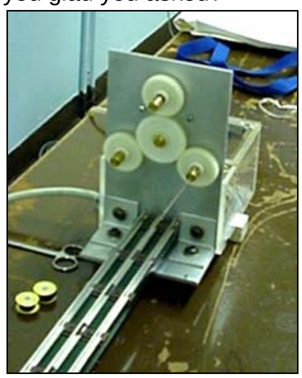
Making Scale Rope

When it comes to our hobby, there probably aren't many things more fascinating than a ropewalk. Newcomers scratch their heads, and question why the strands don't unravel, while veterans are hard pressed to explain why! Their attempts are invariably quite feeble, and they usually end up replying: "All I know is, it works!"

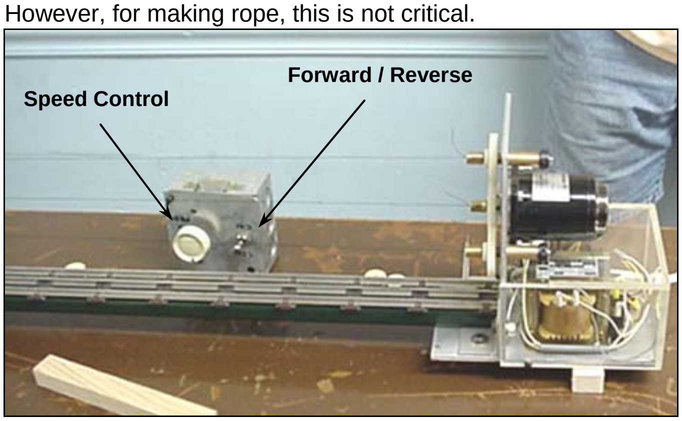
At the June presentation, Bob Filipowski tried to explain the theory by twisting two strands of thread between his fingers. (He said he had read that somewhere.) But all he got was a balled up wad of thread! So, he went to plan "B". He enlightened everyone by stating: "All I know is, it works." Where have we heard that before?

Actually, according to Longridge the reason the strands in a rope do not unravel is that while each strand is trying to untwist, its torsional energy is converted into mutual friction against its neighbor, and it is this friction, which counteracts any tendency to become unraveled. Now, aren't you glad you asked?



Anyway, once things got past that hurdle, they went pretty well. Bob started out by describing the key elements that make up a ropewalk. The heart of the machine is the drive unit and whirls. Historically, rope was made in three and four strand varieties. However, for the model ship builder, there isn't any advantage in building a "walk" with four whirls. Filipowski stated that when completed, both types of line are indistinguishable.

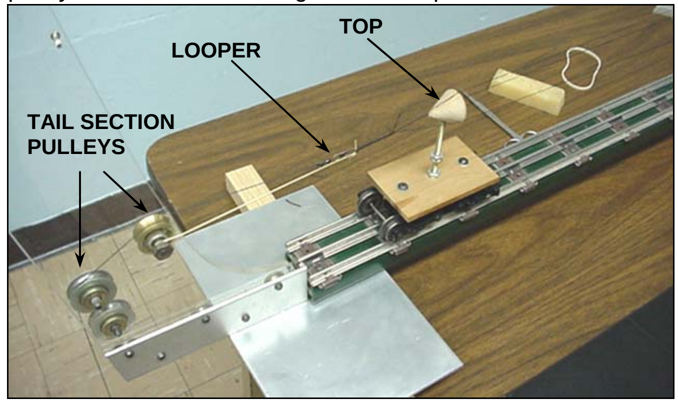
The drive unit can be hand operated, but a variable speed; forward-reverse motor makes the work move along at a much faster pace. Bob was able to control speed with the use of a common electrical dimmer switch mounted in a portable control box. The membership was advised that although dimmers work, a certain amount of motor torque is lost with this application. However, for making rope, this is not critical.



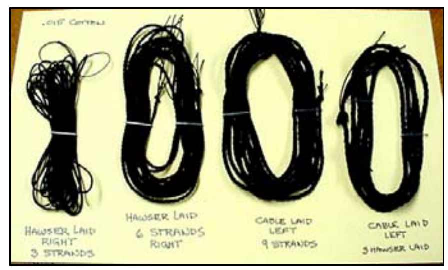
The carriage, which carries the top, is mounted on a chassis scrounged from an old model railroad caboose. It is essential that the wheels turn as freely as possible so as not to impede movement as the rope begins to form. You might want to consider making different tops for different diameter rope. The nine and twelve strand cables can get quite large!

The bed was composed of three 3-foot lengths of Lionel track mounted on Unistrut channel, which helped lock the sections together. The looper, which relieves tension as the strands twist around each other, is nothing more than a fishing swivel.

The final element is the tail section, which has a series of pulleys mounted on it. Weighted line is passed over these, and



applies tension to the looper and carriage. The size of the rope being formed will determine how much weight is utilized. When working with fine thread, tension on the carriage may not be needed at all. Filipowski suggested keeping a log that lists what weight combinations go best with various size lines. Once you have that information, and the resultant diameters, an inventory of sizes can be made for your model when it is time to rig.



Most line on a ship was hawser laid, which means that it was composed of three strands that were wound clockwise. This type of line was also referred to as common or plain rope. Fortunately, most commercial thread is turned in a clockwise direction when produced. One of the few exceptions is imported linen, which is wound counterclockwise.

Shroud laid line was composed of four strands, and came with or without a core. For modeling purposes, Filipowski feels that this is impractical, since the finished product is indistinguishable from hawser laid. Cable laid rope was normally used for shrouds and stays, and was made with nine or twelve strands. This cordage was always wound counterclockwise. There was a reason for this, which will be explained later.

Three 3-strand hawser cable laid rope.

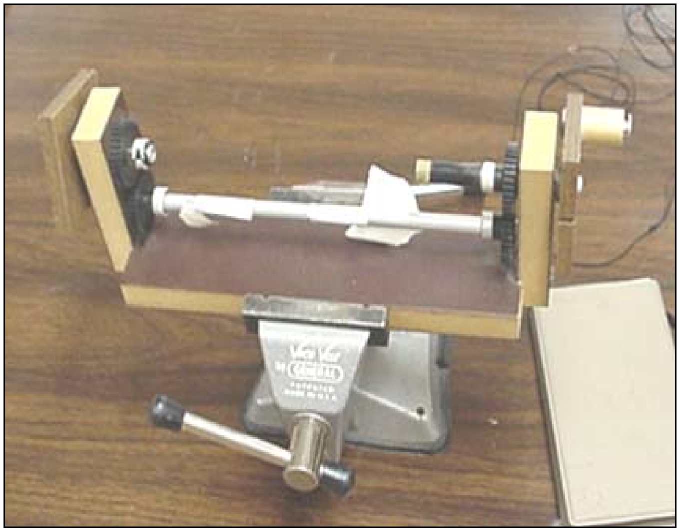
Some sample cards were passed around, which illustrated the sizes that could be obtained from various types of line. One card showed four variations that were derived from .015 diameter cotton thread. They included two 9-strand cables that had been formed in different manners. Putting three strands on each whirl, and running them simultaneously formed one example, while the second sample was composed of three individual 3-strand hawsers, which had been twisted together.

One interesting phenomenon when working with 9 strands is that the whirls must be run counterclockwise, even though the individual threads or hawsers have a right handed twist. This is exactly how real cable was made! A sample of wrong-way wound cable was shown, and the difference was quite evident.

Scale Rope II

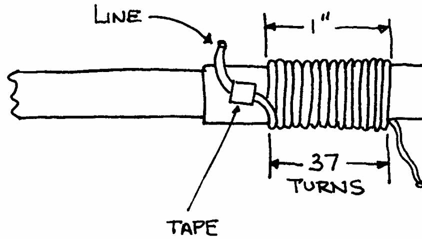
In June Bob Filipowski demonstrated how you could obtain different diameters of scale rope with the help of a ropewalk. The July demonstration explained a means by which this rope could be accurately measured and applied to what ever scale model ship you are building.

Microscopes and a degree in mathematics are not needed. To obtain the diameter of any line, you merely have to count the number of turns it takes for that line to completely cover a known distance. Depending on the diameter of the rope, a 1” or ½” increment is usually adequate. That distance is then divided by the number of



turns, which results in a decimal that represents the line size. Bob stated that just about any round object would work with this method. Some of the most common devices used are pencils, doll rod, and brass tubing.

Filipowski has found that a String-a-Long, which is normally used for serving line, is the perfect tool. With this device firmly secured, the modeler can count the number of revolutions while he uses one hand to turn the crank, and the other to guide the line along. (*Editors note to the dexterously handicapped: It’s nowhere near as bad as rubbing your stomach and patting yourself on the head at the same time!*) Bob uses two pieces of tape to mark the distance he will be using for measurement.



As stated earlier, the distances normally utilized are 1” and ½”. When measuring extremely fine thread, covering one inch can take well over one hundred turns. If you decide to use the lesser length, it merely becomes a matter of dividing the turn count into .5 rather than 1.

Once you have the diameter of a line, that decimal can be used to determine what size rope it would represent at different scales. Bob passed out a very useful table (See the next page.), which covered scales from 1/16” to 1/4“. This document listed both diameters and circumferences of various cables and hawsers at these scales. In the example shown above, 1” divided by 37 turns equals .027”. Cross referencing this number to the table, this line could represent an 8” cable at 1/8”, a 5.5” hawser at 3/16”, or a 4” line at ¼”.

This technique can be of value whether you own a ropewalk or not. Purchased line should be measured the same way.

Bob closed the presentation with one last bit of advice. When rigging a model it is always better to keep your rig on the light side. If the table doesn’t give you an exact match, and you can’t decide, always go smaller. You want your model to have a delicate appearance.

SCALE ROPE CONVERSION

(PI = 3.141592)

FULL SIZE CIRCUMFERENCE IN INCHES	FULL SIZE DIAMETER	1/4" SCALE DIA 1:48	3/16" SCALE DIA 1:64	1/8" SCALE DIA 1:96	1/16" SCALE DIA 1:192
36	11.459	0.239	0.179	0.119	0.0597
34	10.823	0.225	0.169	0.113	0.0564
32	10.186	0.212	0.159	0.106	0.0531
30	9.549	0.199	0.149	0.099	0.0497
28	8.913	0.186	0.139	0.093	0.0464
26	8.276	0.172	0.129	0.086	0.0431
24	7.639	0.159	0.119	0.080	0.0398
22	7.003	0.146	0.109	0.073	0.0365
20	6.366	0.133	0.099	0.066	0.0332
18	5.730	0.119	0.090	0.060	0.0298
16	5.093	0.106	0.080	0.053	0.0265
14	4.456	0.093	0.070	0.046	0.0232
12	3.820	0.080	0.060	0.040	0.0199
10	3.183	0.066	0. 050	0.033	0.0166
9	2.865	0.060	0.045	0.030	0.0149
8	2.546	0.053	0.040	0.027	0.0133
7.5	2.387	0.050	0.037	0.025	0.0124
7	2.228	0.046	0.035	0.023	0.0116
6.5	2.069	0.043	0.032	0.022	0.0108
6	1.910	0.040	0.030	0.020	0.0099
5.5	1.751	0.036	0.027	0.018	0.0091
5	1.592	0.033	0.025	0.017	0.0083
4. 5	1.432	0.030	0.022	0.015	0.0075
4	1.273	0.027	0.020	0.013	0.0066
3.5	1.114	0.023	0.017	0.012	0.0058
3	0.955	0.020	0.015	0.010	0.0050
2.75	0.875	0.018	0.014	0.009	0.0046
2.5	0.796	0.017	0.012	0.008	0.0041
2.25	0.716	0.015	0.011	0.007	0.0037
2	0.637	0.013	0.010	0.007	0.0033
1.75	0.557	0.012	0.009	0.006	0.0029
1.5	0.477	0.010	0.007	0.005	0.0025
1.25	0.398	0.008	0.006	0.004	0.0021
1	0.318	0.007	0.005	0.003	0.0017
0.75	0.239	0.005	0.004	0.002	0.0012
0.5	0.159	0.003	0. 002	0.002	0.0008
0.25	0.080	0.002	0.001	0.001	0.0004