59100
McGregor	5- 1-16	2	"	90441	175	52000
Ashland	5-11-16	143	"	90341	258	41100
McGregor	3-19-16	127	"	15842	250	64000
Ashland	4-25-16	300	"	47742	210	37900
"	5- 6-16	70	"	34342	221	41500
"	5- 3-16	43	"	37643	235	39900
McGregor	3-28-16	199	N.P.	4744	250	43900
Ashland	4- 6-16	70	"	90341	228	35700
"	5-11-16	144	"	38045	281	45900
McGregor	5- 5-16	56	"	4745	250	38000
"	4-26-16	212	"	43645	350	54000
"	5- 1-16	7	"	27745	275	47500
McGregor	4- 1-16	11	"	21847	303	55000
Ashland	3-23-16	248	"	91347	263	54300
"	4-25-16	302	"	204147	256	39600
"	4-29-16	371	"	42447	204	37400
McGregor	4-20-16	181	"	27348	287	47100
Ashland	5-12-16	156	"	40548	198	35200
"	5- 5-16	66	"	90949	231	39200
"	4-21-16	235	"	45050	219	39200
Duluth	6-25-16	RP 1527	"	35950	275	50400
McGregor	3-24-16	165	"	3951	250	44000
Ashland	4-24-16	276	"	21951	245	41200
McGregor	5-10-16	123	"	90451	250	42600
"	3- 1-16	13	"	90754	190	47100
Ashland	4-19-16	227	"	37354	270	46000
McGregor	4- 1-16	10	"	21855	346	56000
Duluth	6-16-16	857	"	42755	325	54000
Ashland	5-30-16	307	"	46455	332	63300
"	5- 6-16	74	"	32755	248	42700
"	5- 1-16	1	"	91257	211	42400
"	5- 6-16	73	"	90058	233	39500
"	5- 6-16	72	"	90258	222	38000
"	7- 6-16	51	"	83859	362	68100
"	5- 3-16	42	"	46760	214	42000
McGregor	4- 6-16	74	"	38361	304	47700
Duluth	5-21-16	RP1393	"	11361	200	39800
"	6-25-16	RP1528	"	34861	290	55300
Ashland	4-19-16	226	"	42362	401	68900
McGregor	4- 6-16	67	"	23262	300	45800
Ashland	5-10-16	129	"	91262	230	38000
"	5- 6-16	79	"	24962	240	42000
Duluth	4-28-16	RP 1826	"	2863	200	36200
Ashland	6-14-16	156	"	23363	340	62500
"	4-26-16	330	"	83964	314	54200
"	4-24-16	271	"	28364	230	51200
McGregor	3-19-16	129	"	90365	240	54000
"	4-10-16	177	"	204165	174	35000

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONT'D.).

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 3 of 10 SHEETS

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	CAR NUMBER	No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Ashland	4-10-16	125	N.P. 39865	408	68400
"	5- 4-16	55	" 90965	226	41000
Duluth	6-29-16	RP 1794	" 48766	300	54300
Ashland	5- 9-16	105	" 16168	235	36200
Duluth	3-21-16	RP 1687	" 83868	285	50700
Ashland	5- 8-16	91	" 91168	265	43300
McGregor	3-28-16	198	" 204069	220	38100
"	5-10-16	120	" 91469	243	44200
Ashland	4-10-16	108	" 90370	173	27100
"	4-25-16	305	" 91171	258	39100
McGregor	3-3-16	29	" 91372	200	49000
Duluth	3-22-16	RP 1824	" 90872	225	46500
Ashland	5-10-16	132	" 90872	250	44500
Duluth	5- 1-16	77	" 2672	200	36000
Ashland	5-26-16	275	" 12072	190	36300
"	4-15-16	182	" 83773	383	57200
"	4-10-16	122	" 48773	386	59100
"	4- 6-16	66	" 90373	211	36400
"	3-21-16	225	" 40373	378	93200
"	5- 8-16	93	" 40273	250	44500
McGregor	4- 4-16	39	" 90374	209	39000
"	5- 6-16	81	" 91074	253	43000
Duluth	6-16-16	RP 855	" 29374	264	50600
Ashland	4-15-16	187	" 91276	281	42500
"	4-26-16	328	" 83776	245	43900
McGregor	4-15-16		" 90276	253	38000
"	5- 1-16	17	" 38176	222	39000
Ashland	4-15-16	181	" 91278	200	36000
"	3- 7-16	79	" 28279	417	68100
McGregor	4- 3-16	21	" 15779	240	45000
"	4-17-16	161	" 38779	300	60000
"	4- 1-16	14	G.N. 126279	409	71000
Duluth	5- 1-16	RP 78	N.P. 10079	215	37800
"	9-13-16	1260	" 29479	327	53500
McGregor	4- 3-16	19	" 204283	243	41000
Ashland	4-27-16	346	" 83783	222	35700
"	4-27-16	347	" 15784	218	43500
McGregor	3-28-16	197	" 45683	438	81300
"	3- 8-16	57	" 91085	200	33000
Ashland	5-10-16	133	" 15785	221	41700
Duluth	3-21-16	RP 1688	" 90686	226	50000

Point of Original Shipment	Date of Way-bill	Way-Bill No.	CAR NUMBER	No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Ashland	4-24-16	270	N.P. 204188	290	44800
Duluth	5-15-16	RP 362	" 23588	300	52900
Ashland	4-27-16	342	" 90988	262	43400
"	6-22-16	229	" 35488	275	42400
"	5-15-16	125½	" 45189	240	37400
"	5-15-16	176	" 25090	265	41200
"	4- 4-16	47	" 28891	347	67000
"	4- 6-16	66	" 34791	308	49200
Duluth	3-5-16	RP 585	" 90192	200	41600
Ashland	4-10-16	110	" 90722	200	32300
McGregor	4-17-16	163	" 23893	176	27000
Ashland	3- 4-16	44	" 25594	434	64700
McGregor	3-16-16	93	" 90094	190	46700
Ashland	4-21-16	234	" 90094	323	48700
McGregor	4-12-16	116	" 43594	306	50000
Ashland	5- 3-16	44	" 90794	200	36600
Superior	3-25-16	3042	" 204095	217	34400
Duluth	5- 1-16	79	" 5796	205	35000
Ashland	4-12-16	144	" 90397	220	42100
Central Ave.	8-11-16	100	" 21997	300	47000
McGregor	5-4-16	50	" 35699	301	55000
"	5-12-16	147	" 90999	246	41000
Duluth	5-25-16	RP 1595	" 6899	200	37600
McGregor	5-20-16	233	Soo 19810	214	38800
"	5-15-16	168	" 8012	255	39000
"	5-15-16	172	" 29216	243	37000
Ashland	6- 3-16	46	" 9016	197	33700
Central Ave.	6-16-16	225	" 100820	225	45200
Central Ave.	5-24-16	281	" 7730	200	35700
" "	6-20-16	261	" 6432	220	42100
Ashland	6-3-16	43	" 107232	181	35500
"	6-14-16	157	" 101738	250	42500
Central Ave.	5-25-16	306	" 24538	220	40700
Ashland	7 -1-16	19	" 26442	302	57700
Brainerd	5- 4-17	1022	N.P. 91404	300	50000
"	5- 7-17	1058	" 8900	230	42800
Duluth	5-15-17	770	" 90700	225	48100
Cloquet	5-24-17	300	" 29003	250	55400
Central Ave.	3-12-17	163	" 91004	215	37500
Brainerd	7-13-17	1182	" 91304	260	45400
McGregor	5- 7-17	279	" 90205	207	40700
Ashland	2- 8-17	56	" 90206	228	42500

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONT'D.)

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 4 of 10 SHEETS

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number		No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Central Ave.	2- 2-17	321	N.P.	91107	224	40000
Ashland	1-17-17	108	"	90075	275	56600
McGregor	7-11-17	34	"	91006	215	35300
Ashland	7-17-17	107	"	90891	275	46200
Central Ave.	1-25-17	399	"	90537	295	51200
" "	1-25-17	395	"	91335	300	48500
" "	1-25-17	404	"	91001	280	45200
Brainerd	1-30-17	1283	"	26667	335	65100
"	1-30-17	1282	"	48315	276	57500
"	1-24-17	1227	"	21839	328	64300
"	2- 3-17	1048	"	35951	262	55500
"	2- 3-17	1047	"	35414	289	63100
"	2- 1-17	1008	"	28346	364	76600
"	2- 1-17	1007	"	46644	325	63700
Central Ave.	2- 9-17	128	"	84836	250	43400
" "	2- 7-17	118	"	90136	243	38700
" "	2- 7-17	121	"	91260	280	44400
Ashland	2- 9-17	72	"	90240	250	52100
"	2- 9-17	68	"	83857	225	44300
Brainerd	2-17-17	1187	"	18851	300	63000
"	2-17-17	1185	"	19249	300	59600
"	2-6 -17	1063	"	41689	350	61600
"	2- 8-17	1103	"	100266	320	57200
Ashland	2- 9-17	71	"	90237	200	50800
McGregor	3-28-17	178	"	37736	331	61800
"	3-28-17	184	"	32998	309	55200
"	3-28-17	185	"	41645	300	57100
"	3-28-17	186	"	36491	352	61800
"	3-28-17	196	"	37799	484	85600
Duluth	3-22-17	2835	"	68752	208	45600
"	3-29-17	2836	"	66182	192	40900
"	3-30-17	2973	"	68097	219	45600
McGregor	2-15-17	89	"	28628	438	78100
Central Ave.	2-21-17	309	"	91494	220	37400
Brainerd	4- 5-17	1042	"	91477	320	48900
"	5- 8-17	1083	"	30006	172	27000
"	4- 7-17	1072	"	90009	311	48300
"	1-26-17	1250	"	43717	350	53800
"	2- 3-17	1045	"	35576	350	53300
"	1-30-17	1284	"	41540	454	68500
Central Ave.	2-21-17	321	N.P.	90562	200	36200
" "	2-21-17	323	"	90991	225	39300
Duluth	4-21-17	1170	"	83874	425	68700
"	4-16-17 RP	1291	"	90967	260	52900
"	4-19-17 "	1531	"	90188	230	47600
"	4-21-17 "	1668	"	91144	250	47100
"	4-19-17 "	1535	"	91286	256	56900
McGregor	5-15-17	231	"	25070	301	54800
"	5-12-17	194	"	63334	300	56000
"	5-12-17	195	"	42165	306	59500
"	5-17-17	266	"	24737	349	63200
"	4-25-17	220	"	90934	335	61700
Duluth	4-28-17 RP	2280	"	91127	225	48700
"	4-28-17 "	2163	"	83881	280	54400
Brainerd	5-27-17	1020	"	48199	307	63900
"	5- 4-17	1023	"	46521	282	55000
"	5- 4-17	1025	"	47898	400	75200
"	5- 4-17	1026	"	36939	275	54100
"	5- 7-17	1055	"	100252	354	67200
"	5- 7-17	1056	"	2997	230	44400
"	5- 7-17	1057	"	36744	305	60200
"	5- 7-17	1059	"	204156	305	55800
"	5- 9-17	1111	"	36331	305	55800
McGregor	5- 8-17	90	"	83830	210	40400
Brainerd	5- 3-17	1014	"	45067	350	71100
"	5- 3-17	1015	"	43068	375	70100
Duluth	5-15-17	4629	"	204071	212	39200
Brainerd	4-30-17	1294	"	2951	215	45000
McGregor	2-24-17	122	"	204076	251	46700
Central Ave.	2-21-17	322	"	91099	235	37900
McGregor	4-16-17	73	"	83758	452	77200
"	4-16-17	72	"	90369	275	50400
Brainerd	4-30-17	1295	"	91306	330	56100
Duluth	4-23-17	1760	"	90154	300	46900
McGregor	4-23-17	150	"	15852	305	50100
Brainerd	4-20-17	1215	"	35793	326	50000
"	4-20-17	1214	"	35131	434	65600
"	4- 6-17	1192	"	29359	500	77100
McGregor	4- 6-17	70	"	91469	256	52300
"	4- 6-17	71	"	84799	315	51900

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONT'D).

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 5 of 10 SHEETS

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number	No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Duluth	5-1-17	160	N. P. 90542	225	45300
Brainerd	4-30-17	1296	" 83894	478	81000
Cloquet	5-19-17	240	" 47625	252	47800
Mcgregor	4-28-17	284	" 204251	221	43000
"	5-25-17	393	" 22837	350	59600
Cloquet	5-17-17	211	" 25777	261	51800
Duluth	5-16-17	RP 825	" 90439	230	45700
McGregor	5-17-17	277	" 43930	305	57700
Cloquet	5-30-17	372	" 28798	261	55100
"	5-30-17	379	" 29998	248	54600
Central Ave.	5-17-17	313	" 16519	246	50900
" "	6-13-17	219	" 84718	262	49500
McGregor	6-16-17	126	" 42503	191	29100
"	6-16-17	121	" 25088	452	77500
"	6-14-17	112	" 23413	215	32300
"	6-18-17	139	" 33445	448	66700
"	6-23-17	156	" 29715	259	41100
"	6- 1-17	3	" 83993	229	48400
Brainerd	6- 8-17	1099	" 84699	245	47400
"	6- 8-17	1100	" 63444	301	58300
"	6- 2-17	1038	" 37192	374	58700
"	5-31-17	1393	" 61633	286	61800
Margie	7-10-17	1012	" 204036	256	42100
McGregor	6-25-17	173	" 21681	389	61700
"	6-28-17	184	" 32303	333	51600
Brainerd	6- 4-17	1054	" 68578	251	48400
"	6- 4-17	1052	" 67347	282	49700
Brainerd	6- 8-17	1098	" 25805	428	86500
"	6- 5-17	1069	" 65894	284	52900
"	6- 1-17	1008	" 36725	305	63700
"	6- 1-17	1009	" 37725	369	73500
"	6- 1-17	1007	" 37509	380	74900
"	6- 1-17	1006	" 10461	230	48 200
McGregor	5-25-17	399	" 90419	252	46800
Duluth	5- 8-17	RP 436	" 15829	220	41500
"	5- 8-17	" 433	" 91387	225	45700
"	5- 2-17	" 165	" 90694	235	60200
"	5- 2-17	" 164	" 91288	240	46300
McGregor	4-25-17	198	" 63563	320	65100
"	4-26-17	239	" 64501	312	67400
Duluth	5- 4-17	RP 266	N. P. 83984	391	76100
"	5-12-17	" 163	" 90391	305	49200
Brainerd	5-4-17	1027	" 91214	344	54800
"	5-18-17	1082	" 90454	167	29100
"	5-21-17	1259	" 16346	365	57100
"	4- 9-17	1107	" 32493	385	60800
"	9-29-17	1286	" 28707	273	64900
"	7- 2-17	1014	" 90176	240	40000
"	6- 4-17	1046	" 91464	132	23100
"	5-23-17	1297	" 84783	291	53100
Duluth	4-23-17	RP 1764	" 90041	240	47900
"	4-21-17	" 1672	" 91051	225	47300
"	4-21-17	" 1671	" 91370	225	44100
"	3-26-17	" 2452	" 90287	235	54700
"	4-5-17	" 504	" 92236	210	53100
"	4- 5-17	" 488	" 83992	350	68300
"	4- 3-17	" 304	" 91427	201	39600
"	4- 3-17	" 303	" 91015	260	43400
Brainerd	4-29-17	" 1273	" 83841	350	72900
McGregor	4-27-17	" 249	" 15896	200	35900
Brainerd	4- 9-17	" 1109	" 26705	332	51100
"	5-19-17	" 1231	" 91179	230	45200
Central Ave.	6-28-17	" 449	" 41579	225	37200
Brainerd	7-21-17	" 1343	" 33113	328	50100
"	7 -3-17	" 1017	" 91474	268	49 200
"	7- 3-17	" 1019	" 91493	265	50700
"	7- 5-17	" 1031	" 15734	271	51800
"	7- 5-17	" 1032	" 90349	273	45100
"	7- 5-17	" 1033	" 204089	208	40800
"	7- 2-17	" 1003	" 90846	263	51900
"	7- 2-17	" 1002	" 16099	250	47900
"	7- 2-17	" 1000	" 16121	202	36500
"	7- 2-17	" 1005	" 90749	252	49400
"	7- 7-17	" 1076	" 16091	270	47500
"	7- 7-17	" 1077	" 204020	222	41800
"	7-11-17	" 1133	" 41353	455	74000
"	7-21-17	" 1345	" 28621	372	56700
"	7- 2-17	" 1006	" 204263	261	51600
"	7- 2-17	" 1007	" 90031	243	49000
"	7- 2-17	" 1009	" 204140	251	48500

SHIPPING WEIGHTSOOF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONTINUED).

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 6 of 10 SHEETS.

Point of Original Shipment	Date of Way-bill	Way-bill No.	Car Number		No.of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	7 -7-17 MP	1079	N.P.	91172	271	45200
"	7- 7-17 "	1080	"	90926	295	48600
"	7- 7-17 "	1082	"	37978	317	58300
"	7- 7-17 "	1083	"	37339	309	58200
"	7- 7-17 "	1084	"	69938	294	53400
"	7- 3-17 "	1021	"	16519	282	47700
"	7- 3-17 "	1022	"	90082	250	41200
Duluth	5-15-17	771	"	83993	450	68900
Central Ave.	4-28-17	191	"	90114	265	44000
Brainerd	7- 3-17	1023	"	90088	253	45500
"	7- 5-17	1040	"	83831	274	46500
"	7-5-17	1035	"	91279	275	44600
"	7- 5-17	1041	"	91315	251	40800
"	7- 9-17	1115	"	90416	176	30700
"	7- 9-17	1116	"	204085	197	36500
"	7-11-17	1132	"	204295	217	48000
"	7-12-17	1166	"	83969	316	52700
"	7-12-17	1117	"	90250	192	33900
"	7- 9-17	1118	"	204275	227	41100
"	7-25-17	1424	"	91398	225	43000
"	7-27-17	1447	"	90828	298	52100
"	7-27-17	1449	"	30193	297	48000
"	7-27-17	1448	"	90627	251	44100
"	7-27-17	1455	"	10009	266	39500
"	7-27-17	1456	"	35185	360	57300
"	7-30-17	1476	"	2313	182	28200
"	8-29-17	1354	"	11610	202	32600
"	8- 6-17	1103	"	35838	213	33500
"	7-30-17	1484	"	47898	318	48500
"	7-30-17	1482	"	24751	325	50000
"	7-30-17	1483	"	41576	335	51700
"	7-30-17	1480	"	90700	314	48900
"	7-30-17	1481	"	26179	426	65300
"	8- 1-17	1013	"	37398	363	57200
"	7-12-17	1160	"	84984	201	38100
"	7-14-17	1183	"	61424	332	61800
"	7- 7-17	1101	"	66593	364	59800
"	7 -7-17	1100	"	91398	249	43500
"	7- 7-17	1102	"	204237	238	37100
McGregor	6-28-17	182	"	68661	300	51700
"	6-23-17	159	"	45638	329	57400
"	7-11-17	33	"	91213	235	38300
Central Ave.	8- 7-17	66	N.P.	23082	425	74800
McGregor	8-24-17	98	"	5538	233	36400
"	8-18-17	81	F.A.W.S.	5420	400	64800
"	8-18-17	80	N.P.	5789	256	41900
"	8-18-17	78	"	39622	495	79600
McGregor	4- 2-17	2	"	66323	372	68400
"	4-14-17	32	"	28180	385	70600
"	8-25-17	106	M.K.&T.	14411	122	20000
"	4- 5-17	54	N.P.	91194	200	41600
Cloquet	9-12-17	138	"	28351	247	42900
Brainerd	8-28-17	1339	"	91009	250	40000
"	7-24-17	1394	"	84789	312	53600
"	7-24-17	1398	"	90057	277	48400
"	7-24-17	1393	"	32551	204	35700
"	7-21-17	1351	"	19683	390	58800
"	7-21-17	1359	"	90763	253	44000
"	7-21-17	1350	"	34283	261	39400
"	7-21-17	1354	"	204241	280	42700
"	7-24-17	1399	"	90723	227	37500
"	7-24-17	1395	"	16413	315	55800
"	7-24-17	1396	"	90041	261	45600
"	7-21-17	1357	"	38908	206	34100
"	7-21-17	1358	"	91152	293	47000
"	8-11-17	1016	"	91007	290	45700
"	8- 3-17	1059	"	84788	229	33800
"	8- 3-17	1070	"	91330	289	47400
"	8-11-17	1007	"	34958	337	50100
"	8-11-17	1008	"	91289	300	49200
"	8-11-17	1010	"	34079	236	35800
"	8- 3-17	1060	"	40752	262	38900
Duluth	11- 8-17	2526	P.AR.	6024	309	66700
"	11-8-17	2532	G.AS.R.	611	279	81000
McGregor	7-11-17	30	N.P.	90253	172	25600
Superior	6- 7-17	891	"	44464	339	51200
Brainerd	6- 8-17	1101	"	91465	273	51200
"	6- 8-17	1102	"	90999	245	50700
"	6- 8-17	1103	"	61483	312	49000
"	6- 4-17	1059	"	61291	337	65000
"	6- 4-17	1058	"	63239	359	71200
"	6- 4-17	1057	"	66137	306	62800
"	6- 4-17	1167	"	83753	318	62000
"	6-14-17	1166	"	90796	216	40000

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONT'D).

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 7 of 10 SHEETS

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number		No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	6-15-17	1170	N.P.	65689	283	57700
McGregor	6- 2-17	41	"	39883	241	39700
Brainerd	6- 2-17	1034	"	90086	197	37600
McGregor	6- 2-17	43	"	26714	166	28100
"	5- 4-17	52	"	15928	250	44100
"	5- 9-17	109	"	90254	207	49300
"	5- 9-17	115	"	25795	363	54200
Central Ave.	5- 1-17	15	"	90400	200	45200
" "	5- 4-17	121	"	69004	233	47300
" "	5- 4-17	122	"	90660	220	47200
" "	5- 4-17	123	"	204030	203	41000
Cloquet	5-14-17	162	"	61357	279	58300
"	5-24-17	300	"	29003	250	55400
McGregor	5-25-17	392	"	45137	355	59500
"	5-25-17	391	"	33454	215	39700
Duluth	5- 5-17	RP 321	"	16783	210	42800
"	5- 5-17	" 322	"	15851	215	45700
"	5-10-17	" 533	"	90081	215	51600
"	5-10-17	" 532	"	90967	220	44100
Brainerd	7- 6-17	1047	"	90824	253	45600
"	7-6- 17	1048	"	91465	219	38700
"	7- 7-17	1088	"	38251	355	69300
"	7-19-17	1283	"	45672	400	76000
"	7 -6-17	1051	"	84815	283	49000
"	7- 6-17	1052	"	91316	230	57900
"	7- 6-17	1053	"	90556	250	50800
"	7014-17	1179	"	204191	300	56100
"	7-16-17	1197	"	91373	250	43700
"	7-13-17	1182	"	91304	260	45400
"	7-13-17	1163	"	90616	242	47100
"	7-13-17	1181	"	90572	257	46800
"	7-23-17	1370	"	43086	312	58400
"	7-21-17	1346	"	36663	315	51300
"	7-21-17	1344	"	91305	274	45500
Duluth	5-15-17	RP 772	"	90989	250	48400
McGregor	5- 9-17	101	"	91042	263	47700
Brainerd	5-23-17	1301	"	4745	172	44100
"	11-21-17	649	"	68914	185	52400
"	11-16-17	475	"	10846	210	37300
Central Ave.	1-16-17	231	"	83864	420	63000
" "	1-16-17	232	"	91388	280	51900
" "	1-18-17	254	"	42325	350	53700
" "	1-18-17	255	"	83869	465	57300

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number		No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	4-30-18	1354	N.P.	58700	490	83200
"	5-10-18	1092	"	58501	600	104200
"	2-11-18	100	"	83802	338	88500
"	4-11-18	1124	"	57402	529	85000
"	4-12-18	1151	"	55305	478	80200
"	3-23-18	1284	"	56205	559	99600
"	4-12-18	1150	"	56306	480	78000
"	4-27-18	1328	"	83907	330	61200
"	5-27-18	1259	"	83907	374	70400
"	5-22-18	1211	"	56507	523	87100
"	6- 5-18	1036	"	16807	260	42600
McGregor	5- 4-18	15	"	56907	500	82400
Brainerd	4-17-18	1197	"	58508	429	76500
"	5-22-18	1199	"	91108	235	45200
"	7-26-18	1116	"	83808	244	37700
"	5-13-18	1111	"	91311	240	39300
"	5-22-18	1202	"	3911	260	44000
"	4-18-18	1207	"	56713	463	80000
"	5- 8-18	1075	"	55213	457	85700
"	5- 7-18	1052	"	57014	512	96800
"	6-10-18	1080	"	90115	200	35600
"	5- 8-18	1073	"	55416	465	81000
"	4-11-18	1126	"	58617	433	71300
"	5-20-18	1172	"	204117	300	49800
"	2-25-18	1067	"	56718	445	86500
"	4- 3-18	1035	"	57519	455	79800
"	5-18-18	1150	"	55319	489	85700
McGregor	4-15-18	107	"	56020	420	74400
Brainerd	5-17-18	1138	"	90720	204	34700
"	4-25-18	1292	"	57921	383	73600
"	4-30-18	1358	"	58121	657	106400
"	5-30-18	1297	"	83821	400	76800
McGregor	2-25-18	102	"	57829	505	83300
Brainerd	4-19-18	1238	"	56823	407	73500
"	6-11-18	1105	"	91423	225	39700
"	4-10-18	1127	"	57324	443	68200
"	5- 7-18	1053	"	56724	575	94800
"	3- 4-18	1018	"	57825	386	67200
"	5-20-18	1171	"	56626	466	79500
"	5-20-18	1173	"	9026	275	46600
"	6-10-18	1071	"	90226	225	42100
"	7- 1-18	1004	"	58427	600	97900
"	6-18-18	1138	"	91327	238	44400

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMARACK, BIRCH, HEMLOCK AND FIR
CROSS TIES (CONT'D.)

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 8 of 10 SHEETS

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car Number	No. of Ties in Cars	Total Weight of Ties in Car Lbs.
McGregor	4-11-18	71	N.P.	55428	415	77800
Brainerd	5-16-18	1134	"	57428	425	69500
"	5-25-18	1201	"	83929	456	79900
"	6- 3-18	1015	"	90829	250	48200
"	4- 1-18	1004	"	57130	442	84300
"	4-18-18	1210	"	56230	412	78800
"	4-18-18	1214	"	57331	401	71100
"	4-19-18	1234	"	57932	369	71900
"	5- 7-18	1047	"	91032	275	43300
"	7-17-18	1084	"	90532	273	45600
"	4- 8-18	1081	"	55833	385	65900
"	5- 9-18	1084	"	84733	275	53600
"	4- 5-18	1051	"	58034	522	84000
"	6-10-18	1079	"	83935	224	36300
"	3-16-18	1188	"	56236	500	93100
"	4-30-18	1391	"	56936	464	79700
"	3-27-18	1332	"	57236	464	92000
"	5-29-18	1283	"	16636	235	38500
"	6- 6-18	1047	"	90436	268	47700
"	4-18-18	1213	"	58737	371	76500
"	3-13-18	1138	"	58338	411	73800
McGregor	4-11-18	72	"	56238	385	65900
Brainerd	5-23-18	1226	"	55438	525	82800
"	5-18-18	1152	"	55038	600	94600
"	5-13-18	1112	"	16738	275	50300
"	5-20-18	1174	"	57638	535	91400
"	6-6- 18	1045	"	90038	253	41900
"	5-16-18	1133	"	16539	277	43500
"	6-12-18	1106	"	16539	234	38100
"	5-20-18	1175	"	16640	285	45500
"	5- 8-18	1074	"	58241	450	77100
"	7 -6-18	1026	"	58841	550	96900
"	2-23-18	97	"	65543	383	62100
"	6-6-18	1257	"	15844	225	37100
"	3-16-18	1187	"	56346	507	89800
McGregor	4-13-18	86	"	58646	430	79000
Brainerd	4-26-18	1313	"	55946	327	70100
"	6- 6-18	1258	"	16648	256	42600
McGregor	3-11-18	59	"	57849	500	83400
Brainerd	5-22-18	1200	"	16249	230	44600
"	3-25-18	1305	"	55249	506	92100
"	4-30-18	1392	"	56850	397	73000
"	4-26-18	1311	"	90250	240	41800
Brainerd	4- 4-18	1042	N.P.	56751	446	69200
"	4-30-18	1365	"	57951	400	71000
Brainerd	5-21-18	1193	"	57852	475	81300
"	7-28-18	1201	"	57253	576	96600
Duluth	4-26-18	RP 1727	"	91354	250	41100
Brainerd	5-29-18	1281	"	83854	475	74600
"	6- 3-18	1019	"	90455	250	45000
"	4-26-18	1312	"	56756	389	77300
"	4-29-18	1331	"	90356	240	41600
"	6-3- 18	1017	"	204157	300	58700
"	5-28-18	1270	"	19658	500	90300
Ashland	2-12-18	109	"	90460	260	51000
Brainerd	5- 7-18	1056	"	90560	275	43000
"	4-19-18	1236	"	56962	407	80600
"	7-20-18	1094	"	83862	325	57200
Duluth	4-21-18	RP 1388	"	83963	300	56900
Brainerd	4-22-18	1259	"	57863	401	80200
"	5-18-18	1151	"	91063	275	48100
"	5- 9-18	1085	"	90963	240	43100
"	6- 1-18	1009	"	90063	225	38600
"	6- 6-18	1046	"	90163	250	45100
"	4- 2-18	1017	"	56264	477	79400
"	4-30-18	1356	"	55265	531	92800
"	5-22-18	1203	"	91166	275	46500
"	4- 5-18	1050	"	58167	314	77800
"	5-20-18	1168	"	15867	232	41300
"	5-10-18	1093	"	56167	605	105500
"	5-15-18	1122	"	57367	605	101800
"	6-10-18	1072	"	16767	264	49900
"	6- 4-18	1029	"	16667	300	56300
"	6-14-18	1127	"	83868	353	61300
"	7-29-18	1120	"	83768	300	51500
"	6- 3-18	1014	"	90669	250	40200
"	5-22-18	1205	"	83871	425	74700
"	5-28-18	1274	"	91071	218	42600
"	5- 4-18	1031	"	56272	400	70100
"	6- 5-18	1037	"	91472	250	43800
"	6- 3-18	1018	"	84672	300	54400
"	4-10-18	1125	"	58373	544	87300
"	6- 3-18	1016	"	83773	425	81400
"	4-13-18	1158	"	57474	452	72500
"	4-15-18	1174	"	55276	429	73800
"	5-18-18	1148	"	91377	275	44200

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK, AND FIR
CROSS TIES (CONT'D.)

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 9 of 10 SHEETS

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number		No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	5-20-18	1170	N.P.	55077	545	80200
"	6- 1-18	1006	"	15977	257	42900
Brainerd	4-30-18	1350	"	57578	400	67000
"	4-25-18	1299	"	56878	429	71400
"	4-10-18	1126	"	58279	510	81900
Duluth	4-23-18	1534	"	56479	465	87200
Brainerd	5-22-18	1206	"	56079	550	93200
"	4-22-18	1266	"	56380	500	84500
Duluth	4-23-18	1533½	"	58481	475	81600
Brainerd	5-28-18	1269	"	91481	225	37700
"	4- 5-18	1011	"	91082	255	43300
Duluth	4-23-18 RP	1535	"	57883	465	85100
Brainerd	3- 1-18	1002	"	91084	203	36400
"	5-18-18	1149	"	16584	276	42300
"	5-15-18	1118	"	57784	585	100600
"	5-7-18	1057	"	16784	275	43900
"	6- 1-18	1005	"	90084	254	40900
"	6-12-18	1109	"	84784	288	52800
"	2-25-18	1069	"	84785	262	41700
"	5-20-18	1167	"	16885	237	35900
"	5-10-18	1095	"	55486	616	108000
Ashland	1-10-18	122	"	37087	180	59200
Brainerd	3-6- 18	1051	"	55487	370	63400
"	6- 5-18	1039	"	90387	250	49300
"	6- 4-18	1030	"	91087	265	45700
McGregor	3- 6-18	25	"	91188	275	48700
Brainerd	4-11-18	1128	"	57488	452	75900
"	5-18-18	1153	"	57688	620	97800
"	5-20-18	1169	"	83888	382	66800
"	4-16-18	1186	"	56389	438	69200
McGregor	5- 7-18	33	"	58989	400	63100
Brainerd	2-28-18	1088	"	55390	361	63200
"	2-25-18	1066	"	91190	235	49100
McGregor	4-25-18	171	"	58690	537	86700
Brainerd	5-17-18	1137	"	90190	225	39000
"	5- 7-18	1051	"	57291	575	85900
"	3-25-18	1304	"	57291	475	100200
Brainerd	5-17-18	1139	"	84692	327	54900
"	6-13-18	1119	"	83794	319	56300
"	6- 3-18	1027	"	16895	274	54900
"	5-24-18	1245	"	84696	250	47700
"	4- 5-18	1052	"	56597	538	89400
"	5-20-18	1176	"	91399	286	51600

Point of Original Shipment	Date of Waybill	Way-Bill No.	Car Number		No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	4-13-18	1157	N.P.	56077	444	77600
McGregor	7 -2-18	10	Soo	17502	365	63200
"	6-14-18	62	"	29376	360	64400
"	7- 9-18	25	"	19388	210	32900
"	3-28-18	53	B&O	182303	405	64200
"	6-14-18	64	C.P.	41906	400	69200
Brainerd	6-14-18	1124	CM&St.P.	75414	355	61700
Ashland	3- 9-18	69	G.N.	127915	386	85000
Brainerd	6- 2-18	1195	N.Y.C.	228515	311	51200
Ashland	1 -7-18	86	St.L.SW.	12028	152	49500
Brainerd	5-31-18	1308	M.K.&T.	19430	325	57100
"	6-14-18	1172	C.P.	268630	325	52800
"	5-31-18	1306	M.P.	16834	275	52900
McGregor	6-11-18	52	CRI&P.	55049	400	68400
"	6-14-18	61	CCC&St.L.	7952	350	60700
Brainerd	3-27-18	1335	G.&P.	363	491	89600
Ashland	1-15-18	167	KCM&O	3166	239	60700
McGregor	6-11-18	51	Erie	97868	440	72000
Brainerd	7-15-18	1068	I.C.	31280	215	38000
McGregor	6-24-18	110	R.I.	49380	350	53100
Ashland	1-9-18	111	N.Y.C.	236881	234	54300
Brainerd	5-27-18	1265	S.P.	82789	274	51300
McGregor	6-24-18	111	MC&St.L.	11189	320	53000
Brainerd	7-16-18	1074	P.R.R.	51790	243	48900
Brainerd	5-29-18	1282	N.P.	15804	250	43600
"	5-24-18	1241	"	90632	350	54600
"	5-17-18	1142	"	90634	365	73400
"	4-26-18	1307	"	204038	250	41900
McGregor	5- 7-18	74	"	57038	530	85200
Brainerd	4-19-18	1233	"	56090	546	84200
Aitkin	9 -6-18	59	B.M.	62340	303	74400
Brainerd	7-17-18	1083	M.P.	30058	370	57600
McGregor	6-14-18	63	N.C.St.L.	9758	400	69100
Duluth	11-17-18	4050	A.A.R.R.	4968	185	43400
McGregor	1-28-19	44	Soo	16502	315	57400
Brainerd	1-27-19	1283	St.LASW	26410	410	62700
Brainerd	2- 4-19	82	Erie	79665	251	56300
Duluth	2- 5-19	820	CB&Q	107769	314	66700
"	2- 6-19	1176	D.L.W	39087	300	61200
"	2-10-19	1812	B.&O.	93925	270	53700
"	2-10-19	1947	Penn.	16097	282	54700
Brainerd	2-10-19	258	N.P.	204054	207	44300

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 10 of 10 SHEETS

SHIPPING WEIGHTS OF CROSS TIES
NO. 1, HEWN PINE, TAMERACK, BIRCH, HEMLOCK, AND FIR
CROSS TIES (CONT'D.)

Point of Original Shipment	Date of Bill	Way-Bill No.	Car Number		No. of Ties in Carw	Total Weight of Ties in Car Lbs.
Brainerd	3-27-19	847	NYC.& N.H.	26141	378	71300
"	3-27-19	848	N.&.W.L.	9088	138	27400
McGregor	2- 7-19	10	C.R.&St.L.	45318	430	78700
Superior	4- 3-19	204	C. & S.	5410	365	66900
"	4- 3-19	205	N.C.&St.L.	5731	365	65700
"	4- 3-19	207	St.L.&W.W.	16854	362	67100
Little Falls	3-31-19	854	N. P.	84695	254	54300
"	4- 3-19	113	Soo	20288	328	60400
Brainerd	9-26-19	C1216	L.V.	69990	165	32200
"	9-26-19	C1212	N.P.	58992	440	91900
"	7 -7-19	C-1020	NYC & NL	38912	350	65000
McGregor	3-26-19	129	C.G.W.	25092	300	55700
Superior	6- 1-19	31	C.R.I.P.	39496	310	58600
Brainerd	8-28-19	C1125	L.&N.	11533	232	47000
"	8-28-19	C1039	NYC&St.L	25602	300	53900
"	8-28-19	C1034	M.H.	75814	296	55100
"	8-28-19	C1036	L.V.	63516	245	46100
"	8-28-19	C-1038	C.G.W.	20078	310	55600
"	8-28-19	C1035	N.W.	23754	246	46900
"	8- 4-19	C1016	C&NW.	75242	400	70700
""	8- 5-19	C1022	N.Y.C.	238134	200	40700
"	8- 8-19	C1033	L.&N.	18890	320	67600
"	7-24-19	C1087	N.Y.C.	244792	250	42700
"	7-11-19	C1042	L.V.	7497	275	49400
"	7-11-19	C1043	C&EI	2512	300	54000
"	7-11-19	C1044	P.M.	41825	300	56400
"	9-15-19	C1078	N.P.	42863	240	47900
"	9-20-19	C1155	N.P.	55112	431	88400
Central Ave.	4-28-20	191	N.P.	90114	265	44400
G R A N D T O T A L - -					764	230894	41133100
Weighted Average Weight per Tie						178.0

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number	No. of Ties in Cars	Total Weight of Ties in Car Lbs.

Office of Valuation Engineer,
St. Paul, Minnesota, September 30th, 1921.
RW.

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS-TIES

NO. 2 HEWN PINE, TAMARACK, BRICH, HEMLOCK & FIR CROSS TIES

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car No.	No. of Ties in Cars	Total Weight Of Ties in Car - Lbs.
Duluth	6/29/16	R.P. 1792	N.P. 27902	500	59200
Ashland	6/21/16	221	" 38303	322	42100
"	5/ 1/16	8	" 91103	294	36700
"	4/24/16	275	" 42904	341	46900
"	"	268	" 90604	400	45800
"	4/15/16	189	" 91306	432	45000
"	5/2 /16	106	" 90607	301	43000
McGregor	4/12/16	120	" 4809	267	33000
Ashland	4/27/16	343	" 90609	317	42600
McGregor	4/25/16	205	" 44812	432	47000
"	5/ 1/16	1	" 8912	260	28800
Ashland	5/ 6/16	71	" 90412	332	43300
McGregor	7/28/16	81	" 32714	400	41000
Ashland	4/ 6/16	69	" 15817	233	29600
Duluth	3/21/16	R.P. 1690	" 83818	400	49100
Duluth	6/29/16	R.P. 1791	" 24219	507	57400
McGregor	3/18/16	128	" 16520	340	48000
Ashland	4/26/16	333	" 91421	359	42300
"	4/29/16	369	" 90422	313	45300
"	4/12/16	158	" 42523	300	40500
"	5/12/16	154	" 204023	261	32700
McGregor	3/28/16	208	" 41626	540	75300
Ashland	5/11/16	145	" 91026	307	38500
McGregor	5/ 3/16	39	" 30226	365	52000
Ashland	4/25/16	304	" 204026	325	36000
McGregor	4/3/16	24	" 47728	430	58800
Ashland	5/ 2/16	29	" 40628	436	56700
"	"	28	" 83828	400	52800
McGregor	5/10/16	129	" 90228	356	43400
Ashland	6/21/16	218	Soo 10446	225	34600
McGregor	5/15/16	170	" 102058	256	39000
"	"	165	" 12498	223	26000
"	4/ 4/16	43	N.P. 45921	350	51000
Ashland	4/15/16	184	" 48132	485	64000
"	4/24/16	288	" 90739	306	42300
McGregor	"	193	" 46008	260	38700
"	4/20/16	183	N.P. 36000	250	36300
Ashland	4/26/16	331	N.P. 90800	235	28500
McGregor	4/27/16	230	" 38501	275	41000
Ashland	4/27/16	344	" 15729	374	45600
"	5/1/16	6	" 91029	356	48400
"	5/ 8/16	90	" 90430	300	36500

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car No.	No. of Ties in Cars	Total Weight of ties in Car - lbs.
McGregor	5/ 6/16	76	N.P. 91130	317	37000
Ashland	6/ 5/16	65	" 45830	268	38200
"	7/ 6/16	50	" 28430	381	51400
"	4/24/16	278	" 91032	400	45900
McGregor	4/ 3/16	22	" 15703	310	43000
"	4/15/16	134	" 37935	429	54000
"	5/10/16	132	" 90436	302	39800
"	5/ 1/16	8	" 3638	275	30000
Ashland	4/24/16	280	" 91038	367	41600
Duluth	7/ 2/16	R.P. 139	" 29639	440	53000
Ashland	4/21/16	236	" 90540	413	46500
"	4/24/16	269	" 91140	371	38800
"	5/ 1/16	5	" 90840	300	36800
Superior	3/25/16	3041	" 204141	257	33000
Ashland	4/ 1/16	19	" 90441	492	51400
"	5/12/16	155	" 83941	420	53700
McGregor	4/15/16	145	" 90842	260	27000
Ashland	4/26/16	334	" 90742	350	47000
"	4/14/16	174	" 32942	528	55400
"	4/10/16	127	" 34042	426	51800
McGregor	4/17/16	157	" 42843	403	47000
"	4/ 1/16	12	" 33143	444	51000
Ashland	5/11/16	142	" 90143	294	37300
Duluth	7/ 2/16	138	" 21843	450	50000
Ashland	3/30/16	307	" 15844	441	55400
"	5/ 3/16	40	" 48744	336	43200
"	4/10/16	111	" 91145	271	38800
Central Ave.	4/ 5/16	45	" 43245	463	59800
McGregor	4/25/16	206	" 45903	279	40000
"	4/15/16	129	" 47504	357	53000
"	4/ 8/16	89	" 6406	225	32000
Duluth	6/29/16	R.P. 1793	" 42508	289	43400
McGregor	4/27/16	229	" 3414	210	32000
"	5/ 8/16	93	" 3414	340	41000
"	5/ 1/16	4	" 43415	273	41300
Ashland	4/12/16	154	" 91219	321	40100
McGregor	3/28/16	212	" 2346	300	41500
Ashland	6/21/16	220	" 28848	337	46100
"	3/30/16	304	" 91049	300	44600
"	5/29/16	298	" 33149	383	53000
McGregor	4/14/16	131	" 90250	250	28000
Ashland	4/10/16	121	" 35850	229	27700

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO. 2 HEWN, PINE, TAMARACK, BIRCH, HEMLOCK & FIR
CROSS TIES.

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car No.	No. of Ties in Cars	Total Weight of Ties in Car - Lbs.
McGregor	4/26/16	211	N.P.	36450	350	41000
Ashland	4/10/16	109	"	204251	235	30500
McGregor	5/ 1/16	5	"	21952	425	50000
"	4/ 3/16	23	"	90052	252	35000
Duluth	7/ 2/16	R.P. 137	"	46352	475	54100
Ashland	4/27/16	341	"	83753	324	43000
McGregor	4/18/16	169	"	5654	350	43000
"	3/28/16	207	"	35254	450	64800
"	4/ 6/16	76	"	90754	300	34700
Ashland	5/ 3/16	41	"	47954	296	43000
McGregor	4/10/16	101	"	33156	273	46300
Ashland	4/19/16	225	"	204157	297	36900
"	5/ 1/16	7	"	90457	400	51800
"	3/ 7/16	81	"	39959	500	57800
"	4/24/16	284	"	91159	400	48400
McGregor	4/20/16	184	"	2560	312	32900
"	4/17/16	159	"	37561	205	22000
"	4/ 6/16	73	"	32763	450	53800
Ashland	5/ 8/16	89	"	90264	326	38400
McGregor	3/1/ 16	12	"	15965	210	38900
"	4/ 8/16	90	"	3966	325	34000
"	5/12/16	148	"	91166	242	36000
Ashland	4/29/16	366	"	90467	352	48300
"	4/12/16	144	"	90367	281	38500
"	4/ 8/16	92	"	90768	251	34300
"	4/27/16	340	"	26269	355	50400
"	5/15/16	174	"	26670	492	58500
Duluth	7/22/16	R.P. 1248	"	40770	277	38800
McGregor	3/28/16	201	"	23473	325	60500
Ashland	5/10/16	134	"	204074	369	44700
"	7/16/16	47	"	24574	376	55400
"	4/24/16	272	"	90872	400	42400
"	4/15/16	183	"	22275	516	55800
"	4/15/16	186	"	90920	311	46400
"	4/1/ 16	21	"	15920	381	53300
"	5/ 9/16	107	"	90926	217	29400
Duluth	6/25/16	R.P. 1529	"	36726	265	39800
Ashland	4/21/16	237	"	90030	261	34300
"	4/12/16	159	"	44430	275	41500
McGregor	4/ 1/16	2	"	5831	245	33500

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car No.	No. of Ties in Car	Total Weight of Ties in Car - Lbs.
Ashland	4/12/16	157	N.P.	90575	271	34600
McGregor	4/ 6/16	70	"	2078	290	34500
Ashland	7/ 6/16	52	"	37779	297	44800
"	4/ 1/16	18	"	90780	380	43400
McGregor	5/ 8/16	90	"	45880	429	53000
Ashland	4/24/16	274	"	47182	400	47800
"	5/9/16	108	"	90383	325	43200
"	4/29/16	368	"	90083	325	44600
"	4/23/16	245	"	91285	220	37200
McGregor	5/10/16	128	"	204185	315	34800
Duluth	9/13/16	R.P. 1259	"	24185	271	35300
McGregor	4/ 4/16	38	"	90786	225	29000
Duluth	7/ 2/16	R.P. 140	"	21686	450	52700
Ashland	4/10/16	112	"	90988	261	34100
McGregor	4/ 4/16	41	"	32590	453	68000
Ashland	7/27/16	281	"	45690	368	49500
"	4/ 6/16	68	"	91391	275	33600
"	4/24/16	287	"	35091	452	48300
"	4/10/16	123	"	4292	303	34100
Duluth	3/21/16	R.P. 1689	"	91092	230	40800
McGregor	4/15/16	148	"	41393	351	39600
Ashland	5/10/16	131	"	91493	312	38100
"	5/8 /16	95	"	91494	315	38500
"	4/14/16	50	"	15898	275	30100
McGregor	4/27/16	224	"	48698	472	50000
"	5/ 1/16	16	"	33698	338	48000
Central Ave.	6/24/16	318	Soo	8510	275	40900
Ashland	6/ 3/16	45	"	7518	271	36000
"	4/ 4/16	46	N.P.	15832	227	30800
"	"	48	"	90033	281	29300
"	4/ 6/16	67	"	90334	235	34200
"	4/19/16	222	"	91135	310	43900
"	4/15/16	188	"	23835	358	53100
McGregor	4/ 3/16	18	"	10638	230	34500
Ashland	4/26/16	332	"	90640	212	31200
"	4/12/16	153	"	38842	435	55700
"	4/ 8/16	49	"	91343	231	23000
"	4/12/16	155	"	90644	300	44000
McGregor	4/ 6/16	75	"	43744	300	44700
"	5/ 8/16	92	"	43645	548	70000
Ashland	4/24/16	264	"	90947	266	37400
"	4/10/16	126	"	204246	344	49900

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

EASTERN DISTRICT
MINNESOTA & WISCONSIN
SHEET #3 of 7 SHEETS

SHIPPING WEIGHTS OF CROSS TIES
No. 2 HEWN, PINE, TAMARACK, BIRCH, HEMLOCK & FIR
CROSS TIES.

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car No.		No. of Ties in Cars	Total Weight of Ties in Car - Lbs.
Ashland	4/12/16	150	N.P.	48449	475	62100
"	4/14/16	176	"	91251	310	39000
"	6/14/16	149	Soo	23220	391	54600
McGregor	5/20/16	239	"	4828	321	33400
Central Ave.	6/20/16	266	"	3632	275	37800
McGregor	5/17/16	190	"	19240	261	35900
Central Ave.	5/24/16	279	"	102246	301	37600
Ashland	7/ 1/16	18	"	17660	403	55200
McGregor	5/15/16	175	"	15164	280	33300
"	5/20/16	238	"	23770	480	68200
Ashland	5/26/16	270	"	104172	250	34900
"	6/14/16	150	"	23672	301	44200
"	6/23/16	243	"	29473	350	46400
"	6/14/16	158	"	106074	340	44900
Central Ave.	8/ 7/16	58	"	4676	315	38500
Ashland	6/15/16	164	"	16382	339	45400
Central Ave.	7/25/16	249	"	6984	285	34900
McGregor	5/22/16	242	"	32188	214	32000
Central Ave.	7/25/16	250	"	1788	294	41300
Ashland	6/16/16	181	"	8892	300	39600
Central Ave.	"	214	"	2592	277	40500
Ashland	5/29/16	295	"	9492	340	45900
Cloquet	5/15/16	178	G.N.	206215	431	53300
"	"	175	"	15682	477	60300
"	6/13/16	273	N.P.	4956	256	39700
Brainerd	8/21/16	1315	"	46400	436	56500
"	10/4/16	1026	"	35800	425	55700
"	12/22/16	1220	"	37314	500	63100
"	8/ 25/16	1370	"	24021	552	66800
McGregor	3/ 28/16	202	"	3424	283	41600
Brainerd	9/ 2/16	1044	"	48432	575	69200
Ashland	5/ 1/16	9	"	91138	367	47300
Brainerd	12/20/16	1200	"	24539	200	27000
Ashland	6/ 5/16	66	"	43844	407	57900
Brainerd	10/2/16	1017	"	26752	465	59700
Ashland	4/26/16	325	"	91166	242	34700
McGregor	5/1/16	3	"	42866	455	59000
Ashland	4/26/16	316	"	46369	295	37300
Brainerd	9/ 2/16	1043	"	27969	335	44700
"	9/ 1/16	1017	"	42172	380	49100
McGregor	4/ 6/16	68	"	90888	273	36200
McGregor	5/ 4/16	49	N.P.	5751	256	28000
"	5/ 6/16	74	"	90851	302	36000
Ashland	4/24/16	363	"	91156	300	43800
"	4/ 4/16	43	"	90258	233	33800
McGregor	5/10/16	224	"	2863	201	27500
"	5/ 1/16	18	"	15965	278	37000
"	4/25/16	207	"	26766	275	41000
Ashland	6/ 1/16	11	Soo	103312	348	47900
McGregor	6/26/16	111	"	17624	263	33000
"	5/24/16	254	"	3750	416	49900
"	6/22/16	100	"	102766	320	45000
"	6/24/16	108	"	17268	350	43000
"	5/22/16	241	"	107876	418	49600
Ashland	5/29/16	297	"	103384	275	34900
"	6/1 /16	12	"	4788	288	38400
"	5/30/16	305	"	6792	243	30700
McGregor	5/17/16	189	"	625025	252	34700
Ashland	4/ 4/16	175	N.P.	33767	500	61800
"	4/12/16	149	"	38870	345	51500
"	4/24/16	277	"	90473	270	38000
"	4/26/16	317	"	24876	350	43500
"	4/24/16	286	"	32679	420	55600
"	4/26/16	318	"	28879	373	49000
"	4/24/16	281	"	26384	350	42000
"	4/24/16	279	"	27785	440	57200
"	4/25/16	303	"	46889	300	44200
"	5/ 6/16	79	"	90891	225	33000
"	4/24/16	252	"	41893	312	42000
"	4/20/16	231	"	47794	500	63300
"	4/10/16	124	"	43197	494	70900
"	4/ 4/16	47	"	90399	252	34300
Central Ave.	2/ 9/17	126	"	83904	395	56200
"	"	127	"	83945	375	44800
Brainerd	2/12/17	1117	"	34102	539	55000
"	5/23/17	1290	"	84953	218	29200
"	5/17/17	1196	"	25602	366	50800
"	5/21/17	1258	"	91003	263	32900
"	5/28/17	1328	"	36405	297	41200
"	4/23/17	1231	"	35109	450	65400
Central Ave.	1/25/17	396	"	90098	350	43000
"	"	397	"	91053	343	46400
Brainerd	1/29/17	1267	"	26296	417	57400

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO.2 HEWN PINE, TAMARACK, BIRCH, HEMLOCK & FIR
CROSS TIES.

Point of Original Shipment	Date of Way-Bill	Way Bill No.	Car Number	No.of Ties in Cars	Total Wt. of Ties in Car-Lbs.
Brainerd	1/24/17	1226	N.P. 22437	472	65900
Central Ave.	2/ 2/17	49	" 90474	315	41300
Brainerd	2/ 5/17	1061	" 33967	438	65500
Central Ave.	2/ 9/17	129	" 91205	275	35600
"	2/ 7/17	131	" 15701	290	37300
"	2/ 7/17	133	" 90033	255	35100
"	"	120	" 90756	300	37100
Brainerd	2/15/17	1166	" 41912	550	65500
"	2/ 7/17	1078	" 40347	415	57200
"	2/17/17	1186	" 36115	380	56000
"	2/ 6/17	1064	" 25098	400	54800
Central Ave.	3/12/17	165	" 90580	325	36000
"	2/21/17	317	" 91374	300	40900
McGregor	3/29/17	208	" 34288	336	41500
"	3/28/17	197	" 29034	540	70400
"	4/26/17	241	" 90891	249	33300
McGregor	4/25/17	218	" 83866	400	58200
Duluth	4/21/17	1669	" 90562	300	45400
Brainerd	4/20/17	1213	" 45018	456	68000
McGregor	4/23/17	149	" 4101	271	38900
"	6/ 2/17	39	" 84792	329	37700
Brainerd	"	1035	" 10330	148	19800
"	7/ 2/17	1016	" 204101	324	44500
"	5/31/17	1394	" 204134	305	34100
"	4/20/17	1218	" 45163	463	67000
"	4/16/17	1195	" 25276	525	78500
"	4/20/17	1217	" 34958	554	79100
"	"	1212	" 39551	450	66300
"	4/16/17	1194	" 46397	550	78400
"	"	1193	" 34946	460	66000
"	4/27/17	1272	" 84796	431	58700
"	4/11/17	1140	" 25274	292	32200
Brainerd	4/30/17	1293	" 90973	302	41000
McGregor	5/25/17	396	" 29455	336	41000
"	"	395	" 19251	475	59900
"	"	397	" 44480	308	42500
"	5/17/17	274	" 23865	268	37100
Brainerd	5/ 9/17	1113	" 4421	341	46600
"	5/11/17	1159	" 35617	400	58900
"	5/ 3/17	1017	" 40631	540	80100
"	5/ 7/17	1065	" 30131	305	42500

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car Number	No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	5/ 7/17	1064	N.P. 35510	360	50800
"	5/ 3/17	1019	" 18641	332	46600
"	5/14/17	1028	" 25821	500	65600
"	5/ 8/17	1109	" 18826	415	57100
"	5/ 3/17	1018	" 18927	450	62000
"	5/ 9/17	1114	" 35430	358	49600
"	5/11/17	1158	" 4902	352	49300
McGregor	5/12/17	196	" 91395	425	43600
"	5/17/17	275	" 39982	447	56900
"	"	278	" 39614	460	64100
"	5/ 8/17	86	" 83837	265	36600
Brainerd	4/25/17	1244	" 91419	316	46800
McGregor	5/28/17	427	" 24133	350	45100
Central Ave.	6/21/17	353	" 90233	362	47800
"	6/13/17	215	" 90576	324	44500
"	"	220	" 83785	331	46100
"	"	218	" 90155	297	41300
"	"	217	" 83840	340	50600
Brainerd	4/25/17	1245	" 36146	451	64600
"	4/27/17	1276	" 35629	424	59700
"	"	1277	" 37094	351	49200
"	5/31/17	1392	" 204208	335	39900
Duluth	5/ 5/17	R.P. 326	" 84911	300	39100
Brainerd	9/15/17	1154	" 204163	230	27900
"	7/24/17	1397	" 90281	256	36000
"	8/11/17	1009	" 33808	290	36500
Duluth	6/20/17	R.P.1248	" 91220	255	35300
McGregor	5/26/17	414	" 91059	253	32500
Brainerd	5/ 4/17	1021	" 35354	443	62800
"	5/ 7/17	1066	" 30198	476	65100
McGregor	5/25/17	400	" 32495	460	58300
Central Ave.	7/ 7/17	89	" 90124	261	23300
Duluth	5/ 2/17	R.P. 161	" 91453	300	42900
Brainerd	5/ 3/17	1016	" 24331	550	81000
McGregor	5/21/17	305	" 15739	220	31800
"	4/28/17	276	" 15734	342	44600
"	"	275	" 204141	354	43300
"	5/ 2/17	36	" 90312	398	45500
Brainerd	4/ 2/17	1003	" 35279	368	55000
"	3/30/17	1493	" 36705	336	47500
"	4/12/17	1159	" 36158	326	46600

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO. 2 HEWN PINE, TAMARACK, BIRCH, HEMLOCK & FIR
CROSS TIES

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car Number	No. of Ties in Cars	Total Wt. of Ties in Car - Lbs.
Brainerd	7/16/17	1193	N.P.	204189	330	46800
"	7/13/17	1179	"	204218	307	41600
"	7/21/17	1338	"	91143	410	45400
"	7/14/17	1182	"	26075	487	66300
"	7/23/17	1371	"	91317	369	48300
"	7/ 3/17	1020	"	90053	360	49100
"	7/ 2/17	1010	"	204208	289	38900
"	7/ 6/17	1054	"	84686	400	51900
"	7/ 7/17	1092	"	36717	344	47500
"	"	1284	"	91284	375	48600
"	7/ 9/17	1120	"	90649	353	48500
"	7/13/17	1165	"	83966	368	49400
Central Ave.	8 / 9/17	92	"	19562	479	58700
"	"	96	"	21985	548	71800
Brainerd	8/ 3/17	1069	"	90728	304	34200
"	8/ 6/17	1105	"	83812	430	59300
"	"	1104	"	90733	277	33200
"	8/ 3/17	1057	"	15735	265	32500
"	8/11/17	1011	"	204129	381	44800
"	"	1029	"	204218	181	21000
"	8/3/17	1061	"	36346	306	36000
"	8/3/17	1062	"	15843	287	33100
"	9/20/17	1201	"	90265	425	51400
"	7/11/17	1130	"	90889	332	41300
Duluth	4/29/17	R.P.2282	"	91262	300	41500
Everett	4/ 9/17	237	"	57083	873	105600
Brainerd	7/27/17	R.P.1446	"	204144	215	23300
"	6/ 4/17	" 1055	"	204289	361	39700
Central Ave.	8/ 9/17	90	"	83845	243	30700
Brainerd	8/ 7/17	1120	"	90460	240	25000
"	9/22/17	1217	"	90786	300	37900
"	9/15/17	1153	"	5283	348	43700
"	7/30/17	1489	"	44690	390	45400
"	8/ 1/17	1020	"	35280	493	51100
"	"	1021	"	204243	324	37800
"	10/4/17	1019	"	25751	320	39400
Mc'regor	7/ 5/17	14	"	36903	422	60400
"	6/11/17	4	"	90989	273	40600
Brainerd	6/15/17	1169	"	204181	242	33800
"	6/14/17	1165	"	90142	349	46000

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car No.	No. of Ties in Cars	Total weight of Ties in Car - Lbs.
Mc'regor	5/ 9/17	116	N.P.	90821	325	43700
Duluth	4/ 1/17	R.P. 194	"	204241	196	22600
Brainerd	6/ 4/17	1050	"	61868	403	52100
"	"	1051	"	69341	334	46300
"	"	1049	"	61153	331	47700
"	6/ 8/17	1097	"	16367	288	40300
"	"	1095	"	13725	455	64300
"	"	1096	"	90160	382	44000
"	8/11/17	1125	"	69016	490	60500
"	6/11/17	1126	"	62395	505	66700
"	6/1/17	1005	"	36122	432	61300
Central Ave.	7/26/17	380	"	204278	373	51500
Brainerd	7/ 3/17	1027	"	91404	330	47500
"	"	1026	"	90488	268	35300
"	7/ 3/17	1038	"	204048	385	46800
"	7/11/17	1134	"	5411	239	33800
"	7/27/17	1451	"	10247	334	36800
"	"	1452	"	37411	290	33200
"	6/ 2/17	1033	"	91397	308	36000
"	6/ 4/17	1048	"	84731	269	36100
"	5/17/17	1195	"	36021	430	59600
"	"	1197	"	36389	450	62600
"	5/19/17	1230	"	16277	350	44900
"	5/23/17	1289	"	15865	279	41300
"	"	1300	"	37948	348	49500
"	"	1302	"	204308	363	51100
"	5/28/17	1329	"	33340	465	65100
"	5/25/17	1332	"	35754	326	46800
"	"	1333	"	35477	333	44200
"	"	1334	"	10917	285	37700
"	5/31/17	1389	"	91069	330	45800
"	"	1390	"	90392	296	44500
"	6/8/ 17	1094	"	15827	325	44700
"	"	1148	"	90247	353	41200
Central Ave.	1/ 7/17	109	"	90750	350	49900
Brainerd	8/ 1/18	1000	"	204100	325	36400
"	4/ 5/18	1048	"	56901	731	76600
"	7/15/18	1069	"	32302	550	67000
"	6/24/18	1173	"	91102	377	40600
"	7/15/18	1061	"	91203	351	46300

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO.2 HEWN PINE, TAMARACK, BIRCH, HEMLOCK & FIR
CROSS TIES

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car No.		No. of Ties in Cars	Total Weight of Ties in Car-Lbs.
Brainerd	6/22/18	1165	N.P.	90203	257	35000
McGregor	6/ 1/18	7	"	36805	419	50600
Brainerd	4/18/18	1201	"	58707	526	72900
"	5/27/18	1258	"	84708	350	43400
"	6/26/18	1190	"	91409	330	38900
"	6/28/18	1199	"	58311	684	84600
"	5/13/18	1107	"	90112	300	39400
"	4/26/18	1310	"	58213	528	77300
Ashland	2/12/18	108	"	91017	340	49800
Brainerd	6/ 8/18	1065	"	90919	277	34500
"	6/13/18	1118	"	91119	211	23400
"	5/22/18	1204	"	83824	575	70900
"	4/19/18	1232	"	56828	515	69900
"	6/ 6/18	1055	"	90728	342	35300
"	7/17/18	1080	"	26131	490	62300
"	4/25/18	1294	"	58836	540	72300
"	5/10/18	1089	"	91437	300	37700
"	4/26/18	1308	"	90738	250	35500
Brainerd	5/17/18	1143	"	16638	350	39700
"	5/13/18	1106	"	91445	300	38900
"	4/26/18	1309	"	84746	300	371500
"	4/25/18	1291	"	58447	570	61900
"	4/22/18	1258	"	57247	580	84500
"	7/16/18	1072	"	15947	364	44500
"	7/15/18	1064	"	90049	360	42300
"	7/ 6/18	1025	"	91249	355	42600
"	6/ 8/18	1066	"	15949	300	34500
Cloquet	3/25/18	250	"	57050	524	66800
McGregor	4/16/18	111	"	55252	379	52600
Brainerd	6/ 6/18	1054	"	90152	332	41300
Duluth	6/ 1/18	R.P. 102	"	91153	400	42900
Brainerd	7/ 1/18	100	"	55056	498	64700
Forsyth	2/28/18	38	"	15757	260	36900
Brainerd	2/25/18	1068	"	55857	250	36000
"	5/14/18	1115	"	90759	279	34100
"	6/10/18	1078	"	90961	369	47900
McGregor	2/23/18	98	"	63264	455	55300
Brainerd	5/18/18	1156	"	91465	370	46600
"	5/ 9/18	1086	"	16667	300	38600
Little Falls	5/10/18	378	"	16667	300	38600
Brainerd	5/20/18	1182	"	90667	340	41500

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car No.		No. of Ties in Cars	Total Weight of Ties in Car-Lbs.
Brainerd	7/17/18	1081	N.P.	15967	336	42800
"	5/22/18	1212	"	15968	375	45200
McGregor	4/11/18	69	"	56969	480	73900
Brainerd	5/22/18	1210	"	56170	550	73250
"	4/22/18	1260	"	84772	300	39300
"	5/17/18	1141	"	91074	300	35700
"	6/10/18	1077	"	16580	288	32200
"	4/12/18	1152	"	57284	547	68200
McGregor	3/ 6/18	24	"	90685	375	47400
Brainerd	5/20/18	1183	"	90285	350	43600
"	6/ 6/18	1052	"	90885	354	44000
McGregor	3/22/18	123	"	57687	525	69700
Duluth	5/ 8/18	R.P. 518	"	90287	255	39000
Brainerd	7/22/18	1102	"	83888	575	66800
"	6/24/18	1180	"	90190	300	37300
"	4/18/18	1202	"	57793	551	78000
McGregor	6/ 1/18	8	"	57093	530	64500
Brainerd	4/19/18	1235	"	58995	550	77800
"	5/10/18	1090	"	56495	410	54000
"	5/28/18	1273	"	204096	300	39300
"	5/ 7/18	1045	"	58498	760	91400
"	6/26/18	1191	"	55499	575	73900
McGregor	6/10/18	43	Soo	160008	560	75800
"	6/13/18	60	"	32722	335	48800
"	6/18/18	81	"	8836	275	38100
"	6/ 8/18	35	"	29168	600	75500
Brainerd	7/ 9/18	1038	M.P.	36505	622	75200
McGregor	6/ 1/18	6	"	36117	507	64900
Brainerd	6/20/18	1149	C&NW.	73022	257	30400
McGregor	7/ 2/18	9	P.R.R.	54046	500	67600
Brainerd	6/17/18	79	AT&SF.	28049	295	39700
McGregor	6/6 /18	28	I.C.	30050	415	56700
Lawler	7/24/18	F. 13	A.E.	1054	262	37480
Brainerd	7/19/18	1039	CRI&P.	31457	351	42600
McGregor	6/ 6/18	29	B&O.	94962	475	63600
Brainerd	6/26/18	1190	St.L&SF.	36463	245	33500
McGregor	6/8/18	5	ACL	42665	507	64700
McGregor	6/15/18	66	M.L&F.	32773	370	50400
"	6/ 7/18	33	C.B&Q.	103183	560	73200
Brainerd	10/14/18	1017	CMASt.P.	69486	460	48500
McGregor	6/28/18	124	C.&E.I.	60987	490	62500

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO. 2 HEWN PINE, TAMARACK, BIRCH, HEMLOCK & FIR
CROSS TIES.

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car No.	No. of Ties in Cars	Weight of Ties in Car- Lbs.
McGregor	6/18/18	84	M.K.T.	60690	421	52400
Brainerd	6/26/18	1192	N.H.	91493	314	41600
Mc.Gregor	6/12/18	58	A.C.S.	38197	500	70300
Brainerd	6/ 6/18	1260	N.P.	16703	250	34600
"	5/13/18	1113	"	56726	537	71300
"	5/ 7/18	1055	"	90848	275	40100
Cloquet	4/13/18	189	"	55352	182	27100
Brainerd	5/ 4/18	1030	"	56359	531	70100
"	3/27/18	1333	"	58275	447	47700
Brainerd	5/27/18	1265	"	84790	203	25500
McGregor	5/ 8/18	16	"	55077	452	66800
"	5/ 7/18	32	"	55891	560	70600
Brainerd	6/ 6/18	1056	"	204194	320	39400
Duluth	10/17/18	4051	"	48695	348	45800
McGregor	6/ 6/18	27	V.S .&P.	26602	293	35700
Brainerd	6/ 4/18	1128	Erie	105626	232	31500
McGregor	6/ 6/18	26	N.Y. N.H.&H.	85531	436	58100
"	5/ 9/18	42	D.S.W.	37063	300	39100
McGregor	6/28/18	123	C.& E.I.	61688	355	39400
Brainerd	3/14/19	431	N.P.	16239	300	41300
"	6/ 6/19	194	N.Y.C.	221586	496	74100
Central Ave.	6/ 9/19	55	P.R.R.	11627	450	53100
Brainerd	8/ 9/19	289	C.of Ga.	6453	326	46200
"	6/10/19	307	D.L&W.	40834	255	30700
"	6/ 9/19	269	Soo.	16692	313	35000
Superior	6/18/19	2040	M.O.P.	25576	388	56000
Central Ave.	4/28/20	193	N.P.	90982	404	48900
Cloquet	5/ 2/20	149	"	91149	278	42500
Total -				521 cars	186753	24317330
Weighted average weight per tie						130 #

Office of Valuation Engineer,
St. Paul, Minn., Sept. 30, 1921.

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

EASTERN DISTRICT
MINNESOTA AND WISCONSIN
SHEET NO. 1 of SHEETS

SHIPPING WEIGHTS OF CROSS TIES
NO. 1 - CEDAR CROSS TIES

Point of Original Shipment	Date of Waybill	Way bill No.	Car Number		No. of Ties in Cars	Total Weight of Ties in Car Lbs.
Brainerd	1-24-17	1223	N.P.	27742	423	52200
"	1-24-17	1222	"	47639	358	45200
"	3-12-17	1114	"	27125	340	44500
"	2- 3-17	1051	"	27233	417	59200
"	2-12-17	1115	"	44557	331	39700
"	2-8- 17	1101	"	38353	382	46100
"	1-30-17	1278	"	36357	353	43100
"	1-30-17	1279	"	23865	414	54900
"	3-10-17	1300	"	25191	481	57600
"	3- 9-17	1282	"	36868	405	50600
"	3- 9-17	1281	"	28349	444	54500
"	2-23-17	1220	"	37617	283	45000
"	3-17-17	1375	"	90035	311	41300
"	3-17-17	1376	"	91036	310	36700
"	3-26-17	1434	"	204180	326	42700
"	3-24-17	1417	"	28890	500	57200
"	3-24-17	1421	"	37188	409	50400
Duluth	4-13-17	RP 1150	"	90660	400	35900
"	4-13-17	" 1148	"	90955	300	37900
"	4-15-17	" 1268	"	204187	340	39800
Brainerd	4-27-17	1274	"	91112	254	31300
"	5- 7-17	1061	"	33414	275	34500
"	5- 7-17	1060	"	34543	369	43800
McGregor	6- 2-17	37	"	16868	265	36400
Brainerd	4-30-17	1494	"	2772	295	34200
"	3-31-17	1507	"	41172	455	66900
"	4- 2-17	1005	"	23853	449	52000
"	4-16-17	1190	"	34514	350	43400
"	4-13-17	1166	"	91456	243	30100
"	4-25-17	1246	"	91201	270	37400
"	4-17-17	1200	"	91385	225	33200
"	4-17-17	1199	"	42936	372	45900
"	4-12-17	1155	"	36150	409	42300
"	4-10-17	1122	"	15755	280	40200
"	4-14-17	1177	"	11353	222	21100
"	4-11-17	1145	"	43829	414	51700
"	4-23-17	1230	"	21536	404	51300
"	4-21-17	1220	"	32985	398	45100
"	4- 6-17	1060	"	8494	260	33200
"	4- 6-17	1059	"	84710	372	45000
"	4-10-17	1123	"	15909	315	34900
"	4-10-17	1124	"	36886	400	45400
"	4-10-17	1125	"	40816	426	55000
"	4-10-17	1126	"	43652	509	61800
"	4- 6-17	1061	"	37452	470	54900
"	4- 7-17	1073	"	90382	325	45300
Brainerd	4- 9-17	1110	N.P.	15907	257	33400
"	4-28-17	1467	"	83839	404	62500
"	4-11-17	1142	"	90711	261	34200
Duluth	4-14-17	HP 1195½	"	204208	375	31900
Brainerd	7-21-17	1348	"	40092	407	38000
"	7-21-17	1347	"	40590	441	42400
"	3- 4-18	1016	"	91200	260	32800
"	2-21-18	1048	"	91103	306	38000
"	5-10-18	1097	"	55008	460	55800
"	4- 3-18	1032	"	56812	361	47200
"	3- 7-18	1056	"	58015	363	38900
"	8 - 7-18	1025	"	15715	270	21100
"	2-25-18	1062	"	204217	328	35000
"	6-15-18	1131	"	91118	285	33000
"	3- 6-18	1047	"	204023	306	43200
"	3-13-18	1135	"	58325	555	67400
"	7- 8-18	1023	"	90829	420	39300
"	2-18-18	1037	"	90128	305	38800
"	4-30-18	1353	"	56232	526	53800
"	7-17-18	1078	"	90332	326	33800
"	4-20-18	1240	"	55334	450	46300
"	6-18-18	1145	"	90534	354	42700
"	4-25-18	1297	"	57835	456	46800
"	2-25-18	1061	"	83939	370	43300
"	5-20-18	1181	"	16643	300	28500
"	7-17-18	1079	"	91343	330	32200
"	5-27-18	1257	"	58146	575	53800
"	6-10-18	1073	"	90446	286	27700
"	4- 3-18	1033	"	56157	439	56300
"	3- 6-18	1044	"	84663	318	41300
"	6- 8-18	1067	"	57966	321	38900
"	3- 6-18	1045	"	91473	289	46100
McGregor	4-23-18	159	"	55375	422	44720
Brainerd	7- 9-18	1041	"	90581	418	35300
"	4-25-18	1298	"	58182	427	46400
"	4- 3-18	1034	"	57685	382	52500
"	2-25-18	1062	"	91286	335	42300
"	7- 9-18	1037	"	90686	350	35500
"	3- 6-18	1042	"	204187	330	46700
"	7-11-18	1054	"	90291	325	35500
"	5- 4-18	1032	"	57093	331	37700
"	2-18-19	454	P.L.	5269?4	255	27700
"	5-21-20	678	M.&I.	1555	342	47900
GRAND TOTAL =			No. of Cars	89	32174	3827420
			Weighted Average Weight Per Tie			119#

Office of Val. Engr., St.Paul, Minn., 9-30-23.

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO. 2 - CEDAR TIES

Point of Original Shipment	Date of Way-Bill	Way-Bill No.		Car Number	No. of Ties in Cars	Total Weight of Ties in Car-Lbs.
Brainerd-	1-24-17	1224	N.P.	25852	534	50900
"	1-24-17	1225	"	32907	463	43400
"	2-12-17	1118	"	43063	486	46000
"	2- 3-17	1050	"	39914	590	66400
"	2-23-17	1218	"	24265	607	58800
"	3-27-17	1449	"	25139	591	49400
"	3-24-17	1415	"	32322	526	46800
"	3-24-17	1416	"	33678	441	39900
"	3-13-17	1328	"	36777	336	28700
"	3- 5-17	1034	"	34938	484	46600
"	2-8-17	1100	"	40755	600	57200
"	1-30-17	1277	"	26438	620	59500
"	4-16-17	1187	"	90555	421	47700
"	4-17-17	1197	"	34342	435	39000
"	4-5-17	1040	"	90096	367	35400
"	3-31-17	1506	"	35614	480	47900
"	4- 6-17	1058	"	34644	575	54700
Duluth	4-14-17 RP	1209	"	16868	300	38000
Brainerd	4-11-17	1139	"	24673	248	54000
"	7-21-17	1342	"	44423	481	32500
"	2-18-18	1039	"	204315	398	35100
"	4- 3-18	1037	"	56027	477	40700
"	3- 6-18	1043	"	90939	445	43300
"	4- 3-18	1036	"	58941	594	50300
"	3-13-18	1134	"	58647	734	69500
"	4-26-18	1315	"	91380	350	28000
"	2-28-18	1078	"	55082	500	44200
"	3- 4-18	1017	"	90599	321	31400
"	3-6 -18	1046	"	15794	440	41700
		No. of Cars		29	13844	1327000
		Weighted average weight per Ties -		-	-	96#

Office of Valuation Engineer,
St. Paul, Minnesota, September 30th, 1921.

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO. 1 - OAK TIES

Point of Original Shipment	Date of Way-Bill	Way-Bill No.	Car No.	No. of Ties in Cars	Total Weight of Ties in Car -Lbs.
McGregor	4/ 8/16	88	N.P. 44158	223	42000
McGregor	5/22/17	348	N.P. 47305	261	56700
"	5/16/17	258	" 83908	175	43100
"	5/22/17	347	" 90625	200	46400
"	5/19/17	298	" 83753	207	46300
"	5/24/17	374	" 204093	165	36100
"	5/ 1/17	15	" 90671	154	30900
"	5/ 7/17	78	" 90833	141	33400
"	5/14/17	220	" 83949	260	54800
"	5/28/17	355	" 90849	145	37300
"	5/23/17	350	" 42008	332	52800
"	5/18/17	300	" 15920	250	39700
Grand total	No. of cars - 12			2513	519500#
Weighted Average weight per tie -					207#

Office of Valuation Engineer,
St. Paul, Minn., Sept. 30, 1921.

EASTERN DISTRICT
MINNESOTA & WISCONSIN
SHEET 1 OF 1 SHEET

NORTHERN PACIFIC RAILWAY COMPANY
VALUATION DEPARTMENT

SHIPPING WEIGHTS OF CROSS TIES
NO. 2 - OAK TIES

Point of Original Shipment	Date of Way Bill	Way Bill No.	Car No.	No. of Ties in Cars	Total Wt. of Ties in Cars Lbs.
McGregor	3/28/16	204	N.P. 21775	284	59000
"	6/ 1/16	5	Soo 2072	155	29800
Brainerd	11/17/16	1091	N.P. 33823	232	39000
McGregor	3/29/17	206	N.P. 63381	300	40900
"	7/10/17	26	" 38262	300	44000
Grand Total -			No. of cars - 5	No. ties-1271	212700#
Weighted Average weight per tie -					167#

Office of Valuation Engineer,
St. Paul, Minn., Sept. 30, 1921.

Shall be glad to know whether the weights furnished the Valuation Dept. are suitable for your purpose or whether it is desired to weigh everything in and out. While the plants are in operation it will mean an additional switch engine at each plant with a full crew to do this work.

Yours truly,

Supt. T. P. & T. T. Plants.

Cy.-H.E.S.

a-9

3659"6"

Brainerd, Minn., Sept. 2nd, 1921.

Mr. W. C. Pinger,
Auditor Capital Expenditures,
St.Paul, Minn.

Dear Sir:

In reply to your letter of August 23rd, which I received on my return here today from the West, beg to advise that I gave the Valuation Dept. weights of green, dry and treated ties for Paradise and Brainerd, taken from an average of a great many cars; and I think that they can furnish this information possibly better than I can as they have, no doubt, got it in convenient shape for reference.

The only way in which weights can be obtained correctly for treated and untreated ties is to weigh the ties as they are treated and after treatment. This will mean a very large expense, and before doing work of this kind and going to the expense of doing it, I would suggest that the matter be referred to the Chief Engineer. It will practically require the service of a switch engine and switch crew continually at each plant.

If giving you the weight per gallon of the mixture that we are using will answer the purpose, and the average number of gallons per tie, this is a very simple matter. The mixture weighs an average of 8½ lbs. per gallon and we use in treatment 5 gallons per tie.

The weighing of green ties coming to Brainerd, if that has to be done, will have to be taken up through the Operating Dept., as they do all the switching for us at Brainerd and Paradise and they would have to weigh the cars before setting in at the plant. As stated above, I gave the Valuation Dept. weights last Summer, I think it was, of green ties of all kinds of wood, dry ties after seasoning in the yard, treated ties after being treated and loaded out for distribution along the line. If that information is not satisfactory for your purpose the only way we can get at it is by actually weighing the ties as they come in, weighing them after framing and weighing before shipping out. Any other estimate you can make is simply an approximation and can not be from the weights furnished the Valuation Dept. with any assurance as it is possible to get it in that manner.

Saint Paul, June 27th, 1931.

12/24/20
3619

Mr. Andrew Gibson,

Supt. T.T. & T.P. Plants,

Brainerd, Minnesota.

Dear Sir:-

Mr. Thian has gone over the data furnished with your letter of the 27th ult., covering weights of ties.

This information will answer all requirements for the present.

Yours truly,

Chief Engineer.

HES-ar

cc-Mr. P.E.Thian.

3659

Saint Paul, Minn., June 2d, 1921.

Mr. H. E. Stevens,

Chief Engineer.

Dear Sir:-

I have to acknowledge receipt of your letter of May 31st, attaching letter from Mr. Gibson and statement of actual weights of certain green ties received at treating plants. This statement will complete data required as to tie weights.

Yours truly,

H. E. Thorn

VALUATION ENGINEER.

HB:jl

Brainerd, Minn., May 27th, 1921.

Mr. H. E. Stevens,
Chief Engineer,
St. Paul, Minn.

Dear Sir:-

Referring to your letter of May 17th:

Hereto attached I beg to hand you, in duplicate, weights of ties received at the Paradise Tie Treating Plant. The Fir and Tamarack come in mixed together and it is impossible to separate them and get separate weights, as we never receive a car of one species of these timbers and the weights are given of mixed carloads. Tamarack and Fir has been coming in mixed about half and half of each species. Occasionally there are cars where they may be more of one species than the other, but it is very seldom when there is much difference in the number of each species, and in order to get the weights separate of each of these species, it would entail considerable expense and labor.

I assume that for the purpose that these weights are required, the attached statement will give the information desired. In shipping out Fir and Tamarack they are shipped in about the same proportion as they are received.

Yours truly,

Andrew Gibson.

Supt. T. P. & T. T. Plants.

encl.

COPY

St. Paul, May 31st, 1921.

Mr. H. Bryan:

Please note attached letter from Mr. Gibson and statement of actual weights of a large number of green ties received at the Treating Plants.

These were made for purpose of comparison with the weights of treated and seasoned ties which I sent you on March 12th.

Kindly advise if these statements will give you all the data you require in regard to tie weights.

Chief Engineer.

SJB/FS

Encl.

Car No.	Net Weight	No. of Ties	Average Weight Per Tie
Grade #2 Green Lodgepole Pine - Hewed			
NP 67439	46400	336	142.2
64818	50200	354	141.7
2 Cars	96600	680	142.06
Grade #1 Green Lodgepole Pine - Hewed			
NP 68113	45900	269	170.3
AGS 4578	46800	273	170.4
NP 63576	41500	255	162.7
NP 46046	37600	247	152.3
4 Cars	171600	1044	164.36
Grade #1 Green Pine (Bull Pine) - Hewed			
Penn 517331	57300	298	192.0
NP 64334	56600	289	195.7
2 Cars	113800	587	193.87
Grade #1 Green Cottonwood - Hewed			
NP 61083	55150	246	224.4
62303	51000	234	218.0
69528	47700	219	218.0
61865	54700	250	219.0
33639	57400	243	236.2
5 Cars	265950	1193	223.11
Grades 1 & 2 Cottonwood - Hewed			
NP 68375	36000	139 #1 & 52 #2	199.0
100143	72700	241 #1 & 95 #2	216.3
33114	48800	197 #1 & 69 #2	183.5
64339	47100	66 #1 & 214 #2	168.0
4 Cars	204600	633 #1 & 430 #2	192.47
Grade #1 Fir and Tamarack - Hewed			
NP 49018	53040	281	188.8
25961	48900	325	150.3
34168	60230	358	168.3
37204	54800	348	158.2
39339	56300	353	159.4
36015	54600	358	152.8
6 Cars	327880	2021	162.22

Car No.		Net Weight	No. of Ties	Average Weight per Tie
Grade 1, Green Pine Ties - Sawed				
NP	46947	73300	564	129.9
	36833	70100	490	143.1
	47299	78860	498	158.3
	36346	70460	539	130.6
	35170	71930	547	131.4
	48350	83460	646	129.3
	43944	80700	640	126.2
	39711	75600	558	135.7
	34371	85530	587	145.6
	42188	83300	644	129.6
	34113	73500	567	129.5
	37317	74000	535	138.3
B&O	90491	58300	370	141.3
NP	40714	79700	538	147.7
	39467	59400	419	141.8
16 Cars		1,190,330	8718	136.54
Grade 1, Green Fir and Tamarack - Sawed				
NP	37881	63760	484	131.6
	36358	64400	488	133.1
	67263	60380	451	133.9
	66015	63300	483	131.1
	48555	82460	628	131.3
	60015	62600	475	131.8
	39909	72900	550	132.4
	48474	85760	586	146.3
	33346	79180	634	125.0
	69195	70800	490	144.4
	69607	64140	489	131.2
	43489	85500	626	136.8
LV	8945	50430	327	154.1
NP	35897	51780	370	139.8
	36899	87840	643	136.8
	38376	85340	627	136.1
	37393	87340	525	166.3
	68115	63930	465	135.2
	69438	66300	503	131.8
	67523	67380	508	132.7
	46075	86130	664	129.6
	33756	68340	545	125.3
	34589	83750	640	130.9
	38763	70730	476	148.8
	38314	80000	590	135.7
	31889	82140	568	144.4
	39995	79880	640	124.9
	46389	83300	646	129.1
	35174	68500	454	150.8
	39857	83040	573	145.1
	38734	64340	495	130.0

Car No.	Net Weight	No. of Ties	Average Weight Per Tie	
	Grade 1, Green Fir & Tamarack - Sawed. (Cont'd.)			
NP 23470	76500	529	144.7	
46373	82700	601	137.7	
18962	68500	475	144.3	
19758	81600	582	140.3	
38090	68100	498	136.7	
32734	72400	525	137.9	
33616	75200	547	137.5	
18108	63400	452	140.2	
41790	60800	433	140.3	
38718	81500	560	145.6	
24031	88500	598	148.1	
35300	61100	435	140.3	
17370	57300	426	134.5	
46447	81880	600	136.4	
64876	59300	462	128.1	
38833	74300	524	141.8	
63257	60000	456	131.7	(198 Tam. (258 Fir.
65585	60000	457	131.3	(188 Tam. (269 Fir.
25227	85200	575	148.2	
67376	60300	461	130.8	(207 Tam. (254 Fir.
37857	66300	457	144.9	
3938	37400	263	142.2	
53 Cars	3,793,610	27557	137.66	

May -1921-

Brainerd, Minn., May 19th, 1921.

Mr. H. E. Stevens,

Chief Engineer,

St. Paul, Minn.

Dear Sir:

Your letter 17th in regard to statement of weight of ties requested in your letter March 15th.

Expect to be able to give you this statement within next few days.

Yours truly,

Andrew Gibson

Supt. T. P. & T. T. Plants.

St. Paul, May 17th, 1921.

Mr. Andrew Gibson,

Supt. Tie Treating Plants,

Brainerd, Minn.

Dear Sir:

Please refer to my letter of March 15th in regard to a statement showing actual weights of ties and advise when this will be furnished.

Yours truly,

REG/FS

Chief Engineer.

Saint Paul, March 15th, 1921.

Mr. Andrew Gibson,
Supt. Tie Treating Plants,
Brainerd, Minnesota.

Dear Sir:-

I have your letter of the 11th with tabulated statement showing actual weights of seasoned and treated cross ties. This information will be very useful and will, I think, be sufficient to cover that phase of the matter.

I would be glad, however, if you would arrange to obtain actual weights on a similar quantity of the same grade and species of ties as received green.

What we desired to show was that the treated weights did not differ substantially from the full green weight.

Yours truly,

Chief Engineer.

HES-ar

cc-Mr. P.E.Thian.

Saint Paul, March 14th, 1921.

Mr. H. E. Stevens,

Chief Engineer.

Dear Sir:-

I am returning file including original statement of actual weights of ties received at treating plants, reported by Mr. Gibson.

With what weights we already have, I do not think it will be necessary to continue weighing additional ties.

Yours truly,

P. G. Thian

VALUATION ENGINEER.

HB:jl

encl.

Saint Paul, March 12th, 1921.

Mr. H. Bryan:

Please note the attached letter from Mr. Gibson and statement of actual weights of a large number of ties received at the treating plants.

Will you kindly look these statements over promptly and advise if you consider it necessary to continue weighing for the purpose of obtaining additional data.

Some little additional work is involved in securing these weights and I do not wish to continue it any longer than necessary.

Chief Engineer.

HES-ar

Encl.

Brainerd, Minn., March 11th, 1921.

Mr. H. E. Stevens,
Chief Engineer,
St.Paul, Minn.

Dear Sir:

Herewith beg to hand you, in duplicate, seven sheets showing tie weights at Paradise.

These weights are taken from the scale cards and are actual, without any guess-work. We have not been receiving as great a variety of ties as we did last summer and, therefore, not able to furnish as many of some species as we would like to. The list, however, may be what the Valuation Dept. wants and, if not, we will keep on weighing until we get what they want.

The Grades 1 & 2 and 3 & 4 come to us all mixed up in the cars and it is an absolute impossibility to keep them separate or get separate weights for these two grades, unless we keep a switch engine on hand continuously and put an extra force of men on to do this work. The Grades 3 & 4 are what we formerly termed No.1 for main line use, and Grades 1 & 2 are what we termed No.2 for branch line and passing tracks.

If any more weights are desired on any particular kind of ties, we will keep on weighing until we get what is wanted.

Yours truly,

Supt. T. P. & T. T. Plants.

enc

Int.	No.	Gross	Tare	Net	No. Ties	Average Per Tie
			Grades 3 & 4 Hewed Fir and Tamarack - Treated			
NP	15926	64200	28400	35800	262	136.7
	90245	66960	38000	28960	253	114.6
	16678	65000	30000	35000	183	191.3
	90138	73400	37900	35500	199	178.2
	16719	71500	31400	40100	194	206.5
	90978	63900	28300	35600	190	187.4
	204290	77700	27300	50400	227	222.0
	90516	73100	28000	45100	223	202.1
	15870	77500	28800	48700	208	224.2
	91315	62900	28500	34400	193	178.2
	83817	79700	39300	40400	202	200.1
11	Cars	775860	345900	429960	2334	184.2
			Grades 3 & 4 Hewed Fir and Tamarack - Seasoned			
NP	65785	61500	26400	35100	240	146.2
	67507	75400	24000	51400	347	148.1
	65152	74880	25300	49580	320	154.9
	68738	85640	25300	60340	415	145.4
	68008	66880	30300	36580	289	126.6
	66258	77180	24600	52580	365	144.1
	63092	46000	24100	21900	135	162.0
	63763	74800	24700	50100	350	143.1
	64563	73660	25100	48560	340	142.8
	68321	88320	26300	62020	420	147.6
10	Cars	724260	256100	468160	3221	143.3
			Grades 1 & 2 Hewed Fir and Tamarack - Treated			
NP	90180	64500	28800	35700	257	138.9
	83960	80800	38900	41900	328	127.7
	91205	62500	30900	31600	256	123.4
	90067	67600	28400	39200	255	153.7
	83893	75400	39400	36000	263	136.9
	91083	72500	28400	44100	313	140.9
	90176	62200	27600	34600	249	138.9
	15996	71040	28500	42540	309	137.4
	204195	65460	33200	32260	248	130.0
	90023	63140	29100	34040	257	132.3
	90458	72480	32400	40080	243	165.0
	16885	65700	31600	34100	305	111.7
12	Cars	823320	377200	446120	3283	135.9

Int.	Car No.	Gross	Tare	Net	No. Ties	Average Per Tie
		Grades 1 & 2 Hewed Fir and Tamarack - Seasoned				
NP	64563	72300	25100	47200	424	111.3
	65785	76200	26400	49800	446	111.7
	64127	66780	25200	41580	323	128.7
	64087	51100	25600	25500	244	104.5
	64655	45100	24600	20500	179	114.5
	63092	82400	24100	58300	530	110.0
	64563	83800	25100	58700	540	108.7
	68321	42300	26300	16000	154	103.9
	63763	50300	24700	25600	221	115.8
	63592	70700	24500	46200	405	114.1
	65176	39260	24700	14560	132	110.3
	65346	79500	23500	56000	500	112.0
	65137	77600	23300	54300	500	108.6
13	Cars	837340	323100	514240	4598	111.8
		Grades 1 & 2 Sawed & Hewed Mixed Fir & Tamarack - Treated				
NP	84867	74800	35100	39700	293	135.5
	15878	68100	33900	34200	270	126.7
	83817	75800	39300	36500	268	136.2
	15718	67900	29100	38800	260	149.2
	16517	70120	32200	37920	281	134.9
	16760	67700	31300	36400	280	130.0
	84689	73560	40900	32660	272	120.1
	91456	69920	29400	40520	335	120.9
	84953	67280	30300	36980	312	118.5
9	Cars	635180	301500	333680	2571	129.8
		Grades 3 & 4 Fir and Tamarack, Seasoned - Sawed				
NP	68321	101400	26300	75100	710	105.8
	68008	83800	30300	53500	500	107.0
	64127	74600	25200	49400	460	107.4
	67500	89700	24000	65700	580	113.3
	63092	80600	24100	56500	503	112.3
	65176	73600	24700	48900	441	110.9
	62964	88200	24700	63500	590	107.6
	63763	68800	24700	44100	400	110.0
	65137	81600	23300	58300	485	120.0
	62946	81500	24700	56800	497	114.3
	63764	84400	24800	59600	525	113.5
	64018	79700	25600	54100	513	105.5
12	Cars	987900	302400	685500	6204	110.5

Int.	Car No.	Gross	Tare	Net	No. Ties	Average Per Tie
			Grades 3 & 4 Sawed Fir and Tamarack - Treated			
NP	90824	70500	28400	42100	338	124.5
	16719	69400	31400	38000	264	143.9
	91224	64400	30500	33900	269	126.0
	90580	64900	28400	36500	267	136.7
	91007	71400	27900	43500	325	133.8
AGS	4578	67320	33000	34220	278	123.09
NP	90873	67340	30200	37140	274	135.6
	65266	60280	26500	33780	280	120.6
	64339	63620	24800	38820	306	126.8
	16879	67500	31200	36300	256	141.8
10	Cars	666560	292300	374260	2857	130.9
			Grades 3 & 4 Sawed & Hewed Fir and Tamarack - Seasoned			
NP	65346	87300	23500	63700	495	128.7
	65152	82300	25300	57000	452	126.1
	68738	78300	25300	52900	422	126.3
3	Cars	247700	74100	173600	1369	126.9
			Grades 3 & 4 Sawed & Hewed Fir and Tamarack - Treated.			
NP	90192	65600	28600	37000	259	142.9
	90961	61300	28400	32900	251	131.1
	83904	82800	39100	43700	252	173.4
3	Cars	209700	96100	113600	762	149.1
			Grades 1 & 2 Sawed & Hewed Fir and Tamarack - Seasoned			
NP	65152	78280	25300	52980	458	115.7
	64018	78800	25600	53200	500	106.4
	65346	68780	23500	45280	420	107.8
3	Cars	225860	74400	151460	1378	109.9
			Grades 3 & 4 Hewed Coast Fir - Seasoned			
NP	62946	77440	24700	52740	415	127.1
	64018	79880	25600	54280	456	119.0
	64583	70720	25100	45620	353	129.2
	64087	61800	25600	36200	301	120.8
	62946	71200	24700	46500	334	139.2
	68738	77500	25300	52200	416	125.5
	63592	73000	24500	48500	361	134.3
	63764	79700	24800	54900	385	142.7
	64127	73620	25200	48420	400	121.1
	64018	61000	25600	35400	300	118.0
	65176	77660	24700	52960	421	126.1
	64127	70460	25200	45260	400	113.2
	65176	73800	24700	49100	421	116.5
	63592	69440	24500	44940	361	124.5
	63764	66100	24800	41300	385	107.2
15	Cars	1083320	375000	708320	5709	124.4

Int.	Car No.	Gross	Tare	Net	No. Ties	Average Per Tie
			Grades 3 & 4 Hewed Coast Fir - Treated			
NP	90030	68000	35800	32200	270	119.3
	91315	62900	28500	34400	219	157.1
	84778	73700	35800	37900	193	196.4
	90179	60400	29000	31400	229	137.1
	83900	80600	38800	41800	264	158.3
	90611	63300	27800	35500	211	168.3
	90858	75000	27800	47200	239	197.5
	90790	64840	29200	35640	206	173.0
	16308	69100	31100	38000	208	182.5
	84677	76440	36200	40240	252	159.3
	84805	68400	34900	33500	211	158.7
	90308	64500	28100	36400	206	176.8
	15720	72620	28400	44220	233	189.7
	90784	65300	27800	37500	219	111.3
14	Cars	965100	439200	525900	3160	166.4
			Grades 3 & 4 Sawed Coast Fir - Seasoned			
NP	68321	69660	26300	43360	421	102.9
	67507	80660	24000	56660	542	104.5
	66258	86780	24600	62180	564	110.3
	68008	71880	30300	41580	450	92.4
	64127	71860	25200	46660	465	100.3
	64655	79340	24800	54540	512	106.5
	64087	71700	25600	46100	461	100.0
	65236	82420	26400	56020	504	111.2
	63592	82600	24500	58100	536	108.4
	65185	72320	26400	45920	450	102.0
10	Cars	769220	258100	511120	4905	104.4
			Grades 3 & 4 Sawed Coast Fir - Treated			
NP	16630	67800	32700	35100	242	145.0
	90984	72000	30000	42000	324	129.6
	90662	64900	28200	36700	272	134.92
	16522	66420	34400	32020	285	112.3
	15795	71000	28200	42800	342	125.1
	84767	72260	33300	38960	268	145.4
	16561	73560	36200	37360	284	131.5
	91428	64600	29500	35100	278	125.3
GRI	4570	77140	42700	34440	206	167.3
9	Cars	629680	295200	334480	2501	133.8

Car Int. No.	Gross	Tare	Net	No. Ties	Average Per Tie
		Grades 1 & 2 Hewed Coast Fir - Seasoned			
NP 65346	52300	23500	28800	294	97.9
67152	63140	25300	37840	370	102.3
64127	76860	25200	51660	576	89.7
68008	70160	30300	39860	478	83.4
65176	68660	24700	43960	470	93.5
65137	67800	23300	44500	450	98.9
64018	93420	25600	67820	750	90.4
63763	64980	24700	40280	444	90.5
65137	73660	23300	50360	526	96.0
65346	74200	23500	50700	560	90.7
64655	42200	24800	17400	195	89.3
67507	51700	24000	27700	278	99.7
65785	77500	26400	51100	520	98.3
68008	59200	30300	28900	340	85.1
66258	45900	24600	21300	228	93.4
15 Cars	981680	379500	602180	6479	92.9
		Grades 1 & 2 Hewed Coast Fir - Treated			
NP304241	64600	29300	35300	286	123.4
84773	77700	35600	42100	315	133.7
90998	72780	28400	44380	344	129.0
3 Cars	215080	93300	121780	945	128.8
		Grades 3 & 4 Mixed Hewed & Sawed Coast Fir - Treated			
NP 90407	61300	27900	33400	257	129.9
304241	68500	29300	39200	317	123.7
90311	64700	28300	36400	252	144.4
90312	70000	28500	41500	251	165.3
4 Cars	264500	114000	150500	1077	139.7
		Grades 3 & 4 Sawed Pine - Seasoned.			
NP 62946	80900	24700	56200	590	95.3
63763	85460	24700	60760	600	101.3
65176	73780	24700	49080	492	99.7
63092	75900	24100	51800	520	99.6
63764	85100	24800	60300	610	98.8
68738	83400	25300	58100	600	96.8
68321	77200	26300	50900	552	92.3
63763	73600	24700	48900	505	96.9
63092	80260	24100	56160	575	97.1
65236	70400	26400	44000	434	101.3
65152	75660	25300	50360	534	94.3
11 Cars	861660	275100	586560	6012	97.6

Int.	Car No.	Gross	Tare	Net	Ties	Average Per Tie
			Grades 3 & 4 Sawed Pine - Treated			
NP	90027	74200	30100	44100	335	131.6
	83886	79980	39200	40780	342	119.2
	90458	64200	32400	31800	267	119.1
	90516	69760	28000	41760	281	148.6
	90353	69800	32700	37100	285	130.2
	90091	64200	28200	36000	282	127.7
	90708	64000	27700	36300	284	127.8
STLSW	5333	64920	30300	34620	283	122.3
NP	90998	63920	28400	35520	251	141.5
	16701	69340	33200	36140	285	126.8
	30347	81360	37900	43460	339	128.2
	90196	74000	29000	45000	342	131.3
	15747	68900	28300	40600	337	120.5
	91359	62400	28700	33700	282	119.5
	15833	61000	28000	33000	274	120.4
	90012	64800	29900	34900	281	124.2
	16609	68800	35700	33100	280	118.2
	91056	70820	28400	42420	335	120.6
18	Cars	1236400	556100	680300	5365	126.8
			Grades 3 & 4 Hewed Pine - Seasoned			
NP	64563	73900	25100	48800	375	130.2
	65137	54500	23300	31200	235	132.8
	65346	75000	23500	51500	428	120.2
3	Cars	303400	71900	131500	1038	167.2
			Grades 3 & 4 Hewed Pine - Treated			
NP	16787	68800	31400	37400	197	190.0
	84778	72400	35800	36600	237	167.9
	90178	66540	27600	38940	237	160.2
	83795	71740	38100	33640	216	155.8
	90124	61400	28900	32500	203	160.2
5	Cars	340880	161800	179080	1071	167.2

Car Int.	No.	Gross	Tare	Net	No. Ties	Average Per Tie
			Grades 1 & 2 Green Pine Ties - Sawed			
NP	63452	114000	37700	76300	525	145.3
	35831	101500	32900	68600	511	134.3
	3362	80400	28100	52300	394	132.7
	33302	102500	33300	69200	490	141.2
	36599	100300	32100	68200	490	139.2
	33144	98000	33000	65000	480	135.4
	35994	102100	31700	70400	490	143.7
	19320	121800	37500	84300	625	134.9
	41937	118700	38500	80200	607	132.1
	40901	123400	38960	83440	630	132.4
	19281	118000	37500	80500	624	129.0
	40001	123700	40600	83100	632	131.5
	3896	80900	27900	53000	399	132.83
	3341	80200	28300	51900	392	132.4
	34734	114800	34400	80400	560	143.6
15	Cars	1579300	512460	1066840	7849	135.9
			Grades 1 & 2 Green Pine Ties - Hewed			
NP	3411	55500	27800	27700	201	137.8
	35204	71700	31800	39900	245	162.9
2	Cars	127200	59600	67600	446	151.6
			Grades 3 & 4 Green Pine Ties - Hewed			
NP	36603	63440	32100	31340	150	208.93
			Grades 3 & 4 Green Hemlock - Hewed			
NP	42182	108660	38600	70060	310	226.0
	25905	88700	34700	54000	242	223.2
2	Cars	197360	73300	124060	552	224.7
			Grades 1 & 2 Green Hemlock - Hewed			
NB	26772	94500	35600	58900	343	171.6
			Coast Fir Switch Ties - Green			
					F.B.M.	PerBd.Ft.
NP	63958	93760	24200	69560	20636	3.378
	49018	122340	35100	87140	25921	3.362
	27534	103600	31900	71700	19472	3.682
PMcKY	90619	151660	48200	103460	30501	3.382
4	Cars	471260	139400	331860	96530	3.43789

Saint Paul, January 20th, 1921.

Mr. P. E. Thian,
Valuation Engineer,
San Francisco, California.

Dear Sir:-

Re your memo noted on returned tie file of January 3d; I hand you herewith revised summary of tie weights for all districts compiled from scale weight reports from several Northwestern Carriers.

You will note that a No. 1 tamarack, pine, fir and hemlock tie averages 177#, while No. 2 tamarack, pine, fir or birch averages 133#. The statement forwarded you by Mr. Stevens on December 24th, gave the weight of a No. 2 tie as 148#. This 148# weight was based on shipping weights and not on scale weights.

The Bureau of Valuation, Pacific District, in its agreement with the Great Northern allowed 180# for No. 1, all districts, and 135# for No. 2, all districts, which is only 3# and 2# respectively in excess of our weighted average weights. I think the statement sent by Mr. Stevens aforementioned, should be changed in respect to No. 2 tie, making the green weight 135#, the average weight after seasoning and ready for retort 119#, and the weight after treatment at end of drying out period 142#.

Yours truly,

HB:jl
encl.

VALUATION ENGINEER.

Cy - H.E.S.

COPY

3659

Brainerd, Minn., Jan. 5th, 1921.

Mr. H. E. Stevens,
Chief Engineer,
St.Paul, Minn.

Dear Sir:

Referring to our correspondence and conversation over the telephone in regard to weights of ties shown on blue print dated March 13th, from Paradise plant.

I am this date in receipt of a letter from Mr. Loom, stating that the ties at Paradise were weighed under the supervision of the switch crew instead of representatives of the tie plant. and that the treated weights were arrived at by adding an assumed weight to the seasoned weight. He says that as near as Mr. Willcutt and Mr. Ekman can remember, that Mr. Nichols who was supposed to attend to the weighing, based the weight of treated ties on an assumed weight which he added to the seasoned ties; so that the blue print referred to should be destroyed or disregarded entirely.

As I told you a few days ago, I am having green ties, seasoned ties and treated ties weighed at Paradise now and within two or three weeks we hope to get correct weights of each kind of tie. I talked with Mr. Bryan of the Valuation Department about this and he said that that would be quite satisfactory.

Yours truly,

Supt. T. P. & T. T. Plants.

Brainerd, Minn., Dec. 24th, 1920.

Mr. H. E. Stevens,
Chief Engineer,
St.Paul, Minn.

Dear Sir:

Referring to our conversation on the telephone yesterday afternoon in regard to blue print showing weights of ties at Paradise and Brainerd, blue print dated March 13, 1918.

Since talking with you, Mr. Loom came in here from Paradise. He has come to Brainerd to spend Christmas with his relatives, and I talked with him about the weighing at Brainerd and asked him to get me the data for Paradise as to how the ties were handled and the weights obtained. His letter which is hereto attached, explains how the work was done at Brainerd, which bears out the information I received here.

I was mistaken, however, as to years in which these ties were weighed. It seems that the weights were taken in 1916 instead of '17 and the early spring of 1918 as stated in my letter; so the work of weighing was completed before I returned here from the hospital.

In talking the weights over with Mr. Johnson, who was clerk in the office at the time these figures were obtained, he is under the impression that the treated weights were estimated on the basis of 30 lbs. weight over the seasoning weight per tie, but that does not quite correspond with the figures on the print and we cannot find anything around the office that would show how they were obtained. There must have been some memoranda from which the figures were obtained, but we looked through everything there is and the only conclusion we can arrive at is that the memoranda was destroyed in the fire, but I cannot understand how the figures could have been copied unless there was something as the basis from which to obtain them; but as already stated, I cannot find a single memorandum around the office to show.

Mr. Loom examined the figures for the Brainerd work and he says that, as near as his recollection goes, that they are absolutely correct, but of course there is nobody here who knows how the Paradise work was done until he returns and interviews Mr. Willcutt and Mr. Ekman, who were at Paradise during the time these weights were obtained.

Just as soon as I hear from him I will send you his reply.

Yours truly,

Supt. T. P. & T. T. Plants.

enc

Brainerd, Minn., Dec. 24th, 1920.

Mr. Andrew Gibson,
Supt. T.P. & T.T. Plants,
Brainerd, Minn.

Dear Sir:

In reply to your letter of the 23rd in regard to how weights were arrived at in making up the attached blue print.

As near as I can remember this weighing was carried on during 1916 at Brainerd, but am not sure as to the time and methods used in weighing the Paradise ties. I will look this up as soon as I return to Paradise.

At Brainerd we were receiving a great many ties both seasoned and green, and were able to get scale weights of a great number of carloads of each kind of timber at this time. After treatment we had about the same number of carloads of treated ties of each grade and timber weighed on the scales. The part of this print showing the Brainerd ties was compiled from these scale weights and I know of no more accurate way in which this work could have been done. I had charge of this work personally and the figures arrived at compare very closely with those of several other weighing tests we have carried on at various times.

Yours truly,

Asst. Supt. Tie Treating Plants.

Saint Paul, December 24th, 1920.

Mr. P. E. Thian,
Valuation Engineer, N.P.Ry.Co.,
709 Wells Fargo Building,
San Francisco, Calif.

Referring to Mr. Crockett's inquiry as to average weight of green, seasoned and treated ties.

In the operation of our tie treating plants we have from time to time obtained test weights for the purpose of determining information of this character, and from the results of these tests, the following average weights have been obtained:

		#1	#2
1.	Average weight of green tie before seasoning when loaded on cars at origin	180#	148#
2.	Average weight of tie after seasoning ready for retort	158#	130#
3.	Average seasoning length of time before treatment	1 Yr.	1 Yr.
4.	Average volume of tie	3.5	3.75
5.	Length of time drying out after treatment and before putting in track	3 Mos.	3 Mos.
6.	Weight after treatment at end of drying out period	189#	155#

Chief Engineer.

HES-ar

3659

Brainerd, Minn., April 25, 1919.

Mr. H. E. Stevens,
Chief Engineer,
St. Paul, Minn.

original in file 1736

Dear Sir:-

You mentioned a few days ago that the Government maintained that cross ties only weighed on an average of about 110# each. For your information I am enclosing in duplicate weights obtained at the Brainerd Tie Plant on various grades and species of timber during the last week. There are ties that will probably only weigh 105# or 110#, but we have not seen any of them. They would be considered fence posts along side of what we get at the Brainerd Tie Treating Plant. The weight of those ties also explains the difficulty there is in obtaining men with sufficient strength and ambition to handle the heavy ties that we are receiving. I may here state that we have thousands of green Birch and Maple ties unpeeled in the Brainerd Yard that will weigh 350# and over.

I am sending copy of these sheets to Mr. Thian as he mentioned something about tie weights a short time ago and this may be of some interest and use to him; also sending copy to Mr. Weisenburger for his information.

Yours truly,

(signed) Andrew Gibson.

Supt. T.P.& T.T. Plants.

AG

Cy Mr. P. E. Thian.
Mr. F. V. Weisenburger.

C O P Y

Brainerd, Minn., April 25, 1919.

Mr. H. E. Stevens,
Chief Engineer,
St. Paul, Minn.

Dear Sir:-

You mentioned a few days ago that the Government maintained that cross ties only weighed on an average of about 110# each. For your information I am enclosing in duplicate weights obtained at the Brainerd Tie Plant on various grades and species of timber during the last week. There are ties that will probably only weigh 105# or 110#, but we have not seen any of them. They would be considered fence posts along side of what we get at the Brainerd Tie Treating Plant. The weight of those ties also explains the difficulty there is in obtaining men with sufficient strength and ambition to handle the heavy ties that we are receiving. I may here state that we have thousands of green Birch and Maple ties unpeeled in the Brainerd Yard that will weigh 350# and over.

I am sending copy of these sheets to Mr. Thian as he mentioned something about tie weights a short time ago and this may be of some interest and use to him; also sending copy to Mr. Weisenburger for his information.

Yours truly,

(signed) Andrew Gibson.

Supt. T.P.& T.T. Plants.

AG

Cy Mr. P. E. Thian.
Mr. F. V. Weisenburger.

C O P Y

WEIGHTS OF TIES.

1736

GREEN BIRCH - GRADE #3.

SAWED - 24 Ties Weighed - Weight per Tie - 190#, 183#, 189#, 193#, 165#, 206#, 179#, 183#, 188#, 183#, 189#, 179#, 188#, 175#, 180#, 188#, 185#, 209#, 181#, 205#, 202#, 185#, 177#, 185#.
Average Weight per Tie - 187#.

HEWED - peeled - 24 Ties weighed - Weight per Tie - 164#, 163#, 176#, 176#, 177#, 196#, 158#, 158#, 151#, 175#, 174#, 180#, 217#, 221#, 214#, 205#, 214#, 214#, 220#, 205#, 203#, 204#, 205#, 213#,
Average Weight per Tie - 191#.

HEWED - unpeeled - 6 Ties Weighed - Weight per Tie - 158#, 159#, 194#, 152#, 144#, 198#.
Average Weight per Tie - 168#.

GREEN MAPLE - Grade #3.

SAWED - 24 Ties weighed - Weight per Tie - 165#, 160#, 183#, 173#, 150#, 176#, 193#, 185#, 177#, 189#, 160#, 187#, 184#, 180#, 175#, 183#, 172#, 173#, 199#, 190#, 174#, 185#, 176#, 177#.
Average Weight per Tie - 178#.

HEWED - peeled - 24 Ties weighed - Weight per Tie - 200#, 210#, 216#, 196#, 204#, 216#, 191#, 217#, 195#, 205#, 188#, 206#, 208#, 217#, 234#, 235#, 203#, 206#, 200#, 219#, 202#, 203#, 200#, 200#.
Average Weight per Tie - 206#.

TAMARACK - Dry - Peeled - GRADE #3.

HEWED - 6 Ties Weighed - Weight per Tie - 138#, 134#, 143#, 154#, 147#, 148#.
Average Weight per Tie - 144#.

TAMARACK - Green - Peeled - GRADE #3.

HEWED - 24 Ties weighed - Weight per Tie - 181#, 170#, 145#, 164#, 165#, 183#, 153#, 164#, 134#, 153#, 163#, 148#, 153#, 189#, 157#, 155#, 150#, 148#, 175#, 181#, 200#, 147#, 154#, 166#.
Average Weight per Tie - 160#.

SPRUCE - Green - Peeled - GRADE #3.

HEWED - 12 Ties Weighed - Weight per Tie - 127#, 118#, 137#, 131#, 128#, 130#, 114#, 124#, 118#, 157#, 140#, 134#.
Average Weight per Tie - 127#.

Brainerd, Minn.,
Weights obtained
April 23nd, 1919.

WEIGHTS OF TIES.

GREEN BIRCH - GRADE #3.

Kind of Ties	Total Number of Ties on Car	Net Weight Car Load	Average Weight per Tie
Green Birch, Hewed, Peeled,	354	66,500#	363#
	365	69,400#	362#
Green Birch, Sawed,	300	71,100#	237#
	335	55,300#	246#

Four(4) Green Birch, Grade #3, Unpeeled, Weight per Tie - 332#, 384#, 264#, 335# -
Average Weight per Tie - 301#.

GREEN TAMARACK - GRADE #3.

Green Tamarack, Hewed, Unpeeled,	280	75,800#	271#

GREEN PINE - GRADE #3.

Green Pine, Hewed, Unpeeled,	357	51,900#	203#
	280	56,300#	201#
	383	54,700#	194#
	262	51,380#	196#

Total Number Pine Ties Weighed - - 1,081
Average Weight per Tie - 198#.

Brainerd, Minn.,
Weights obtained
April 24th, 1919.

WEIGHTS OF TIES.

GREEN BIRCH - GRADE #2.

SAWED - 24 Ties Weighed - Weight per Tie - 190#, 183#, 189#, 193#, 165#, 206#, 179#, 183#, 188#, 183#, 189#, 179#, 188#, 175#, 180#, 188#, 185#, 209#, 181#, 205#, 203#, 185#, 177#, 185#.
Average Weight per Tie - 187#.

HEWED - peeled - 24 Ties weighed - Weight per Tie - 164#, 163#, 176#, 176#, 177#, 196#, 158#, 158#, 151#, 175#, 174#, 180#, 217#, 231#, 214#, 205#, 214#, 214#, 220#, 205#, 203#, 204#, 205#, 213#,
Average Weight per Tie - 191#.

HEWED - unpeeled - 6 Ties Weighed - Weight per Tie - 158#, 159#, 194#, 152#, 144#, 198#.
Average Weight per Tie - 168#.

GREEN MAPLE - Grade #3.

SAWED - 24 Ties weighed - Weight per Tie - 165#, 160#, 183#, 173#, 150#, 176#, 193#, 185#, 177#, 189#, 160#, 167#, 164#, 180#, 175#, 183#, 173#, 173#, 199#, 190#, 174#, 185#, 176#, 177#.
Average Weight per Tie - 176#.

HEWED - peeled - 24 Ties weighed - Weight per Tie - 200#, 210#, 216#, 198#, 204#, 216#, 191#, 217#, 195#, 205#, 168#, 206#, 208#, 217#, 234#, 235#, 203#, 206#, 200#, 219#, 202#, 202#, 200#, 200#.
Average Weight per Tie - 206#.

TAMARACK - Dry - Peeled - GRADE #3.

HEWED - 6 Ties Weighed - Weight per Tie - 138#, 134#, 143#, 154#, 147#, 148#.
Average Weight per Tie - 144#.

TAMARACK - Green - Peeled - GRADE #3.

HEWED - 24 Ties weighed - Weight per Tie - 161#, 170#, 145#, 164#, 165#, 183#, 152#, 164#, 134#, 152#, 163#, 148#, 152#, 169#, 157#, 155#, 150#, 148#, 175#, 191#, 200#, 147#, 154#, 166#.
Average Weight per Tie - 160#.

SPRUCE - Green - Peeled - GRADE #2.

HEWED - 12 Ties weighed - Weight per Tie - 127#, 118#, 127#, 131#, 128#, 120#, 114#, 124#, 118#, 157#, 140#, 134#.
Average Weight per Tie - 127#.

Brainerd, Minn.,
Weights obtained
April 23nd, 1919.

WEIGHTS OF TIES.

GREEN BIRCH - GRADE #3.

Kind of Ties	Total Number of Ties on Car	Net Weight Car Load	Average Weight per Tie
Green Birch, Hewed, Peeled,	354	66,500#	363#
	365	69,400#	362#
Green Birch, Sawed,	300	71,100#	337#
	335	55,300#	246#

Four(4) Green Birch, Grade #3, Unpeeled, Weight per Tie - 332#, 384#, 364#, 335# -
Average Weight per Tie - 301#.

GREEN TAMARACK - GRADE #3.

Green Tamarack, Hewed, Unpeeled,	280	75,800#	271#

GREEN PINE - GRADE #3.

Green Pine, Hewed, Unpeeled,	357	51,900#	202#
	280	56,200#	301#
	282	54,700#	194#
	262	51,380#	196#

Total Number Pine Ties Weighed - - 1,081
Average Weight per Tie - 198#.

Brainerd, Minn.,
Weights obtained
April 24th, 1919.

San Francisco, California,
December 11th, 1920.

Mr. P. E. Thian,
Valuation Engineer,
Northern Pacific Railway,
Saint Paul, Minnesota.

Dear Sir:-

Referring to Mr. Bryan's letter to you of December 7th, 1920, in regard to information furnished on ties before and after treatment at the Brainerd and Paradise plants:-

I wish to state that we would like to have a letter that we could present to Mr. Crockett with no superfluous information, and answering Mr. Crockett's questions.

In Mr. Bryan's letter, he states average weight of tie is so much - I do not know what he means by this, whether green ties or ties after seasoning.

He also states that the weight after seasoning, before treatment is 187 and 157#; think he meant to say after treatment, instead of before treatment.

Below find statement of information Mr. Crockett desires:

1. Average weight of ties before seasoning when loaded on cars at origin.

2. Average weight of ties after seasoning just before going in retort.

3. Average seasoning length of time before treatment.

4. Average volume of tie treated

5. Length of time drying out after treatment and before put in track.

6. Weight after treatment at the end of drying out period.

I think it would be well to have Mr. Lowry Smith sign these letters, based on what data and experioence he had, to the best of his ability, as the I.C.C. are aware of the varying weights of ties and do not expect an exact answer.

From the data submitted with this letter, I cannot arrive at any of the figures stated.

Yours truly,

A. C. TERRELL

DIVISION ENGINEER.

ACT/c

H.B. - Rush Answer. P.E.Thian, 12-11-20.
Plain simple letter. State conclusions concisely. Leave out all references, Give results only. Can have detail letter as supporting data, but we do not want to finish same now.

C O P Y

Saint Paul, Minn., December 23, 1920.

Mr. H. E. Stevens:-

Following are the averaged results of weighings at Brainerd and Paradise as given on attached blue print:

B R A I N E R D

	Green	Seasoned	Treated
All woods	163.7#	133.8#	154.9#
Percent of green weight, loss or gain		- 18.3%	+ 12.9%
Net loss of weight			- 5.4%

P A R A D I S E

	Green	Seasoned	Treated
All woods	144.3#	126.8#	144.3#
Percent of green weight, loss or gain		- 12.5%	+ 13.5%

No net loss or gain.

As you will note, these results do not agree with the recent statement summarized, as they showed a net gain of weight in every case except one.

I cannot understand how the meager weight data tabulated on the attached blue prints was deduced from the actual weighing of 1300 car loads of ties.

We have here twelve instances of ties of various average weights each from Brainerd and Paradise. It is desirable to know how these several averages were derived from the 1300 car loads weighed.

It is difficult to reconcile the exact similarity of weights of green ties and treated ties - all classes and kinds, at Paradise.

For the purpose of Mr. Crockett's inquiry, the results, or percentages derived from the tabulation of actual tests covering 258 ties shown on blue print attached, should be used, and not the 1917 weights applied to the 1300 car load lots reported to Mr. E. O. Parks in Mr. Gibson's letter of December 18th, 1918.

In the actual tests summarized on blue print, we at least have something tangible and easily verified.

Yours truly,

J. E. Thiam

VALUATION ENGINEER.

HB:jl

NORTHERN PACIFIC RAILWAY COMPANY

VALUATION DEPARTMENT

ACCOUNT 8 - TIES----TIE WEIGHTS.

LOSS IN WEIGHT DUE TO SEASONING AND GAIN IN WEIGHT DUE TO CREOSOTE TREATMENT OF CROSS TIES.

Ties Seasoned At	Ties Treated At	Seasoning Period	Date Treated	No. of Ties	Kind of Ties	Weight Green	Weight After Seasoning Before Treating	Weight After Treating Ready For Track	Loss in Weight in Seasoning	Gain in Weight in Treating	Percent of Green Weight: Loss in Seasoning	Gain in Treating	Net Gain
						Pounds	Pounds	Pounds	Pounds	Pounds	%	%	%
Auburn	Paradise	26 Months	Dec.1919	50	7"x8"x8" sawed red fir	114.69	95.12	119.38	19.57	24.26	17.1	21.1	4.0
Tacoma	Paradise	"	"	49	" " " "	114.60	95.69	120.73	18.91	25.04	16.5	21.8	5.3
South Tacoma	"	"	"	50	" " " "	113.70	94.66	119.46	19.04	24.80	16.7	21.8	5.1
Lakeview	"	"	"	49	" " " "	112.66	95.14	119.59	17.52	24.45	15.6	21.7	6.1
Average (Weighted) of Ties seasoned on Puget Sound -				198	7"x8"x8 sawed red fir	113.92	95.15	119.79	18.77	24.64	16.48	21.63	5.15
Paradise	Paradise	13 Months	June 1920	12	Pine	126.96	101.86	122.60	25.10	20.74	19.8	16.4	*3.4
"	"	"	"	12	Fir	119.88	104.58	130.91	15.29	26.33	12.8	22.0	9.2
"	"	"	"	12	Hemlock	100.88	90.75	117.17	10.13	26.42	10.1	26.2	16.1
"	"	"	"	12	Tamarack	115.50	106.92	121.75	8.58	14.83	7.4	12.8	5.4
"	"	"	"	12	Douglas Fir	103.04	97.92	118.00	5.12	20.08	5.0	19.5	14.5
Average of Ties seasoned at Paradise				60		113.25	100.39	122.09	12.84	21.70	11.34	19.16	7.82
Weighted Averages of all the above				258		113.76	96.36	120.32	17.40	23.96	15.30	21.06	5.76
Average of the above, giving equal weight to each of the 6 groups						113.36	99.52	121.70	13.84	22.18	12.21	19.57	7.36

The above ties were treated without any previous perforating or other mechanical treatment to increase the penetration of creosote.

* Loss.

Office of Valuation Engineer,
Dec. 20, 1920.
HB

Saint Paul, December 18th, 1920.

Mr. H. E. Stevens,
Chief Engineer.

Dear Sir:-

Following is a statement regarding information desired by Mr. Crockett of the Bureau of Valuation, San Francisco:

	No. 1	No. 2
1. Average weight of green tie before seasoning when loaded on cars at origin	180#	148#
2. Average weight of tie after seasoning ready for retort	158#	130#
3. Average seasoning length of time before treatment	1 yr.	1 yr.
4. Average volume of tie	3.5	3.75
5. Length of time drying out after treatment and before putting in track	3 mos.	3 mos.
6. Weight after treatment at end of drying out period	189#	155#

In working up the four test sheets of ties seasoned at coast points and the series of recent tests made at Paradise, I find an average loss in seasoning of 12.31%, gain in treatment 19.57%, or a net gain of 7.36%. I have applied these percentages to a basic green tie, average weight of 180# for No. 1 and for the No. 2 148#.

The weight we have adopted for a No. 1 tie is that agreed to by the Great Northern and the Bureau of Valuation, which includes a tie 7" or over by 7" by 8' long, and the weight for a No. 2 tie is the average of our own compilation, supported by statements of other carriers.

Our weight for No. 2 as set out here is 13# greater than that allowed the G. N. by the Bureau of Valuation. These weights include all classes of ties other than oak and cedar.

I consider the weight as basically applied very fair, especially when one considers the light weight sawed timber west of the Cascade.

Yours truly,

P. E. Thian

VALUATION ENGINEER.

CC - P. E. Thian.

Brainerd, Minn., Dec. 18th, 1920.

Mr. H. E. Stevens,
Chief Engineer,
St.Paul, Minn.

Dear Sir:

I herewith beg to enclose two blue prints showing average weights of cross ties received at Brainerd and Paradise Treating Plants, before and after treatment.

These ties were received at Brainerd and Paradise during the year 1917 and we had a man at each plant who accompanied the switchmen when the ties came in green to the scales. They were weighed in carload lots as received from the woods. They were all stacked in the yards at both plants for seasoning and in the Fall of 1917 and the early Spring of 1918 they were loaded on flat cars for transfer to the boring machine, and before transferring were weighed on the scales at Brainerd and Paradise. After treatment they were again weighed on the scales at Brainerd and Paradise before shipping out, so that the weights are the averages of very nearly 1300 carloads, between both plants - about an equal number weighed at each place.

This statement was made up at the request of the Auditing Dept. and copies were sent to the Auditing Dept. at that time and also copies to your office. These ties, of course, as you will see by the statement, were what we used to call No.1 and No.2 ties. This was before the Government specifications were made up and there was no No.3 or 4 figures used. No.3 and 4 would be the No.1 and No.1 and 2 would be equal to the No.2's on this list.

As I stated to Mr. Parks in my letter of July 15th, while this statement represents an average of the ties received during the year 1917 and treated in the Fall of that year and the Spring of 1918, I do not believe it would be fair to use these figures in shipping out ties and taking the average weight for this reason, that last year we received the heaviest ties at the tie plant we ever received at Brainerd. Paradise, I might say, rarely varies in weight and the average weights for Paradise ties would be all right for this years shipment; but Brainerd varies so much that the only way to get accurate weights is by actual weighing in and out. It took a great deal of switch engine time and also considerable time of our men to get these weights, but it occurred to me at the time while we were doing the job we might as well do the thing right. Hence, the reason for weighing so many carloads.

If there were any other weights taken of ties at Brainerd and Paradise, we have no record of them here as the records prior to February 1917 were all burned up in the depot fire at Brainerd.

Yours truly,

Supt. T. P. & T. T. Plants.

enc

Average Weights of Cross Ties received at Brainerd and Paradise Treating Plants before and after treatment.

BRAINERD PLANT

Kind	WEIGHT		
	Green	Seasoned	Treated
#1 Hewed Tamarack,	189#	170#	191#
#1 Hewed Birch,	247#	200#	221#
#1 Sawed Birch,	177#	128#	159#
#1 Hewed Hemlock,	198#	147#	168#
#1 Sawed Hemlock,	147#	96#	116#
#1 Hewed Red Oak,	164#	149#	167#
#1 Jack Pine,	111#	102#	124#
#2 Hewed Tamarack,	153#	124#	145#
#2 Sawed Tamarack,	109#	90#	108#
#2 Hewed Birch,	163#	143#	163#
#2 Sawed Birch,	139#	109#	130#
#2 Hewed Hemlock,	167#	147#	167#

PARADISE PLANT

#1 Hewed Douglas Fir,	155#	135#	155#
#1 Sawed Douglas Fir,	135#	121#	135#
#1 Hewed Western Tamarack,	155#	135#	155#
#1 Sawed Western Tamarack,	135#	121#	135#
#1 Hewed Lodgepole-Yellow Pine,	177#	157#	177#
#1 Sawed Lodgepole-Yellow Pine,	157#	143#	157#
#2 Hewed Douglas Fir,	140#	120#	140#
#2 Sawed Douglas Fir,	128#	110#	128#
#2 Hewed Western Tamarack,	140#	120#	140#
#2 Sawed Western Tamarack,	128#	110#	128#
#2 Hewed Lodgepole-Yellow Pine,	152#	132#	152#
#2 Sawed Lodgepole-Yellow Pine,	130#	110#	130#

Brainerd, Minn.,
March 13th, 1918.

TEST SHOWING SEASONING AND TREATMENT OF PERFORATED TIES WITH VARIOUS STYLES OF PERFORATION AND SPECIES OF TIMBER

Tie No.	Style of Perforation	Weight 5-18-19	Weight 1-30-20	Weight 6-1-20	Weight After Treatment	Loss Account Seasoning	Gain Account Treatment
P I N E:							
7	#1,1/4 x 5	136.5	114	113	140	13.5	27.0
8	"	135.0	104	104	139	31.0	35.0
9	"	138.0	92	90	118	48.0	28.0
	Average	133.17	103.33	102.33	129.0	30.83	26.67
10	#2,1/4 x 7	97.5	90.0	87.0	108.0	10.5	21.0
11	"	118.0	86.0	86.0	116.0	32.0	30.0
12	"	119.0	93.0	92.0	113.0	27.0	21.0
	Average	111.50	89.67	88.33	112.33	23.17	24.00
1	#3,1/4 x 4	104.5	91.0	91.0	110.0	13.5	19.0
2	"	96.5	84.0	83.0	109.0	13.5	26.0
3	"	93.5	85.0	83.0	109.0	10.5	26.0
	Average	98.17	86.67	85.67	109.33	12.50	23.67
4	#4,3/4 x 3	130.0	107.0	106.0	130.0	14.0	24.0
5	"	119.0	111.0	109.0	141.0	10.0	32.0
6	"	106.0	91.0	91.0	115.0	15.0	24.0
	Average	115.00	103.00	102.00	128.67	13.00	26.67
AVERAGE - 12 PINE		114.46	95.67	94.58	119.83	19.88	25.25
F I R:							
25	#1,1/4 x 5	138.5	124.0	124.0	161.0	14.5	37.0
26	"	126.5	115.0	115.0	137.0	11.5	22.0
27	"	111.0	102.0	100.0	133.0	11.0	33.0
	Average	125.33	113.67	113.00	143.67	12.33	30.67
28	#2,1/4 x 7	130.0	117.0	115.0	151.0	15.0	36.0
29	"	131.5	120.0	119.0	159.0	12.5	40.0
30	"	121.5	108.0	103.0	142.0	18.5	39.0
	Average	127.67	115.00	112.33	150.67	15.33	38.33
31	#3,1/4 x 4	122.0	106.0	106.0	145.0	16.0	39.0
32	"	112.5	100.0	103.0	131.0	9.5	28.0
33	"	115.0	102.0	103.0	145.0	12.0	42.0
	Average	116.50	102.67	104.00	140.33	12.50	36.33
34	#4,3/4 x 3	133.0	115.0	114.0	145.0	19.0	31.0
35	"	132.5	120.0	121.0	146.0	11.5	25.0
36	"	113.0	101.0	101.0	145.0	13.0	44.0
	Average	126.17	112.00	112.00	145.33	14.17	33.33
AVERAGE - 12 FIR		123.92	110.83	110.33	145.00	13.58	34.66

Tie No.	Style of Perforation	Weight 5-9-19	Weight 1-20-20	Weight 6-1-20	Weight After Treatment	Loss Account Seasoning	Gain Account Treatment
HEMLOCK:							
49	#1,1/4 x 5	136.5	106.0	105.0	132.0	31.5	27.0
50	"	97.0	88.0	87.0	110.0	10.0	23.0
51	"	101.0	93.0	91.0	113.0	10.0	22.0
	Average	111.50	95.67	94.33	118.33	17.17	24.00
52	#2,1/4 x 7	96.0	88.0	87.0	116.0	9.0	29.0
53	"	98.0	90.0	88.0	119.0	10.0	31.0
54	"	89.0	82.0	82.0	122.0	7.0	40.0
	Average	94.33	86.67	85.67	119.00	8.67	33.33
55	#3,1/2 x 4	103.0	93.0	92.0	115.0	11.0	23.0
56	"	120.5	114.0	108.0	135.0	12.5	27.0
57	"	101.5	92.0	91.0	110.0	10.5	19.0
	Average	108.33	99.67	97.00	120.00	11.33	23.00
58	#4,3/4 x 3	110.0	100.0	97.0	117.0	13.0	20.0
59	"	96.0	91.0	90.0	110.0	6.0	20.0
60	"	98.0	90.0	87.0	112.0	11.0	25.0
	Average	101.33	93.67	91.33	113.00	10.00	21.67
AVERAGE-13 HEMLOCK		103.87	93.92	92.08	117.58	11.79	25.50
COTTONWOOD:							
73	#1,1/4 x 5	170.0	95.0	108.0	149.0	62.0	41.0
74	"	171.0	90.0	96.0	134.0	75.0	38.0
75	"	137.0	82.0	96.0	140.0	41.0	44.0
	Average	159.33	89.00	100.00	141.00	59.33	41.00
76	#2,1/4 x 7	158.0	76.0	85.0	130.0	73.0	45.0
77	"	170.5	84.0	104.0	161.0	66.5	57.0
78	"	141.5	86.0	97.0	144.0	44.5	47.0
	Average	156.67	82.00	95.33	145.00	61.33	49.67
79	#3,1/2 x 4	132.5	83.0	87.0	118.0	45.5	31.0
80	"	146.0	89.0	93.0	138.0	53.0	45.0
81	"	154.5	89.0	96.0	146.0	58.5	50.0
	Average	144.33	87.00	92.00	134.00	52.33	42.00
82	#4,3/4 x 3	150.5	91.0	110.0	154.0	40.5	44.0
83	"	149.0	91.0	96.0	147.0	53.0	51.0
84	"	131.5	85.0	92.0	138.0	39.5	46.0
	Average	143.67	89.00	99.33	146.33	44.33	47.00
AVERAGE - 13 COTTONWOOD		151.00	86.75	96.67	141.58	54.33	44.92

Tie No.	Style of Perforation	Weight 5-14-19	Weight 1-20-20	Weight 6-1-20	Weight After Treatment	Loss Account Seasoning	Gain Account Treatment
TAMARACK:							
97	#1,1/4 x 5	101.0	91.0	91.0	118.0	10.0	27.0
98	"	111.0	105.0	105.0	132.0	6.0	27.0
99	"	117.0	104.0	98.0	139.0	19.0	31.0
	Average	109.67	100.00	98.00	126.33	11.67	28.33
100	#2,1/4 x 7	133.0	121.0	120.0	156.0	13.0	36.0
101	"	116.5	111.0	110.0	121.0	6.5	11.0
102	"	103.0	97.0	98.0	132.0	5.0	34.0
	Average	117.50	109.67	109.33	136.33	8.17	27.00
103	#3,1/2 x 4	126.00	114.0	113.0	131.0	13.0	18.0
104	"	105.0	101.0	101.0	117.0	4.0	16.0
105	"	98.0	96.0	95.0	105.0	3.0	10.0
	Average	109.67	103.67	103.00	117.67	6.67	14.67
106	#4,3/4 x 3	106.5	102.0	102.0	113.0	4.5	11.0
107	"	90.0	85.0	86.0	100.0	4.0	14.0
108	"	121.0	111.0	110.0	128.0	11.0	18.0
	Average	105.83	99.33	99.33	113.67	6.50	14.33
AVERAGE - 12 TAMARACK		110.67	103.17	102.42	123.50	8.25	21.8
DOUGLAS FIR:							
121	#1,1/4 x 5	110.5	105.0	104.0	119.0	6.5	15.0
122	"	111.5	105.0	105.0	123.0	6.5	17.0
123	"	94.0	90.0	95.0	116.0	1.0	21.0
	Average	105.33	100.0	101.33	119.00	4.00	17.67
124	#2,1/4 x 7	111.5	106.0	106.0	128.0	5.0	22.0
125	"	103.0	98.0	98.0	113.0	4.0	15.0
126	"	106.5	99.0	100.0	117.0	6.5	17.0
	Average	106.67	101.00	101.33	119.33	5.33	18.00
127	#3,1/2 x 4	94.5	90.0	91.0	112.0	3.5	21.0
128	"	117.5	111.0	110.0	128.0	7.5	18.0
129	"	90.0	86.0	85.0	97.0	5.0	12.0
	Average	100.67	95.67	95.33	112.33	5.33	17.00
130	#4,3/4 x 3	95.0	91.0	90.0	108.0	5.0	18.0
131	"	102.00	99.0	97.0	115.0	5.0	18.0
132	"	105.0	100.0	98.0	117.0	7.0	19.0
	Average	100.67	96.67	95.00	113.33	5.67	18.33
AVERAGE - 12 DOUGLAS FIR		103.33	98.33	98.25	116.00	5.08	17.75

TEST SHOWING SEASONING AND TREATMENT OF NON PERFORATED TIES WITH VARIOUS SPECIES OF TIMBER

Tie No.	Weight 5-8-19	Weight 1-20-20	Weight 6-1-20	Weight After Treatment	Loss Due To Seasoning	Gain Due To Treatment
PINE:						
13	114.0	98.0	97.0	114.0	17.0	17.0
14	160.0	87.0	85.0	121.0	75.0	36.0
15	105.5	98.0	95.0	122.0	10.5	27.0
16	145.0	100.0	98.0	115.0	47.0	17.0
17	145.0	134.0	132.0	146.0	13.0	14.0
18	112.0	103.0	101.0	115.0	11.0	14.0
19	107.0	97.0	96.0	116.0	11.0	20.0
20	135.0	102.0	102.0	125.0	33.0	23.0
21	123.0	95.0	94.0	110.0	29.0	16.0
22	132.5	104.0	104.0	132.0	28.5	28.0
23	127.0	117.0	117.0	131.0	10.0	14.0
24	117.5	103.0	101.0	134.0	16.5	33.0
Average	126.96	103.08	101.80	122.80	25.10	20.75
FIR:						
37	117.5	94.0	93.0	128.0	24.5	35.0
38	118.0	106.0	97.0	125.0	21.0	28.0
39	113.5	104.0	104.0	124.0	9.5	20.0
40	126.0	112.0	112.0	147.0	14.0	35.0
41	111.5	100.0	99.0	120.0	12.5	21.0
42	115.5	104.0	104.0	140.0	11.5	36.0
43	108.0	93.0	93.0	116.0	15.0	23.0
44	125.0	106.0	104.0	129.0	21.0	25.0
45	122.5	110.0	110.0	137.0	12.5	27.0
46	119.0	106.0	106.0	130.0	13.0	24.0
47	130.0	115.0	116.0	130.0	14.0	14.0
48	132.0	117.0	117.0	145.0	15.0	28.0
Average	119.88	105.58	104.58	130.91	15.29	26.33
HEMLOCK:						
61	103.0	93.0	95.0	117.0	8.0	22.0
62	91.0	85.0	83.0	118.0	8.0	35.0
63	95.0	81.0	84.0	135.0	11.0	51.0
64	98.0	93.0	90.0	113.0	8.0	23.0
65	112.5	101.0	99.0	115.0	13.5	16.0
66	101.0	90.0	92.0	130.0	9.0	38.0
67	113.0	94.0	97.0	112.0	16.0	15.0
68	89.0	83.0	81.0	100.0	8.0	19.0
69	106.0	93.0	91.0	135.0	15.0	44.0
70	103.0	95.0	92.0	110.0	11.0	18.0
71	90.0	86.0	86.0	111.0	4.0	25.0
72	109.0	101.0	99.0	110.0	10.0	11.0
Average	100.88	91.25	90.75	117.17	10.13	26.42

NON-PERFORATED TIES

Tie No.	Weight 5-8-19	Weight 1-20-20	Weight 6-1-20	Weight After Treatment	Loss Due To Seasoning	Gain Due To Treatment
COTTONWOOD:						
85	156.0	91.0	90.0	135.0	66.0	45.0
86	150.5	90.0	86.0	131.0	64.5	45.0
87	180.5	103.0	98.0	145.0	82.5	47.0
88	170.5	98.0	93.0	142.0	77.5	49.0
89	151.0	93.0	90.0	130.0	61.0	40.0
90	182.0	106.0	95.0	143.0	87.0	48.0
91	157.0	93.0	87.0	110.0	70.0	23.0
92	137.0	86.0	82.0	129.0	55.0	47.0
93	141.5	88.0	83.0	116.0	58.0	33.0
94	159.0	88.0	84.0	131.0	75.0	47.0
95	146.0	91.0	91.0	141.0	55.0	50.0
96	146.5	84.0	78.0	131.0	68.5	53.0
Average	156.46	92.59	88.08	132.0	68.33	43.91
TAMARACK:						
109	103.5	98.0	98.0	120.0	5.5	22.0
110	113.5	103.0	103.0	120.0	10.5	17.0
111	106.0	101.0	101.0	114.0	5.0	13.0
112	125.5	113.0	113.0	130.0	12.5	17.0
113	140.0	131.0	130.0	150.0	10.0	20.0
114	109.0	104.0	104.0	116.0	5.0	12.0
115	117.0	99.0	101.0	113.0	16.0	11.0
116	126.0	115.0	113.0	132.0	13.0	19.0
117	123.5	114.0	113.0	128.0	10.5	15.0
118	110.0	103.0	104.0	119.0	6.0	15.0
119.	96.0	91.0	91.0	99.0	5.0	8.0
120	116.0	111.0	112.0	121.0	4.0	9.0
Average	115.50	106.83	106.92	121.75	8.58	14.83
DOUGLAS FIR:						
133	104.5	100.0	99.0	117.0	5.5	18.0
134	105.0	100.0	100.0	120.0	5.0	20.0
135	103.0	100.0	97.0	137.0	6.0	40.0
136	109.0	103.0	103.0	133.0	6.0	29.0
137	98.0	93.0	94.0	108.0	4.0	14.0
138	95.0	91.0	92.0	106.0	3.5	14.0
139	107.0	103.0	101.0	116.0	6.0	15.0
140	98.0	93.0	92.0	113.0	6.0	21.0
141	107.0.	103.0	103.0	126.0	5.0	24.0
142	100.0	96.0	95.0	115.0	5.0	20.0
143	107.5	103.0	103.0	115.0	5.5	13.0
144	102.0	98.0	98.0	111.0	4.0	13.0
Average	103.04	98.33	97.92	118.00	5.12	20.08

RESULTS OF SEASONING AND TREATMENT TESTS ON PERFORATED AND NON-PERFORATED TIES.

The results are given in terms of the seasoned weight.

	PERFORATED TIES		NON-PERFORATED TIES	
Style of Perforation	Loss Due To Seasoning	Gain Due To Treatment	Loss Due To Seasoning	Gain Due To Treatment
PINE:				
#1, 1/4 x 5	32.2%	26.1%		
#2, 1/4 x 7	26.2%	27.2%		
#3, 1/2 x 4	14.6%	27.6%		
#4, 3/4 x 3	12.7%	28.2%		
Average	21.0%	26.7%	24.7%	20.2%
FIR:				
#1, 1/4 x 5	10.9%	27.1%		
#2, 1/4 x 7	13.6%	34.1%		
#3, 1/2 x 4	12.0%	34.9%		
#4, 3/4 x 3	12.6%	29.7%		
Average	12.3%	31.4%	14.6%	25.2%
HEMLOCK:				
#1, 1/4 x 5	18.2%	25.5%		
#2, 1/4 x 7	10.1%	38.9%		
#3, 1/2 x 4	11.7%	33.7%		
#4, 3/4 x 3	11.0%	33.8%		
Average	12.8%	27.7%	11.2%	29.2%
COTTONWOOD:				
#1, 1/4 x 5	59.3%	41.0%		
#2, 1/4 x 7	64.4%	52.2%		
#3, 1/2 x 4	56.8%	45.8%		
#4, 3/4 x 3	44.3%	47.3%		
Average	56.2%	46.5%	77.5%	49.9%
TAMARACK:				
#1, 1/4 x 5	11.9%	28.9%		
#2, 1/4 x 7	7.5%	24.8%		
#3, 1/2 x 4	6.5%	14.2%		
#4, 3/4 x 3	6.5%	14.5%		
Average	8.1%	20.5%	8.0%	13.9%
DOUGLAS FIR:				
#1, 1/4 x 5	3.95%	17.4%		
#2, 1/4 x 7	5.25%	17.7%		
#3, 1/2 x 4	5.60%	17.8%		
#4, 3/4 x 3	5.97%	19.3%		
Average	5.18%	18.2%	5.2%	20.4%

Brainerd, Minnesota,
November 1st, 1920.

Saint Paul, April 14th, 1920.

3659

Mr. P. E. Thian,

Valuation Engineer.

Herewith one copy of tabulated statement showing weight of test ties before and after treatment. These may be of interest to you in compilation of average weights of ties.

Chief Engineer.

HES-ar

Encl.

Re: Weights of ties in
seasoning tests at Lakeview,
So. Tacoma, Tacoma and Auburn.

Tacoma, Washington
March 31st, 1920

Mr. A. Gibson
Supt. T. T. & T. Plant
Brainerd, Minn.

Dear Sir:

Referring to placing additional information on tables showing weight in pounds of cross ties used in seasoning tests at Lakeview, So. Tacoma, Tacoma, and Auburn.

Am forwarding to you under separate cover three copies of tables with the information added as requested.

Yours very truly,

District Engineer

AFS/K
(Enc.)

C.C. to H.E. Stevens : I am also forwarding you two copies of table.

Lakeview

NORTHERN PACIFIC RAILWAY

TABLE SHOWING WEIGHT IN POUNDS OF CROSS TIES USED IN SEASONING TESTS

Note:
"A" is weight just before treatment
"B" is loss of weight due to seasoning
"C" is weight after treatment
"D" is gain in weight due to treatment

Tacoma 10/1917 to 1/1920
Ties shipped from Walville 10/5/17
Ties are 7"x8"x8' Red Fir

LAKEVIEW

Date	10-25-17	11-22-17	1-4-18	2-5-18	3-5-18	4-5-18	5-6-18	6-5-18	7-5-18	8-5-18	9-5-18	10-7-18	12-13-19	1-2-20		
Weather	Cloudy	Thick Hy. Fog	Rain	Rain	Fair	Fair	Clear	Fair	Fair	Cloudy	Fair	Fair #				
Tie No.													A	C	B	D
151	111.5	111.0	114.0	111.5	109.0	106.5	104.0	102.0	99.5	99.0	98.0	99.5	95.0	122.0	16.5	27.0
152	129.0	125.0	127.0	126.0	121.0	118.5	112.5	109.0	105.0	104.0	102.0	103.5	108.0	123.0	21.0	15.0
153	107.5	107.5	113.0	113.0	111.0	109.0	104.5	101.5	98.0	97.0	95.5	97.5	100.0	138.0	7.5	38.0
154	117.5	115.5	119.0	115.5	112.0	110.5	107.5	105.5	103.0	102.0	101.0	102.0	97.0	132.0	20.5	35.0
155	118.5	117.5	121.0	119.0	116.0	114.5	111.5	109.0	107.0	106.5	105.5	107.0	103.0	130.0	15.5	27.0
156	117.0	111.0	113.5	110.5	106.0	102.5	98.5	95.5	93.0	91.5	90.5	92.0	90.0	110.0	27.0	20.0
157	115.0	114.0	117.0	115.0	112.0	110.0	106.5	105.0	102.5	102.0	100.5	102.5	97.0	120.0	13.0	23.0
158	118.5	118.0	119.0	117.5	115.0	113.0	110.0	108.0	106.0	105.5	104.0	105.5	101.0	130.0	17.5	29.0
159	103.5	103.5	107.0	105.5	103.0	100.0	97.5	95.5	93.0	93.0	91.0	93.0	91.0	109.0	12.5	18.0
160	118.0	117.5	120.5	119.5	116.0	114.5	111.5	109.5	107.5	107.0	106.0	107.5	102.0	130.0	16.0	28.0
161	111.5	111.5	115.0	113.5	110.5	108.5	106.0	103.5	100.5	100.0	99.0	100.5	103.0	122.0	8.5	19.0
162	137.0	132.0	132.5	131.5	128.0	123.0	116.5	110.5	103.5	100.0	96.5	98.0	96.0	127.0	41.0	31.0
163	104.0	105.0	108.5	107.5	104.0	101.0	96.5	94.0	90.5	90.0	89.0	92.0	89.0	109.0	15.0	20.0
164	102.0	100.0	103.5	100.5	97.0	94.5	91.5	89.0	87.0	86.5	85.5	87.0	84.0	109.0	18.0	25.0
165	102.5	100.5	105.0	102.0	98.5	96.0	93.5	90.5	88.5	87.5	86.5	88.0	86.0	107.0	16.5	21.0
166	101.0	100.5	104.5	104.0	101.0	98.0	95.0	92.5	89.5	89.5	88.0	91.0	90.0	126.0	11.0	36.0
167	130.5	129.0	132.0	131.0	127.5	125.0	121.5	119.5	117.0	116.0	114.5	116.5	113.0	129.0	17.5	16.0
168	105.5	103.5	106.5	104.5	101.5	99.5	97.0	95.0	93.0	92.5	91.5	93.0	90.0	120.0	15.5	30.0
169	118.0	118.0	121.0	120.0	117.0	115.0	112.5	110.0	107.5	106.5	106.0	107.5	102.0	128.0	16.0	26.0
170	111.5	111.0	116.0	115.0	110.5	107.5	103.5	101.0	98.0	97.0	96.0	98.0	93.0	125.0	18.5	32.0
171	117.0	116.0	119.0	116.5	113.5	111.0	108.0	106.0	104.0	103.0	101.5	103.0	98.0	120.0	19.0	22.0
172	109.0	109.0	115.0	112.0	108.5	106.0	103.0	101.0	98.5	98.0	96.5	98.0	94.0	128.0	15.0	34.0
173	121.5	117.5	124.5	120.0	115.0	112.0	107.5	105.0	102.0	101.0	99.5	100.0	91.0	124.0	30.5	33.0
174	148.0	143.5	144.5	142.5	137.5	132.0	125.0	119.0	113.5	109.0	106.0	106.0	95.0	114.0	33.0	19.0
175	108.0	107.5	111.0	108.0	105.5	103.5	101.5	100.0	97.5	97.0	96.0	97.5	92.0	115.0	16.0	23.0
176	107.0	105.5	115.5	112.0	108.0	105.0	101.0	98.0	96.0	94.5	93.0	94.0	90.0	128.0	17.0	38.0
177	105.0	104.5	109.5	106.5	103.0	101.0	98.0	96.0	94.0	93.5	92.5	93.0	90.0	114.0	15.0	24.0
178	127.5	123.5	128.0	123.5	119.0	116.0	112.5	109.5	106.5	105.5	104.0	105.0	100.0	129.0	27.5	29.0
179	119.0	113.5	116.0	114.0	110.0	106.5	103.0	100.0	97.5	96.5	95.0	96.5	92.0	112.0	27.0	20.0
180	111.5	108.5	113.0	111.0	107.0	104.0	101.0	99.0	96.5	95.5	94.5	96.5	94.0	116.0	17.5	22.0
181	106.0	104;5	109.0	106.0	102.5	100.5	98.0	96.0	94.0	93.0	92.0	93.5	90.0	114.0	16.0	24.0
182	119.0	116.5	121.0	118.5	115.0	113.0	110.0	109.0	105.0	104.5	102.0	104.0	113.0	126.0	6.0	13.0
183	117.0	115.5	119.5	118.0	114.0	111.5	109.0	107.0	104.5	103.5	103.0	103.0	99.0	117.0	18.0	18.0
184	100.0	98.0	102.0	101.5	97.5	96.5	93.5	91.5	89.0	88.0	87.5	88.5	85.0	110.0	15.0	25.0
185	95.5	93.5	97.0	94.5	91.0	89.0	87.0	85.5	83.5	83.0	82.5	84.0	80.0	98.0	15.5	18.0
186	117.0	116.5	120.0	117.0	114.0	112.0	109.5	108.0	105.0	104.5	103.5	104.5	101.0	126.0	16.0	25.0
187	105.5	104.5	108.0	105.5	102.5	100.5	98.5	96.5	95.5	95.0	94.0	95.0	91.0	121.0	14.5	30.0
188	98.0	96.5	102.0	96.5	94.0	92.0	89.5	88.0	85.5	85.0	84.0	85.0	82.0	124.0	16.0	42.0
189	107.5	108.5	110.0	110.0	107.5	105.0	102.5	100.5	97.5	97.0	96.0	98.0	96.0	112.0	11.5	16.0
190	112.0	113.0	114.0	113.5	110.5	108.0	105.0	102.5	99.5	99.0	98.0	101.0	97.0	117.0	15.0	20.0
191	109.0	108.0	112.0	111.0	108.5	105.0	102.5	101.0	98.5	98.0	96.5	98.0	98.0	113.0	11.0	15.0
192	116.0	114.0	118.0	115.5	112.0	109.5	107.0	105.0	102.5	102.0	101.0	102.0	98.0	115.0	18.0	17.0
193	109.0	107.0	111.5	108.0	104.5	102.5	100.0	98.5	96.5	96.0	95.0	96.0	92.0	111.0	17.0	19.0
194	111.5	108.0	113.0	109.5	105.0	103.0	99.5	97.5	95.0	94.0	93.0	93.5	90.0	113.0	21.5	23.0
195	97.0	95.0	99.0	97.0	93.0	90.5	87.5	85.5	83.0	83.0	82.0	83.5	81.0	103.0	16.0	22.0
196	114.0	114.0	115.0	115.0	112.5	110.5	108.0	105.5	102.5	102.0	100.5	103.0	108.0	132.0	6.0	24.0
197	108.0	106.5	110.0	108.0	104.5	102.5	100.0	98.0	95.5	95.0	94.0	96.0	91.0	113.0	17.0	22.0
198	113.0	113.0	114.0	113.5	111.5	108.5	106.5	104.0	101.5	101.0	100.0	101.5	107.0	132.0	6.0	25.0
199	112.5	112.0	114.5	112.5	109.0	107.5	104.5	103.0	101.0	100.5	99.5	101.0	97.0	117.0	15.5	20.0
Average	112.66	111.12	114.72	112.64	109.23	106.77	103.59	101.27	98.56	97.77	96.51	98.00	95.14	119.59	17.52	24.45
Test Weight	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5	132.5				

Scales used were #444328 (Lakeview Station Scales)

(#) Fair on day ties were weighed but it had been raining hard for several days previous,
Columns A, B, C, and D, the following records in connection with the treatment of ties furnished by Supt. T.P.&T.T.Plants:
These ties were treated at Paradise Treating Plant on December 17 and 18, 1919. Retort No. 1, Charge No. 214.
Treating Record:--Cil dropped on ties at a temperature of 190° F. at 2:30 P.M., 17th, held at that temperature until 7:30 A.M., 18th, when pressure of 100 pounds applied and held for three hours and thirty minutes. Vacuum of 18 inches drawn from 9:45 A.M. until 11:30 A.M., when ties removed from retort and stacked up along railway track for placing in track.

Office of District Engineer
Tacoma, Washington
March 29th, 1920

Analysis of Creosote Used

Gravity at 38° C.	1.105
Water	None
210	2.2
235	0.9
270	19.2
315	18.4
355	19.9
Residue Soft Pitch	38.8
Tar Acids	0.6

Tacoma

NORTHERN PACIFIC RAILWAY

TABLE SHOWING WEIGHT IN POUNDS OF CROSS TIES USED IN SEASONING TESTS

Note:
"A" is weight just before treatment
"B" is loss of weight due to seasoning
"C" is weight after treatment
"D" is gain in weight due to treatment

Tacoma 10/1917 to 1/1920
Ties shipped from Walville 10/5/17
Ties are 7"x8"x8' Red Fir

TACOMA

Date	10-15-17	11-21-17	1-5-18	2-6-18	3-6-18	4-8-18	5-6-18	6-5-18	7-8-18	8-6-18	9-5-18	10-7-18	12-13-19	1-2-20		
Weather	Partly	Clear	Misty	Rain	Fair	Fair °	Clear	Fair	Fair	Cloudy	Fair	Fair #				
Tie No.	Cloudy												A	B	C	D
51	104.0	99.5	102.5	101.0	96.5	95.5	93.0	91.5	89.5	88.0	87.75	89.0	85.0	19.0	130.0	45.0
52	123.5	119.0	123.0	120.0	116.5	114.5	111.0	110.0	108.0	106.5	106.50	107.75	104.0	19.5	125.0	21.0
53	98.0	95.0	99.0	96.5	92.0	91.5	88.5	88.0	86.5	85.0	84.75	86.50	83.0	15.0	102.0	19.0
54	102.5	97.5	100.5	98.0	94.0	92.0	91.0	89.5	87.5	86.0	85.50	86.75	84.0	18.5	142.0	58.0
55	109.0	107.0	112.0	108.0	105.0	103.5	101.0	100.5	98.0	97.5	96.50	97.50	95.0	14.0	119.0	24.0
56	106.0	100.0	103.0	99.5	96.5	94.5	92.5	91.0	89.5	88.0	87.75	89.00	86.0	20.0	129.0	43.0
57	108.5	105.0	108.5	106.5	102.0	100.0	97.5	97.0	94.5	93.0	93.00	94.25	91.0	17.5	125.0	34.0
58	103.5	101.0	105.0	102.5	99.0	98.0	95.0	92.0	91.5	90.5	89.50	91.00	88.0	15.5	113.0	25.0
59	102.0	99.0	99.0	101.0	96.5	96.0	93.0	91.0	90.0	88.0	88.00	89.75	86.0	16.0	125.0	39.0
60	112.0	109.0	113.0	110.0	106.0	104.0	102.5	100.5	99.0	98.5	97.50	99.25	95.0	17.0	125.0	30.0
61	107.0	104.5	107.5	106.5	102.0	100.0	99.0	97.0	95.5	95.0	93.75	95.50	92.0	15.0	118.0	26.0
62	118.0	114.0	118.0	115.5	111.0	108.0	105.5	104.0	102.0	101.0	100.50	102.50	97.0	21.0	121.0	24.0
63	123.5	117.5	121.5	118.0	113.0	110.0	108.5	106.5	104.5	103.5	102.75	104.75	100.0	23.5	123.0	23.0
64	106.5	103.5	109.0	105.5	101.0	100.0	97.5	96.0	93.5	92.5	92.00	93.50	90.0	16.5	113.0	23.0
65	104.0	103.0	105.5	103.5	100.5	100.0	97.5	95.5	93.0	92.0	91.00	93.25	90.0	14.0	108.0	18.0
66	96.0	92.5	97.5	95.0	90.5	89.5	87.5	86.5	84.0	83.5	82.75	84.00	80.0	16.0	104.0	24.0
67	123.5	117.5	120.0	117.5	113.0	110.0	107.0	105.5	103.0	102.5	102.25	103.75	99.0	24.5	117.0	18.0
68	129.0	124.5	127.0	123.0	120.0	117.0	114.0	112.0	110.0	109.0	109.00	111.00	106.0	23.0	126.0	20.0
69	119.0	113.0	117.0	114.0	109.0	107.0	104.0	102.0	100.0	100.0	98.75	100.75	96.0	23.0	138.0	42.0
70	113.0	109.0	112.5	110.5	107.0	105.0	103.0	101.0	100.0	100.0	99.25	100.75	96.0	17.0	118.0	22.0
71	110.0	107.0	111.5	109.5	105.0	104.0	102.0	100.0	97.5	96.5	96.50	98.00	95.0	15.0	112.0	17.0
72	110.5	107.0	112.5	108.0	104.0	101.5	100.0	99.5	97.0	97.0	95.50	97.00	94.0	16.5	119.0	25.0
73	111.0	107.5	111.5	109.0	104.5	103.5	101.0	100.5	97.5	96.0	95.75	97.00	93.0	18.0	111.0	18.0
74	140.0	133.5	137.0	133.0	128.0	125.0	121.0	120.0	114.5	113.5	113.75	114.25	107.0	33.0	130.0	23.0
75	128.0	125.5	127.0	125.0	121.5	119.0	118.0	115.0	112.5	112.5	112.00	113.25	109.0	19.0	127.0	18.0
76	113.0	109.0	112.0	111.0	106.5	105.0	103.0	100.5	99.5	99.5	97.50	98.75	94.0	19.0	117.0	23.0
77	107.00	104.5	107.5	106.5	101.5	100.0	97.5	96.5	94.5	93.0	93.00	95.00	90.0	17.0	108.0	18.0
78	151.5	146.0	150.0	149.0	144.5	141.5	137.0	135.0	132.0	131.0	129.75	131.50	123.0	28.5	149.0	26.0
79	101.5	97.5	101.0	99.5	94.5	93.0	90.0	90.0	87.5	87.0	85.75	88.25	83.0	18.5	107.0	24.0
80	117.0	114.5	117.0	116.0	112.5	110.5	108.0	107.5	105.0	105.0	104.50	106.25	103.0	14.0	125.0	20.0
81	116.0	113.5	117.0	116.0	111.0	109.0	107.0	106.0	104.0	104.0	103.25	105.00	100.0	16.0	122.0	22.0
82	112.0	109.0	111.5	108.0	105.0	103.0	101.0	100.0	98.0	98.0	96.50	98.25	94.0	18.0	112.0	18.0
83	112.0	110.0	111.5	111.5	107.5	105.5	103.0	102.5	100.0	100.0	99.25	100.75	97.0	15.0	121.0	24.0
84	102.5	100.0	103.0	102.5	97.0	96.0	91.0	90.0	88.5	88.0	87.25	89.50	85.0	17.5	112.0	27.0
85	113.0	109.5	111.5	111.0	106.0	105.5	102.0	100.0	99.0	99.0	97.25	99.75	95.0	18.0	117.0	22.0
86	101.0	98.5	98.5	102.0	97.0	96.0	92.5	90.0	88.0	88.0	86.50	89.00	84.0	17.0	119.0	35.0
87	141.5	138.0	140.0	138.5	133.5	131.0	127.0	125.0	122.5	122.0	121.00	123.00	116.0	25.5	137.0	21.0
88	111.0	109.5	112.0	110.0	106.0	105.0	101.0	100.5	99.0	98.5	97.75	99.50	95.0	16.0	115.0	20.0
89	138.0	134.0	138.5	136.5	132.0	130.0	126.5	125.5	120.5	120.5	120.00	122.00	116.0	22.0	142.0	26.0
90	127.0	121.0	124.0	122.0	116.5	114.5	110.5	109.0	105.5	105.0	104.50	106.00	101.0	26.0	125.0	24.0
91	112.5	109.5	111.0	109.5	105.5	104.0	101.5	100.5	98.5	98.5	97.00	98.75	95.0	17.5	117.0	22.0
92	117.0	115.0	118.5	118.5	114.5	112.5	109.0	107.0	104.5	104.0	103.50	105.50	101.0	16.0	120.0	19.0
93	103.0	99.5	99.5	102.0	97.0	96.5	92.5	89.5	88.0	87.0	86.25	88.00	85.0	18.0	109.0	24.0
94	140.5	135.5	137.5	137.5	133.0	131.0	127.5	124.0	122.5	120.0	119.75	121.00	115.0	25.5	135.0	20.0
95	102.5	100.0	103.0	102.5	98.0	98.0	93.5	90.5	90.5	89.0	88.00	90.00	87.0	15.5	117.0	30.0
96	132.5	127.5	128.0	128.0	123.5	120.0	115.5	114.0	110.5	110.0	109.00	110.75	106.0	26.5	128.0	22.0
97	119.5	118.0	120.0	120.0	115.0	115.0	111.0	108.5	105.0	103.5	103.50	106.25	101.0	18.5	120.0	19.0
98	~~107.5~~	~~103.5~~	~~106.5~~	~~105.5~~	~~101.0~~	~~100.0~~	~~95.5~~	~~93.0~~	Missing							
99	110.0	106.0	109.0	108.5	104.5	104.5	100.0	98.0	96.0	93.0	94.00	96.00	92.0	18.0	114.0	22.0
100	106.0	105.5	108.0	106.5	103.0	103.0	99.0	96.5	94.0	94.0	92.75	94.50	90.0	16.0	110.0	20.0
Average	~~114.46~~	~~110.92~~	~~113.93~~	~~112.30~~	~~108.00~~	~~106.38~~	~~103.45~~	~~101.83~~								
Not Incl																
#98-Avrg	114.60	111.07	114.08	112.44	108.14	106.51	103.61	102.01	99.82	99.04	98.34	100.06	95.69	18.91	120.73	25.04
Test	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00				
Weight	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.00	150.00	150.00	150.00	150.00				

Scales used were #716747 - Tacoma Division Carpenter Shop Scales (Head of Bay)
April 8, 1918, Scales #716747 having been shipped to Murray, used Scales belonging to J. E. Berkheimer.
Sept. 5, 1918 Berkheimer's Scales having been disposed of used Fairbanks Scales #19471 belonging to Bilroy Alloys Co., a much better scale than formerly used.

(°) Fair but had recently stopped raining.
(#) Fair on day ties were weighed but it had been raining hard for several days previous.

Columns A, B, C, and D, the following records in connection with the treatment of ties furnished by Supt. T.P.&T.T. Plants:
Theseties were treated at Paradise Treating Plant on December 17 and 18, 1919. Retort No. 1, Charge No. 214.
Treating Record:--Oil dropped on ties at a temperature of 190° F. at 2:30 P.M., 17th, held at that temperature until 7:30 A.M., 18th, when pressure of 100 pounds applied and held for three hours and thirty minutes. Vacuum of 18 inches drawn from 9:45 A.M. Office of District Engineer until 11:30 A.M., when ties removed from retort and stacked up along railway track for placing in track.

Tacoma, Washington
March 27th, 1920

Analysis of Creosote Used

Gravity at 38° C.	1.105	315	18.4
Water	None	355	19.9
210	2.2	Residue Soft Pitch	38.8
235	0.9	Tar Acids	0.6
270	19.2		

So. Tacoma

NORTHERN PACIFIC RAILWAY

TABLE SHOWING WEIGHT IN POUNDS OF CROSS TIES USED IN SEASONING TESTS

Note:
"A" is weight just before treatment
"B" is loss of weight due to seasoning
"C" is weight after treatment
"D" is gain in weight due to treatment

Tacoma 10/1917 to 1/1920
Ties shipped from Walville 10/5/17
Ties are 7"x8"x8' Red Fir

SO. TACOMA

Date	10-20-17	11-22-17	1-3-18	2-5-18	3-5-18	4-5-18	5-6-18	6-5-18	7-5-18	8-5-18	9-5-18	10-7-18	12-13-19		1-2-20	
Weather	Fair	Dense Fog	Rain	Showers	Fair	Fair	Clear	Fair	Fair	Cloudy	Fair	Fair #	A	B	C	D
Tie No.																
101	111.5	110.0	113.0	111.5	108.5	107.0	104.0	103.0	100.5	99.0	97.0	99.5	95.0	16.5	114.0	19.0
102	111.0	109.0	111.5	110.5	108.5	107.0	104.0	102.5	100.0	98.5	97.0	99.0	94.0	17.0	112.0	18.0
103	105.0	104.0	105.0	105.0	101.0	98.0	96.0	95.0	92.0	90.5	89.5	92.0	89.0	16.0	105.0	16.0
104	105.0	103.0	109.0	105.5	101.0	99.0	96.0	94.5	93.0	91.5	89.5	92.0	89.0	16.0	119.0	30.0
105	105.0	103.5	107.0	106.0	102.0	100.0	96.5	94.5	93.0	91.0	89.0	91.0	87.0	18.0	120.0	33.0
106	157.0	151.0	152.5	150.5	144.5	140.0	133.5	129.0	122.5	118.5	114.0	115.5	103.0	54.0	130.0	27.0
107	107.0	106.0	109.0	108.0	104.0	102.0	98.5	97.0	95.0	93.0	92.0	94.0	90.0	17.0	120.0	30.0
108	105.0	105.0	108.0	108.0	104.0	102.5	99.0	97.5	94.5	93.0	92.5	95.0	93.0	12.0	122.0	29.0
109	111.0	108.5	111.5	110.0	105.5	104.0	100.0	96.5	93.5	92.5	90.0	92.0	89.0	22.0	124.0	35.0
110	116.0	116.0	120.0	117.5	114.0	112.0	109.0	107.5	105.5	104.0	103.0	105.0	99.0	19.0	121.0	22.0
111	96.5	95.5	98.5	98.0	94.0	92.5	90.0	89.0	87.0	86.5	84.0	86.5	83.0	13.5	106.0	23.0
112	102.5	101.5	104.0	102.5	96.0	96.5	94.5	92.0	90.5	88.0	87.5	90.0	87.0	15.5	122.0	35.0
113	126.5	124.0	128.0	125.0	120.5	120.0	116.0	115.5	114.0	112.0	110.0	112.0	108.0	17.5	131.0	23.0
114	114.0	111.5	115.0	113.5	109.0	107.5	104.5	103.0	102.0	100.5	98.5	101.0	198.0	16.0	121.0	23.0
115	95.5	94.0	95.0	95.0	91.0	89.0	87.5	85.5	83.5	81.5	81.0	83.0	80.0	15.5	107.0	27.0
116	97.5	96.0	97.5	98.0	94.0	93.0	91.5	90.0	88.0	86.0	85.0	87.0	84.0	13.5	111.0	27.0
117	115.0	112.5	116.0	115.0	111.0	109.5	106.0	105.0	103.0	101.5	100.0	102.5	97.0	12.0	118.0	21.0
118	114.0	113.0	116.0	115.0	110.0	109.0	105.5	104.5	103.0	101.5	99.0	101.5	97.0	17.0	115.0	18.0
119	106.0	105.5	107.0	107.0	103.5	102.0	99.0	96.5	94.5	93.0	92.0	94.0	91.0	15.0	111.0	20.0
120	113.5	110.0	115.0	113.0	109.5	108.0	104.5	103.0	100.0	98.5	96.5	99.0	95.0	18.5	136.0	41.0
121	119.0	116.0	119.0	117.0	113.0	111.5	109.0	107.5	105.5	104.0	102.0	104.5	99.0	20.0	122.0	23.0
122	130.0	127.0	129.0	127.5	123.0	121.5	119.0	117.5	116.0	114.5	112.5	114.5	109.0	21.0	130.0	21.0
123	122.0	117.0	119.0	117.5	113.0	111.0	108.0	106.0	105.0	103.5	101.5	103.0	98.0	24.0	118.0	20.0
124	117.0	116.0	119.0	117.5	114.0	112.5	110.0	108.0	105.0	103.5	102.5	104.5	100.0	17.0	118.0	18.0
125	123.5	120.5	122.0	121.0	116.5	115.0	111.5	109.0	106.0	104.5	103.5	105.5	100.0	23.5	127.0	27.0
126	120.5	117.0	119.0	118.0	114.0	111.5	108.0	107.0	104.5	103.0	101.5	103.0	98.0	22.5	121.0	23.0
127	111.0	105.5	107.0	106.0	101.5	97.5	94.0	92.0	89.5	87.5	86.5	88.5	85.0	26.0	113.0	28.0
128	124.0	120.5	121.0	120.5	117.0	115.0	111.0	108.5	106.0	104.5	103.0	105.0	100.0	24.0	120.0	20.0
129	125.0	123.0	126.0	125.0	121.0	119.5	117.0	117.0	115.0	114.0	112.0	114.5	111.0	14.0	132.0	21.0
130	121.0	117.0	120.0	119.0	114.5	113.0	110.0	108.5	106.5	105.0	103.0	105.0	100.0	21.0	122.0	22.0
131	118.5	116.0	121.5	118.5	114.0	112.0	108.5	107.5	106.0	104.5	102.0	104.0	99.0	19.5	123.0	24.0
132	106.0	104.0	109.0	106.5	102.0	101.0	98.0	96.5	95.5	94.0	92.0	94.0	90.0	16.0	122.0	32.0
133	123.0	120.5	125.0	123.0	118.0	117.0	114.0	113.0	111.5	110.0	108.0	110.0	105.0	18.0	125.0	20.0
134	110.5	107.5	111.5	109.5	105.0	104.0	100.0	99.0	97.5	95.5	94.0	96.0	93.0	17.5	124.0	31.0
135	113.5	109.5	114.5	113.0	106.5	104.5	100.5	99.0	97.0	95.0	93.0	95.0	91.0	22.5	125.0	34.0
136	111.0	108.5	113.0	111.0	107.0	104.5	101.0	100.0	97.0	96.0	94.0	95.5	91.0	20.0	124.0	33.0
137	99.0	96.0	100.5	97.0	93.0	91.0	88.5	87.5	86.0	84.0	82.5	84.5	82.0	17.0	110.0	28.0
138	119.0	117.0	121.0	119.0	115.0	114.0	110.5	109.5	108.0	106.0	104.5	106.5	102.0	17.0	121.0	19.0
139	115.0	111.0	114.5	112.0	108.0	106.0	103.0	101.0	99.5	97.5	96.0	98.0	94.0	21.0	110.0	16.0
140	101.0	98.5	103.0	100.0	95.0	94.0	91.0	90.5	89.5	88.0	86.5	88.5	86.0	15.0	104.0	18.0
141	104.5	101.0	106.0	103.0	97.5	95.5	92.5	91.5	90.0	89.0	87.0	89.0	86.0	18.5	108.0	22.0
142	110.5	109.0	113.5	111.0	106.0	104.0	101.5	100.0	98.0	96.5	94.0	96.5	93.0	17.5	122.0	29.0
143	116.5	113.5	116.0	114.5	110.5	108.5	105.5	104.5	103.0	101.5	99.0	100.5	97.0	19.5	117.0	20.0
144	114.0	112.0	115.0	113.5	110.0	109.0	106.0	104.0	102.5	101.0	99.0	101.0	97.0	17.0	123.0	26.0
145	110.0	108.0	113.0	110.0	106.0	104.5	101.5	100.0	97.5	95.5	94.0	96.0	92.0	18.0	122.0	30.0
146	114.0	110.5	113.5	112.0	108.0	106.5	102.5	101.5	99.0	97.0	95.0	97.0	93.0	21.0	122.0	29.0
147	111.5	109.0	111.5	110.0	106.0	105.5	102.0	101.0	99.0	97.0	95.5	97.0	92.0	19.5	109.0	17.0
148	130.0	125.5	128.0	126.5	122.0	121.5	119.0	118.0	116.5	115.0	113.5	115.5	110.0	20.0	135.0	50.0
149	104.0	103.0	106.0	105.0	101.0	100.0	96.5	95.5	94.5	92.5	91.0	93.0	90.0	14.0	117.0	27.0
150	125.0	120.0	123.0	121.0	117.5	116.0	112.5	110.0	108.5	107.0	105.0	107.0	102.0	23.0	122.0	20.0
Average	113.70	111.18	114.37	112.79	108.58	106.91	103.75	102.23	100.20	98.54	96.81	98.88	94.66	19.04	119.46	24.80
Test Weight	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5				

Scales used were #111 (Cut in top piece) Reclaimation Plant Scales

(#) Fair on day ties were weighed but it had been raining hard for several days previous.

Columns A, B, C, and D, the following records in connection with the treatment of ties furnished by Supt. T.P.&T.T. Plants:
These ties were treated at Paradise Treating Plant on December 17 and 18, 1919. Retort No. 1, Charge No. 214.
Treating Record: Creosote-Oil dropped on ties at a temperature of 190° F. at 2:30 P.M., 17th, held at that temperature until 7:30 A.M., 18th, when pressure of 100 pounds applied and held for three hours and thirty minutes. Vacuum of 18 inches drawn from 9:45 AM until 11:30 A.M., when ties removed from retort and stacked up along railway track for placing in track.

Office of District Engineer
Tacoma, Washington
March 29th, 1920

Analysis of Creosote Used

Gravity at 38° C.	1.105	315	18.4
Water	None	355	19.9
210	2.2	Residue Soft	
235	0.9	Pitch	38.8
270	19.2	Tar Acids	0.6

Auburn

NORTHERN PACIFIC RAILWAY

TABLE SHOWING WEIGHT IN POUNDS OF CROSS TIES USED IN SEA SONING TESTS

Note:
"A" is weight just before treatment
"B" is loss of weight due to seasoning
"C" is weight after treatment
"D" is gain in weight due to treatment

Tacoma 10/1917 to 1/1920
Ties shipped from Walville 10/5/17
Ties are 7"x8"x8' Red Fir

AUBURN

Date	10-13-17	11-20-17	1-4-18	2-6-18	3-6-18	4-8-18	5-7-18	6-6-18	7-6-18	8-6-18	9-6-18	10-8-18	12-13-19	1-2-20		
Weather	Cloudy	Fair	Rain	Rain	Fair	Fair	Cloudy	Fair	Fair	Cloudy	Fair	Fair #				
Tie No.													A	B	C	D
1	115.0	114.5	118.5	118.0	114.0	112.0	108.5	106.5	105.0	104.0	103.5	105.0	100.0	15.0	119.0	19.0
2	116.0	114.5	118.0	116.0	112.5	109.5	108.5	107.0	105.5	105.0	104.5	105.5	98.0	18.0	118.0	20.0
3	116.5	115.0	119.5	117.0	113.0	110.5	109.0	107.0	106.0	105.0	104.0	106.0	101.0	15.5	119.0	18.0
4	113.5	110.0	114.0	111.0	107.5	105.0	103.0	101.0	100.0	99.0	98.0	100.0	93.0	20.5	108.0	15.0
5	89.0	86.5	92.0	90.0	85.5	82.0	81.5	79.0	78.5	77.5	77.0	79.5	75.0	14.0	95.0	20.0
6	131.5	126.5	132.0	128.0	124.5	121.0	118.0	116.0	114.0	113.0	111.5	113.0	110.00	21.5	128.0	18.0
7	110.0	107.0	111.0	108.0	105.0	101.5	100.5	99.0	97.5	96.5	95.5	97.5	92.0	18.0	109.0	17.0
8	94.0	92.0	96.0	94.5	91.0	88.5	85.5	83.5	82.0	81.0	81.0	82.0	79.0	15.0	101.0	22.0
9	139.0	134.0	135.5	135.5	130.0	125.0	123.0	120.5	118.0	116.5	115.5	117.0	107.0	32.0	143.0	36.0
10	104.0	101.0	107.5	103.0	99.0	96.5	94.0	92.0	90.5	89.5	86.0	90.0	85.0	19.0	119.0	34.0
11	115.5	111.0	116.0	113.5	109.0	106.5	103.5	101.5	99.5	98.5	97.5	99.0	94.0	21.5	124.0	30.0
12	111.5	108.5	112.0	109.5	106.0	104.5	102.0	101.0	99.0	98.5	97.5	99.5	94.0	17.5	120.00	26.0
13	124.0	118.0	123.5	118.5	115.0	112.0	109.5	107.0	105.5	104.0	103.5	106.0	100.0	24.0	130.0	30.0
14	134.0	130.5	134.0	132.0	128.0	126.5	123.5	121.5	120.0	118.5	117.5	120.0	114.0	20.0	134.0	20.0
15	122.5	116.5	121.0	118.5	114.5	111.0	108.0	106.0	104.0	103.0	102.0	104.0	97.0	25.5	117.0	20.0
16	103.0	99.5	102.5	101.0	98.0	96.5	94.0	92.0	91.0	90.0	90.0	92.0	87.0	16.0	107.0	20.0
17	113.5	110.5	113.5	112.5	108.0	105.5	102.5	101.0	98.5	97.0	96.5	98.5	94.0	19.5	128.0	34.0
18	99.0	95.5	100.5	98.0	95.0	94.0	89.5	87.0	85.5	84.5	84.0	87.0	81.0	18.0	100.0	19.0
19	114.0	109.5	112.5	110.5	107.0	105.0	102.5	100.0	98.5	97.0	96.5	98.5	93.0	21.0	107.0	14.0
20	107.0	103.5	107.5	104.5	102.0	99.5	97.0	94.5	93.5	92.0	91.5	94.5	88.0	19.0	142.0	54.0
21	120.5	117.5	122.0	119.0	116.0	113.5	110.5	109.5	107.5	106.5	104.5	108.0	101.0	19.5	125.0	24.0
22	118.0	116.5	122.0	119.0	116.0	114.0	111.0	109.5	107.5	106.5	104.0	108.0	103.0	15.0	132.0	29.0
23	121.5	115.0	118.0	118.0	113.0	110.5	107.0	105.0	103.0	102.0	101.0	102.5	98.0	23.5	123.0	25.0
24	115.0	110.5	114.5	112.5	108.0	106.0	103.0	101.0	99.0	98.0	97.5	100.0	94.0	21.0	119.0	25.0
25	104.0	103.5	106.0	106.0	103.0	101.5	98.5	97.0	95.0	94.0	94.0	96.0	90.0	14.0	106.0	16.0
26	103.0	100.0	102.5	101.5	98.5	96.0	93.5	91.5	90.0	89.00	89.0	91.0	86.0	17.0	105.0	19.0
27	118.0	114.5	118.5	117.0	112.5	110.0	106.5	104.0	102.0	101.0	100.0	102.0	96.0	22.0	116.0	20.0
28	113.5	110.0	112.5	112.5	108.5	106.0	103.0	101.0	99.0	98.0	97.5	99.5	93.0	20.5	115.0	22.0
29	109.0	106.5	108.5	108.5	104.0	102.5	100.5	98.0	97.0	95.5	95.0	97.0	91.0	18.0	116.0	25.0
30	122.0	119.5	123.5	121.0	117.5	114.5	111.5	109.0	107.0	106.0	104.5	107.0	101.0	21.0	126.0	25.0
31	113.5	111.5	114.5	114.0	110.5	108.5	105.5	104.0	102.5	101.0	100.5	103.5	97.0	16.5	115.0	18.0
32	114.5	112.5	116.5	115.5	112.5	110.5	107.5	106.0	104.5	103.5	103.0	105.5	99.0	15.5	125.0	26.0
33	107.5	103.5	105.5	106.0	101.5	99.5	96.0	94.0	92.0	90.5	90.5	92.0	88.0	19.5	118.0	30.0
34	131.5	129.5	132.5	131.5	129.5	127.0	124.5	122.5	120.0	118.5	118.0	119.5	112.0	19.5	135.0	23.0
35	132.5	130.0	132.0	132.0	129.0	126.5	123.0	121.5	119.5	117.5	117.0	118.5	112.0	20.5	136.0	24.0
36	106.5	104.0	108.5	108.0	103.5	100.0	96.5	94.5	92.0	91.0	90.5	94.0	87.0	19.5	115.0	28.0
37	111.0	108.5	111.0	111.0	107.0	105.0	102.0	100.5	98.5	97.0	96.5	99.0	93.0	18.0	119.0	26.0
38	109.0	104.5	106.5	106.0	102.0	99.0	95.5	94.0	92.0	90.5	90.0	92.5	86.0	23.0	119.0	33.0
39	122.0	118.5	122.0	121.5	117.0	114.5	111.0	108.5	106.5	105.5	105.5	107.5	101.0	21.0	135.0	34.0
40	107.0	103.0	106.5	105.0	102.0	99.5	96.5	94.5	92.5	92.0	91.5	94.5	88.0	19.0	111.0	23.0
41	125.0	124.0	126.5	126.0	123.0	121.0	118.0	115.5	114.0	113.0	112.0	114.5	107.0	18.0	134.0	27.0
42	127.0	122.0	124.0	124.5	119.5	116.0	112.5	109.5	106.0	104.5	104.5	105.0	101.0	26.0	117.0	16.0
43	125.5	122.5	127.0	124.5	120.0	117.5	114.0	112.0	109.0	108.0	108.0	109.5	105.0	20.5	130.0	25.0
44	121.0	117.5	118.5	118.0	115.0	112.5	110.0	107.5	105.0	103.5	103.5	105.0	100.0	21.0	119.0	19.0
45	109.0	105.0	108.0	107.5	103.0	100.0	96.5	94.0	90.5	90.0	90.0	92.5	88.0	21.0	108.0	20.0
46	121.0	118.0	120.0	120.0	116.5	114.0	110.0	107.5	105.0	104.0	103.0	105.0	100.0	21.0	135.0	35.0
47	123.0	120.0	122.0	123.0	119.0	116.0	111.5	108.0	104.5	103.0	103.0	104.5	100.0	23.0	120.0	20.0
48	106.0	105.0	107.5	109.0	103.5	101.0	97.0	94.0	92.0	91.0	90.5	93.0	89.0	17.0	115.0	26.0
49	110.0	106.0	107.5	109.0	104.5	102.0	98.5	96.0	93.0	92.0	91.5	94.0	89.0	21.0	109.0	20.0
50	95.0	92.0	95.0	95.0	91.5	90.0	87.5	85.0	83.0	82.5	82.5	84.0	79.0	16.0	103.0	24.0
Average	114.69	111.50	114.93	113.63	109.83	107.34	104.44	102.35	100.42	99.30	98.63	100.78	95.12	19.57	119.38	24.26
Test. Weight		117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0				

Scales used were #112571 - Cooper Shop Scales - A uburn Transfer

(#) Fair on day ties were weighed but it had been raining hard for several days previous.
Columns A, B, C, and D, the following records in connection with the treatment of ties furnished by Supt. T.P.&T.T. Plants:
These ties were treated at Paradise Treating Plant on December 17th and 18th, 1919. Retort No. 1, Charge No. 214.
Treating Record:--Oil dropped on ties at a temperature of 190° F. at 2:30 P.M., 17th, held at that temperature until 7:30 A.M., 18th, when pressure of 100 pounds applied and held for three hours and thirty minutes. Vacuum of 18 inches drawn from 9:45 A.M. until 11:30 A.M., when ties removed from retort and stacked up along railway track for placing in track.

Office of District Engineer
Tacoma, Washington
March 27th, 1920

Analysis of Creosote Used

Gravity at 38° C.	1.105	315	18.4
Water	None	355	19.9
210	2.2	Residue Soft Pitch	38.8
235	0.9	Tar Acids	0.6
270	19.2		

3659

¢