THE SIGNAL BRIDGE

Volume 14 NEWSLETTER OF THE MOUNTAIN EMPIRE MODULAR RAILROADERS CLUB Number 5

APRIL 2007 ISSUE

CLUB OFFICERS

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John Carter

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Treasurer:
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Newsletter Editor:
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Webmaster:
John Edwards

LOCATION
ETSU Campus, George L. Carter Museum

HOURS
- Business Meetings are held the 3rd Tuesday of each month. Meetings start at 7:00 PM at the ETSU, Brown Hall Science Building, Room 312, Johnson City, TN.

- A social gathering is held prior to the business meeting at *RUBY TUESDAYS* on State of Franklin across from ETSU starting at 5:45 PM. Visitors and those interested in joining MEMRR are invited to attend.

- Work nights are held weekly on Thursday evenings starting at 5:00 PM and lasting until ???

- Open viewing and operating layout is available every Saturday from 10:00 AM until 3:00 PM.

- Operation Sessions are in the planning stages with dates TBA.

"Thank you Penny!"

In the spring of 2005 when the Mountain Empire Modular Railroaders were told they would have to vacate the space they had been occupying in the Carroll Reece Museum on the campus of East Tennessee State University we were not only faced with our disappointment in having to move out of a site that we hoped would be a long-term home for our club and its model railroad layout, but with the harsh reality that we had no other place to go. The president, Fred Alsop, and several of the club members begin to contact people in the region who might assist us in finding a new home for the club. Fred spoke to Dr. Paul Stanton, President of ETSU who decided he would like the club to return to the university campus as soon as he could find suitable space for it that would be dedicated as a site for a memorial railroad museum honoring George L. Carter, President of and CEO of the Clinchfield Railroad. But, that would take more than a year to be accomplished.

In the meanwhile Alan Bridwell, with the city of Johnson City, began to look for space here at the Hands-On Museum or other possible locations in Johnson City. Fred and Hobie were invited by developers of the Bristol Train Station to come visit it as a possible site for our railroad.

Several weeks of investigating and discussions and following possible leads went by with no real solution, and then came a call from Alan Bridwell. He had discussed our plight with Penny McLaughlin, the Director of the Tipton-Haynes State

IN THIS ISSUE:

Historic Site in south Johnson City and she wanted to talk to the club about the possibility of using some display space she had available. Fred met with her the next day and besides finding we had some mutual friends in common, her son-in-law, Keith, was a former biology student of Fred's, we decided that both sides would like to give it a test run for a few months to see what kind of neighbors we would be as she had a large vacant display space and we had a railroad without a home that might fill it. Additionally, she had Fred appointed to the Tipton-Haynes State Historic Site's Board of Trustees.

That board, with Penny's urging quickly approved our request of almost unlimited access to the site and the purchase of the protective lexan panels to protect and beautify our layout in return for a regular public running schedule, specials runs and open house participation for Tipton-Haynes special events, and the conduction of some educational workshops. We moved in the late summer of 2005 and Tipton-Haynes became our new temporary home. We had found a home that was better than the one we had been asked to vacate and a new special hostess who would also become our special friend in Penny McLaughlin.

In March of 2007 a Memorandum of Understanding (MOU) between ETSU and MEMRR was signed by all parties and final preparations for our occupation of the new museum site on the university campus were completed. On Saturday, April 7, 2007, the club moved all its property from Tipton-Haynes to ETSU, vacuumed the floors, turned off the lights, expressed our personal gratitude to Penny, and turned in our keys. It was a sad day for all of us to leave a place we had been so welcomed to occupy for more than 20 months and our friend, Penny; and yet one filled with promise for a new more permanent home.

Now we are extremely busy making plans for the new ETSU museum, rebuilding the donated Bankus N-scale layout the university accepted, and continuing to build our own HO-scale layout. Life for the club has become a little more complicated. But, in looking forward, it is most appropriate that we pause and look at our most recent past and try to find the words to express our most sincere gratitude to our friend, life-time member, and "hostess-with-the-mostess", Penny McLaughlin, Director of the Tipton-Haynes State Historic Site. Penny, to a person in the MEMRR we love you. We know we had to leave sometime and that in our absence you are going to get the state funds you have been waiting so long for to make the Tipton-Haynes Visitors' Center the kind of site that records the contributions of those historic families to Johnson City that you have long dreamed about being able to do. But we will miss you and hope you will find the time to come to some of our club meetings and check out our new facilities as well. We cannot thank you enough for taking us in as an extended part of your family, for the publicity and support you gave us, for your cheery disposition and friendship. You provided us with so much more than the space we did not have, you made it a real home for us and gave us the almost unlimited access we needed to build the layout and operate our railroad. I know you are aware of the major changes you saw in our modular layout between the time we first set it up in your visitors' center in 2005 and when we took it down for the last time there a few weeks ago. Most of that progress could not have been accomplished without the long period of time we had to access our layout and get the work done. Thank you. The big bonus for us was getting to know you. You did treat us as neighbors and family. We got to know a lot about you and your dreams for the visitors' center and you got to know a lot about us, and probably a lot more than you may have wanted to know in some cases. It was a great run for us and we hope in some small way we were able to contribute to your state historic site and to bring a little fun to you personally. Thanks for everything, but especially thanks for the memories, they are all great, warm and comfortable ones.

With affection and gratitude from all the members of the Mountain Empire Modular Railroaders, and their President.

Fred J. Alsop III

TREASURER'S REPORT

As reported at November's meeting:

02/01/07	Balance on Hand	$ 1,208.97
	Income	$ 62.05
	Expenses	$ 40.50
02/28/07	Ending Balance	$ 1,230.52
	March Obligations	$ 40.13
	Balance Available	$ 1,190.39

Next Meeting: April 17th, 2007
Location: ETSU, Brown Hall Science Building, room 31
Time: 7:00 PM
Dinner: 5:45 PM Ruby Tuesdays
Across from ETSU on State of Franklin
Program: "Weathering With Acrylics"

PRODUCT REVIEW
Dream-Plan-Build Video Series,
Special Project Edition
Realistic Layout Operations

Following up on the release of Volume 7 in its Dream-Plan Build Video Series, Kalmbach Publishing Co.'s has released a Special Project Edition on "Realistic Layout Operations." This DVD contains a step-by-step how-to guide on how to run trains in a prototypical fashion on a modest N-Gauge home layout.

Sixteen chapters take the viewer through the necessary steps in setting up an operating session with a minimum amount of paperwork. The disc provides .pdf files with examples of all the forms needed. There are examples of timetables, how to use train orders, and, the heart of the system, a car waybill system (see Micro-Mark catalogues for the components).

Several of the chapters explain the various roles and needed personnel to successfully run an operating session including Yardmaster, Dispatcher, and Train Operator (engineer/conductor).

Most of the chapters deal with running trains. The club might wish to purchase a copy if we ever get around to putting on a full operating session some weekend.

Cost: $24.95 including S&H

PRODUCT REVIEW
Dream-Plan-Build Video Series,
Real Rails Edition
Horseshoe Curve

The Dream-Plan Build Video Series from Kalmbach Publishing Co.'s has developed into several distinct lines with the new release of a second Real Rails Edition on "Horseshoe Curve."

The video provides a tour of the Altoona – Johnstown mainline during the Conrail heydays of the late 1980's to the mid 1990's. Chapters present a tour of the former Pennsy railroad shops; a look at action along Horseshoe Curve and a brief history; A history of Conrail; tours of Bennington Curve and the tunnels of Gallitzin PA; and finally a cab ride on a pair of helper engines as they coast down grade back to Altoona.

The video is not for everyone, but there are some interesting lessons for the modeler. The focus on two interlocking towers, rustic rugged mountainous scenery, and modern train movements will hold the attention of most viewers. Besides there are even some interesting line side structures.

"Hey, Hobie – you ought to see the telegraph poles along the right-of-way… they gots 6 cross arms. Say, wouldn't it be fun to string wire on those. It's only 60 lines!"

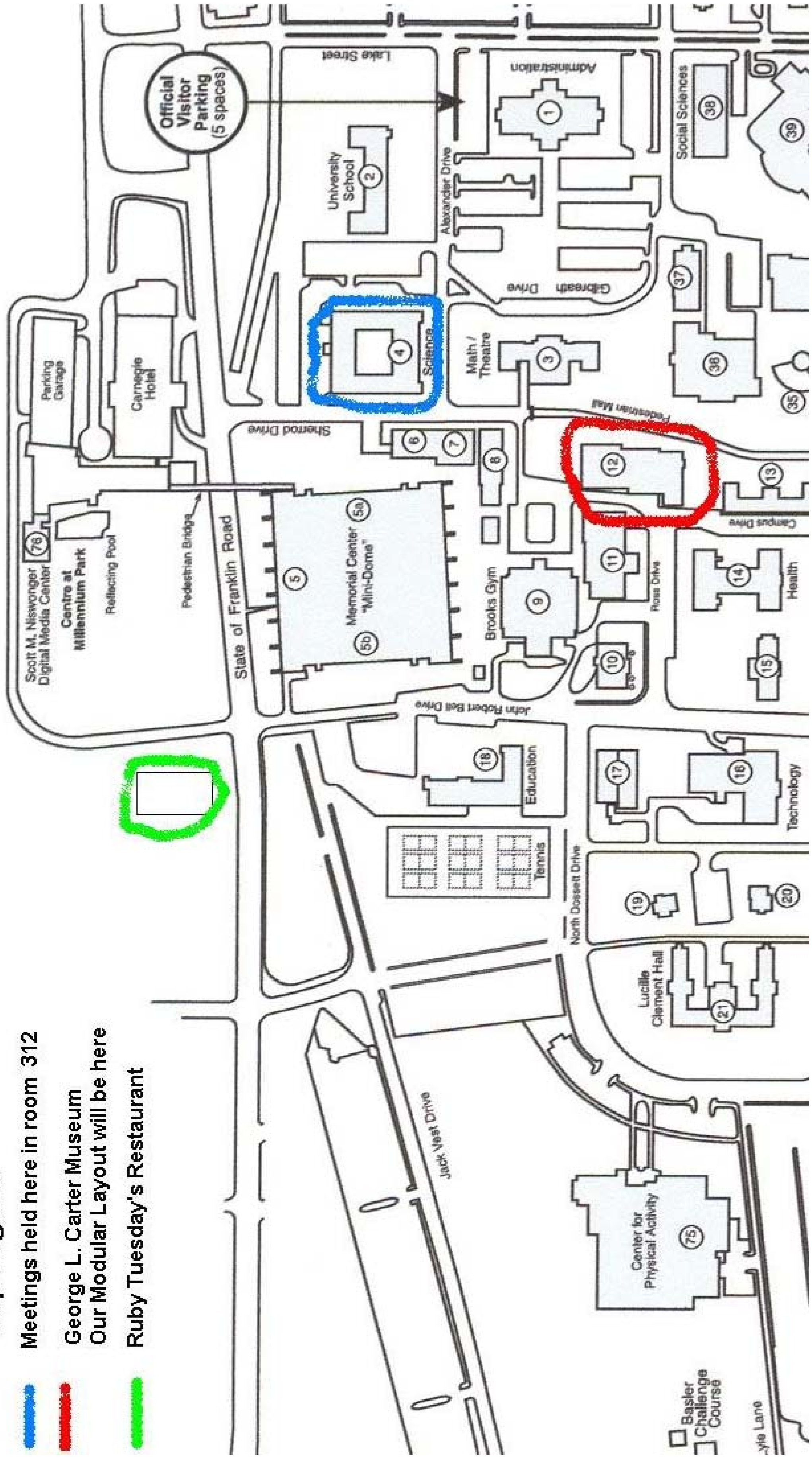
Cost: $24.95 including S&H

Progress on the MEMRR….

East Tennessee State University

Map Legend

- (blue) Meetings held here in room 312
- (red) George L. Carter Museum
  Our Modular Layout will be here
- (green) Ruby Tuesday's Restaurant



POLE LINES

Issue Date: Apr. 1964 | Sheet No.: D6u.01

Compiled by John P. Seehaver
Source Material:
Specification for the Construction of Railroad Communications Pole Lines:
A.A.R., Communications Section

Probably the most important non-revenue-producing department of a prototype railroad is its Communications Department. Nearly all railroad communications are handled on pole lines, although a small but growing percentage proceeds over microwave radio relays. While pole lines are not needed in successful operation of a model railroad, they may be modeled with the effect of enhancing realism of the scenery, particularly if properly installed. These pages will furnish basic data for modeling pole lines. Data has been *adapted* from AAR specifications for constructing communications pole lines; not all details are presented, and only communications lines are considered. Power and signal line circuits, transpositions, etc., are omitted from this paper.

HISTORICAL CONSIDERATIONS

As a general rule, the earlier the period of the railroad being modeled, the smaller will be its communications line. The use of telegraph in dispatching trains began about 1852, and that of telephone in 1879. Since then, the use of communications in railroading has grown immensely. A single wire is sufficient for each telegraph circuit, but telephone circuits require two wires—a pair. Initially one pair per circuit was needed, but as the art advanced, means were found to impose greater numbers of circuits on each pair, resulting in reduction of the number of wires on a pole line. At one time, railroad pole lines also carried many commercial telegraph circuits, but some railroads have separated themselves from this activity. Railroad communications lines were greatest in number through the period of World War II; since then, with modern carrier circuitry, etc., they have been reduced in number, although not in volume of message traffic.

TRAFFIC CONSIDERATIONS

The first circuit on any pole line is the dispatching circuit. A message circuit for communications between headquarters and stations on other than dispatching business is usually added. A block circuit may extend from station to station, used for local business. Through circuits between terminals, headquarters-to-terminal circuits, etc., add still other lines. Obviously, the larger and busier the railroad, the more communication circuits it needs. Main lines demand larger communications lines than do branches. On some light branches, only the dispatcher's circuit is needed since local business may be transacted over the dispatcher's wire without undue interference.

DETERMINING SIZE OF COMMUNICATIONS LINES

The foregoing general statements introduce the principles on which physical size of communications lines are based; the number of circuits determines in part pole size, number of crossarms and pole spacing. These factors are also influenced by geographical location of the railroad being modeled, as shown below in the Loading Map. The more severe the winter weather to be expected, the stronger will the line have to be built.

The main line of a major railroad could demand a communications line with six or seven crossarms. Modeling of such poles would not be difficult, but preparing enough of them to cover the railroad could be tedious. It is suggested, therefore, that the average, modern main-line model railroad be paralleled by a communications line constructed with three crossarms per pole. Earlier, lighter-duty main lines or fairly-heavy branches could be served by lines with two crossarms. For light branch lines a single, ten-pin crossarm would be satisfactory, with six-pin crossarms employed on short lines. These are merely guiding principles for modeling practice; individual preference will determine the actual scope of the model, not excluding the full use of multiple-crossarm line poles.

GENERAL PRINCIPLE

In normal practice, all power lines cross above communications lines.

STRENGTH OF LINES

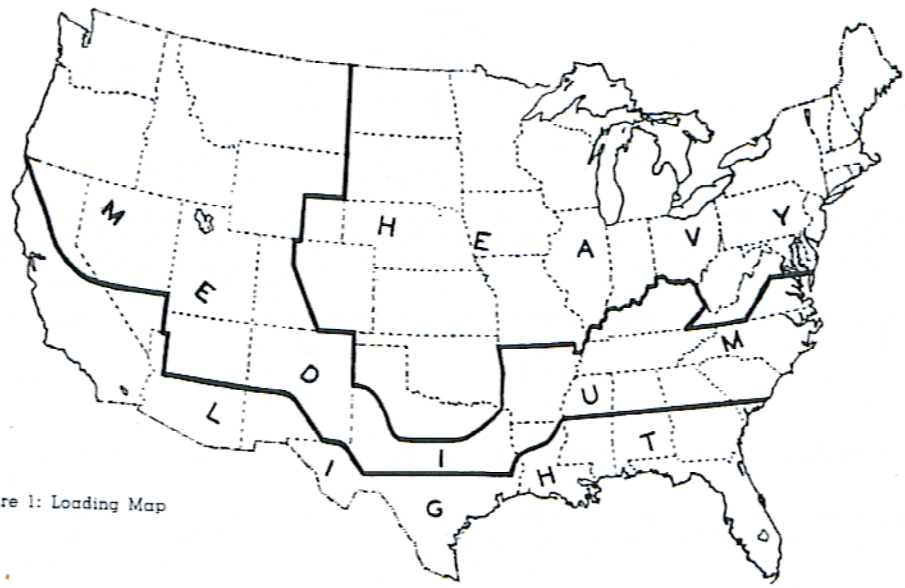


Figure 1: Loading Map

This DATA SHEET provides for three grades of line strength. Grade I lines are intended for use in the Heavy Loading District, Grade II for the Medium Loading District and Grade III for the Light Loading District.

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D6u.02 — POLE LINES — Continued

Table 1: Span Lengths and Poles per Mile

Span Length, Feet	Poles per Mile, Approx.	Span Length, Feet	Poles per Mile, Approx.
88	60	150	35
100	53	175	30
130	40	200	26

Table 2: Standard Class* and Spacing for Poles for Open Wire Lines

Wires, Total Number	GRADE I		GRADE II		GRADE III	
	Pole Class	Poles per Mile	Pole Class	Poles per Mile	Pole Class	Poles per Mile
1 to 6	7	40	7	30	7	26
7 to 12......................	5	40	6	35	7	30
13 to 20......................	5	40	5	35	6	30
21 to 30......................	3	40	4	35	5	30
31 to 40......................	3	40	4	35	5	30
41 to 50......................	2	53	3	55	4	35

*See Table 3

CLEARANCES FOR POLES AND ATTACHMENTS

Clearances are measured between points of closest approach of objects concerned. Where practicable, poles are located so as to provide clearance of at least 13 feet from the inside of the nearest track rail, but in no case less than eight feet. Where possible, horizontal separation of at least eight feet from the nearest track rail is maintained for all crossarms, wires, etc. Where this clearance cannot be obtained, vertical clearances between the lowest crossarms and track level is provided as follows:

Horizontal Separation, Feet	Vertical Clearance, Feet
8 to 5	20
5 to 3	22
Less than 3	25

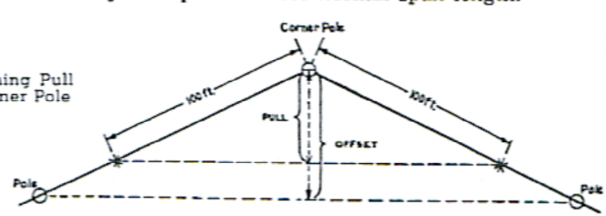
On level right-of-way the lowest crossarm ordinarily has vertical clearance of ten feet or more above ground. In irregular terrain, safe clearance is provided. Wires crossing over railroad tracks must have a minimum clearance of 27 feet above railheads. All wires on lines along or crossing city streets must have minimum clearance of 18 feet above ground. Wires clear buildings, bridges and other structures by at least two feet unless attached to them. Clearance of at least four feet from trees and underbrush is recommended.

LOCATION AND GRADING OF LINES

Lines are run as straight as right-of-way conditions will permit. Where practicable, crossings from one side of the right-of-way to the other are avoided. Lines are located as close to the outer edge of the right-of-way as possible, but need not be located more than the height of the average pole from the nearest rail.

Individual spans are kept as near as practical to the specified span length. Where a pole cannot be placed so as to give the correct span length, it is usually set as near as possible to correct location and the next span shortened or lengthened sufficiently to make the sum of the two spans equal to twice normal span length.

Figure 2: Determining Pull at a Corner Pole



The angle which a line makes at a corner is commonly designated by the *"pull"* on the corner poles. Pull is defined as the distance a pole is out of line with two points located 100 feet away on opposite sides and in line with the corner pole and two adjacent poles. See Figure 2. Sharp corners should be avoided in laying out a line. The pull on a single pole corner should never exceed the values shown below:

Number of Wires	Pull not to exceed	Number of Wires	Pull not to exceed
1 to 10	40 feet	31 to 40	15 feet
11 to 20	25 feet	More than 40	10 feet
21 to 30	20 feet		

Corners at which the pull exceeds 40 feet are made on two poles, so placed that the pull on each of them is as nearly equal as possible.

Numerous corners with small pulls are considered undesirable. Figure 3 illustrates the *tangent method* of locating poles on curves. Several successive poles are set in a straight line so that the completed curve contains several short tangent sections and a few corner poles, each bearing a fairly heavy pull.

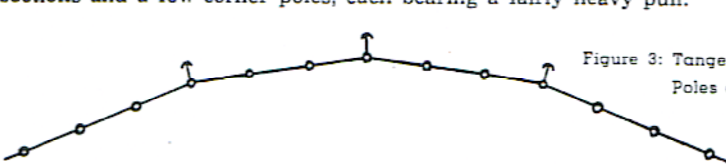
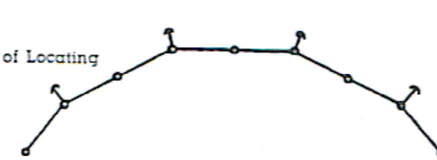


Figure 3: Tangent Method of Locating Poles on Curves



When practicable, span length at railroad crossings does not exceed 100 feet on Grade I, 125 feet on Grade II and 150 feet on Grade III lines.

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In general, lines follow ground contours so that poles may be of uniform height. Where ground contours change abruptly, or where it is necessary to change the level of a line to clear trees, buildings, crossings, etc., lines should be graded so as to avoid abrupt changes in slope. Pole heights are ordinarily so proportioned that upward or downward pull, distance "d" in Figure 4, does not exceed these values:

Average span length 100 feet or less: 4 feet
Average span length 130 feet: 5 feet
Average span length 150 feet: 6 feet
Average span length over 150 feet: 7 feet

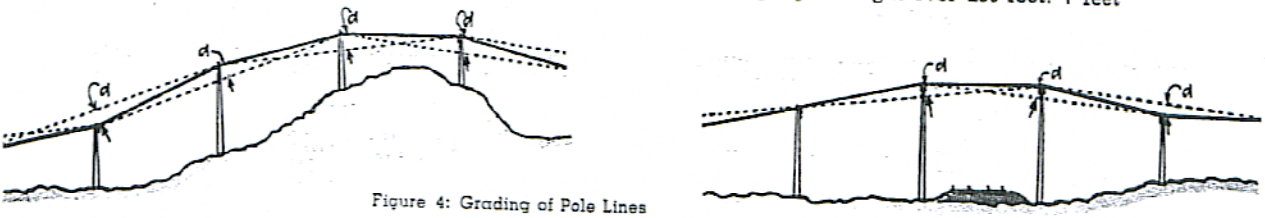

Figure 4: Grading of Pole Lines

In mountainous country it is sometimes advisable to exceed these values to avoid undue costs. Where the upward or downward pull on a pole exceeds twice the amounts specified above, the pole should be equipped with double crossarms.

FRAMING AND SETTING POLES

Poles are usually *roofed* and *gained* as shown in Figure 5. Gains are normally set on 20" centers.

Poles on straight sections are set so that the crossarms on adjacent poles face in opposite directions. On steep hills and grades, arms face toward the top of the grade. At corners, crossarms are so placed as to halve the angle formed by the line wires. Arms on poles adjacent to the corner should face the corner pole.

CROSSARMS

The standard types of crossarms are illustrated in Figure 6. Double crossarms are recommended in these situations:

(a) On poles at railroad crossings, or crossings over trolley wires.

(b) On corner poles having a pull of more than twenty feet.

(c) On poles where the upward or downward pull exceeds twice the value specified in the section on Locating and Grading of Lines.

(d) On poles supporting spans of more than 200 feet in Grade I, 300 feet in Grade II and 400 feet in Grade III lines.

Crossarms are attached at right angles to poles and in vertical alignment. Each crossarm is secured by means of a standard crossarm bolt driven through from the back of the pole and fitted with two 2¼" square washers, and with crossarm braces, as shown in Figure 7. Double crossarms are arranged as shown in Figure 8. On these installations, gains are required for the arms on only one side of the pole. Double crossarms have only one pair of braces.

Where necessary to avoid obstructions, crossarms may be attached as shown in Figure 9.

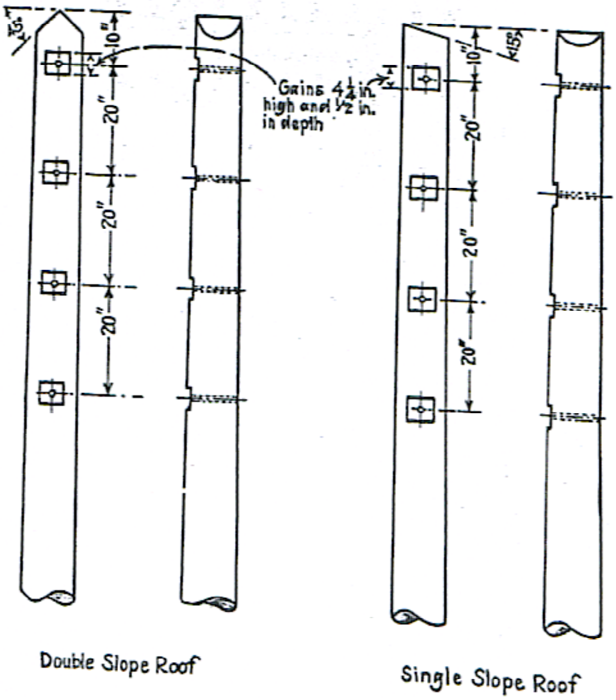

Figure 5: Roofing and Gaining of Poles

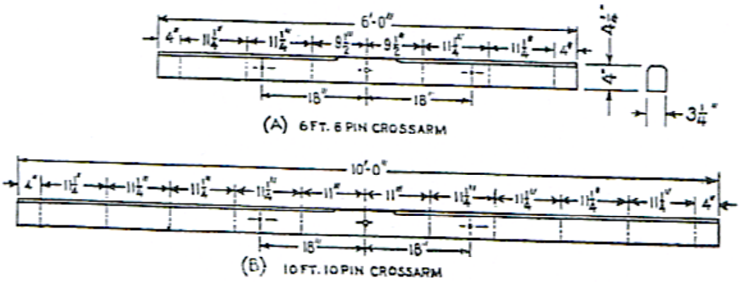

Figure 6: Two Standard Crossarms.

Crossarms are 4" deep x 3¼" thick. Top edges are chamfered ⅜" x 45° or rounded on a ⅜" radius. Drawings indicate length of chamfer

WOOD POLE BRACKETS

When not more than two wires are to be carried on a line, they are supported on wood pole brackets as shown in Figure 10. Brackets are also used to add one or two wires to an existing line; AAR specifications provide that no more than four wires shall be carried on brackets. Wood pole bracket construction is not permitted at major railroad crossings, where light crossarm construction is required. Brackets may be used, however, at crossing over minor tracks, and at crossings over trolley contact wires, provided that the wires involved are supported on each crossing pole by two brackets.

Double-bracket attachment involves two brackets per wire. Brackets are affixed approximately thirty degrees apart and suitably aligned on one another to suit the needs of the wire.

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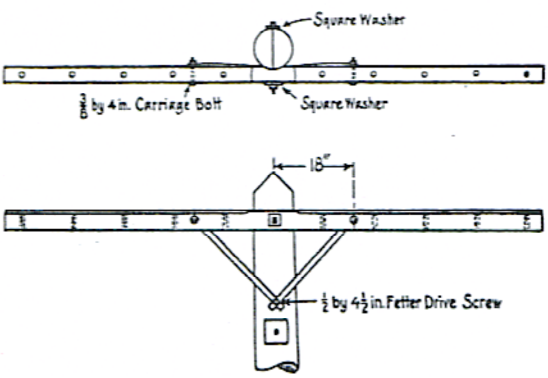

Figure 7: Method of Attaching Single Crossarm

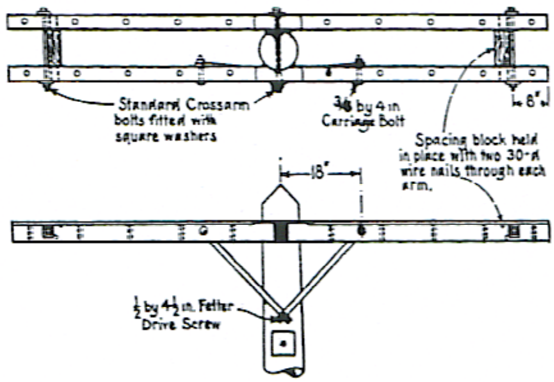

Figure 8: Method of Attaching Double Crossarms

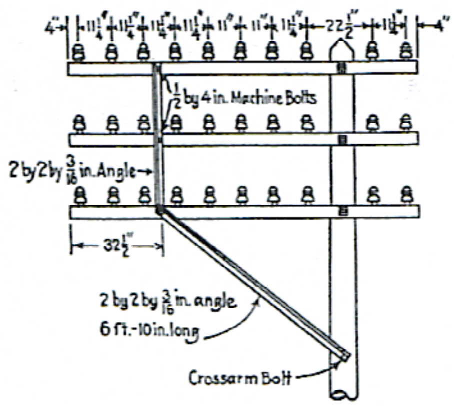

Figure 9: Side Arms

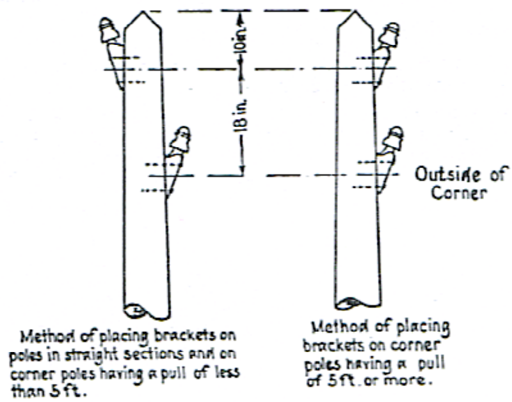

Figure 10: Wood Pole Brackets

TABLE 3: POLE DIMENSIONS

Class of Pole	1	2	3	4	5	6	7
Minimum Top Diameter (inches)	8½	8	7½	7	6	5½	5
Length of Pole Above Ground Line (feet)	Minimum Diameter at Ground Line (inches)						
10	—	—	—	—	6½	6	5½
12	—	—	8	7½	7	6½	6½
14	10	9½	8½	8	7½	7	6½
16	10½	10	9	8½	8	7½	7
20	11	10½	9½	9	8½	8	7½
25	12	11	10½	10	9	8½	8
30	12½	12	11	10½	9½	9	8½
35	13½	12½	11½	11	10	9½	9
40	14	13	12	11½	10½	10	9½
45	14½	13½	12½	12	11	10½	10
50	15	14	13	12½	11½	11	—
55	15½	14½	13½	13	12	11½	—
60	16	15	14	13½	12½	—	—
65	16½	15½	14½	14	13	—	—
70	17	16½	15½	14½	—	—	—
75	17½	16½	15½	14½	—	—	—
80	18	17	16	—	—	—	—

CONSTRUCTION SUGGESTIONS

Poles may be scratch built of commercial doweling of appropriate size, tapered by sanding. Crossarms may be fashioned of stripwood of proper dimensions. Especially in O scale, clear or pale green transparent beads of the kind sold in variety stores for jewelry making may be used to simulate insulators. These may be attached with a lills pin, pushed through bead and crossarm and clipped off close to the under side of the arm. Jigs will assist the builder in framing and gaining poles and in affixing insulators.

Plastic poles complete with crossarms, braces and insulators are commercially available. While better suited to power and signal applications, these poles may be used for communications lines. Individual crossarms may be removed through careful use of a razor saw, and cemented to other poles, permitting the modeling of varied crossarm arrangements.

Actual stringing of wires is impractical in any of the common scales for the reason that material will not sag realistically. Furthermore, strung wires would interfere with maintenance and equipment handling, and be liable to excessive damage. A well-built, realistically constructed pole line will be accepted by the eye as readily as if the wires were in place.