

the total width of the metal about 15 feet. The metal was well consolidated with a steam roller.

Road No. 5.—Similar to No. 1, except that the stone was all shipped to the same station and that the freight was 60 cents per ton, and the stone f.o.b., at the quarry, 65 cents per ton.

Road No. 6.—Similar to No. 2.

Road No. 7.—Similar to No. 3.

Road No. 8.—Well graded, knolls cut down and hollows raised. The metal was well consolidated with a steam roller. The metal used was a coarse gravel mixed with stones, which was run through the crusher and revolving screen.

Road No. 9.—This was a short piece of road built as an experiment. The soil was very light sand.

REPORT ON TEMPORARY TRETLING*

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whether there is likely to be much mud or water to contend with. All the latter information should be on file in the superintendent's office so as to enable him to determine what kind and manner of temporary work will best meet the requirements. If not too deep the opening may be cribbed up with ties, if very deep it may be that foundation can be secured for temporary framed bents, and if the bottom is soft, much water or a swift current, it will probably be necessary to drive piles.

These questions, having been disposed of, the next thing is to determine what debris is in the way of constructing the temporary structure. Are their engines and cars in the washout? If so where is the wrecking outfit, and how soon can the obstructions be moved? Also where is the necessary material for such temporary work, as it is desirable to construct, and can it be brought to the burnout or washout in time?

These questions are important and must be answered by everything being in readiness before the work can progress very rapidly in any particular case.

Crib Work.

One method of bridging a shallow washout is by using a crib work of ordinary track ties and old logs. This method is the most expeditious, as a large number can be built at the same time.

The general method of construction is as is shown in the sketch.

Many consider this a rude method of constructing temporary work, and as it is usually constructed by men of little experience and very hurriedly, it often proves unsatisfactory. When built in a proper manner, however, they serve their purpose well. The crib should be brought up as nearly level as possible, care being taken to select ties of the same thickness for each course. If double cribs are necessary the method of construction shown in the sketch is the most satisfactory, as there is less swaying and they are more easily constructed than two separate cribs. The cribs are capped with long stringers 12 by 14 inches, or equivalent size, and the ties and track laid on them as in ordinary work. The writer has seen cribs of this kind in use 12 feet high.

Framed Bents.

These are constructed along the same lines as more permanent ones. The principal difficulty here is to secure a good foundation. Rip-rap stone is of valuable assistance in securing such. The stone is dumped promiscuously at the spot and then levelled off and the lower sill placed on it. Mud sills placed longitudinally are also much used.

Piles.

Piling, used where the bottom is soft or where water is encountered, is a common method of bridging a temporary gap. The pile-driver used should have a clear span of 16 to 20 feet in order to give sufficient panel lengths. A staging or platform close to the water is needed to support workmen who guide the point of the pile into place and in other ways assist the work.

Example of Very Rapid Work.

As an example of very rapid work in bridging a washout the following account is of interest:—

Heavy rains one hundred miles up the river caused a flood, which came down with a wave six feet high and washed out 2,222 feet of bridging and trestling. The structures washed away consisted of two 3-truss spans of 155 feet each, one 3-truss span of 130 feet, four deck plate girders each 44 feet and a pile trestle approach at either end. Besides the main gap 4,400 feet of track had also to be filled in by trestles or in the shallow places by tie crib work before the main washout could be reached.

The average depth of the washout to be bridged was 15 feet. Thirty-five foot piles with an average penetration of 13 feet were used, and in all 420 piles were driven in 122 bents. This means that 1.6 piles or 7 feet of bridge was completed in an hour. Panel length 15 feet. At each end two pile-driver crews and three trestle bridge gangs, or 36 men in all, were stationed, besides two train crews so that work could be carried on all the time. The pile-drivers were 20 feet extension, with steam turning gear and drop hammer weighing 3,100 lbs.

The method of work was to drive a bent of piles, saw them off, put on caps and sway braces, lay the stringers, ties and rails then move ahead and repeat the operation. All material was handled by the drivers, and towards the end it was necessary for them to run back 1,000 feet eight times for each panel. The progress of finishing the whole washout in 129 hours of actual work was phenomenal.

Best Method is to Prevent Washouts or Burnouts.

It is of the utmost importance that during severe rainstorms or time of freshets the section foreman and his men should be patrolling the track. If proper care is taken to signal approaching trains no wrecks or derailments should occur and the consequent loss of life and property due to them will be avoided. There have been incidents without number when, if some man equipped with a shovel had happened along at the right time he could have turned the course of the stream or placed some brush to prevent the initial wearing away of the bank. Here the same rule applies as in most of the ordinary affairs of life, namely, "an ounce of prevention is worth a pound of cure." Therefore while it is wise to have the necessary material for bridging a washout at convenient points it is much better to prevent such accidents from taking place.

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