

During the summer months open joints may be loosened, bars tapped lightly with a maul, and again retightened. Similarly, in cold weather, tight joints may be opened up. Special care should be taken with points where steel has been laid adjoining rail of lighter section, as there is a constant threat that the light rail may suddenly give way against the thrust of the heavier, more rugged track structure.

Heaving track is a familiar phenomenon to most trackmen in the colder climates. Drainage will go a long way toward eliminating this possibility. There is scarcely a man in track work who does not know that the various soil components, some of which are more retentive of moisture than others, cause track to heave both laterally and vertically. Such points must be watched carefully, especially when the frost is going out, as the track does not always settle back into position uniformly.

Under the head of precipitation comes snow and rain. Both are a bane to the trackman and supervisor. Heavy and unexpected rain has been responsible for many a derailment. Only last year, on one of our middle western railroads, there occurred a cloudburst, during which five and a half inches of rain fell in a period of three hours. A bridge under which there had not been more than three feet of water for twenty years was forced to withstand the onrush of a fifteen-foot flood.

Heavy rainfall is no respecter of railroad property and adequate flow-ways must be provided. Narrow track shoulders should not be neglected. Wooden bridge ends subject to wash should be ripped up.

A careful system of bank widening should be carried forward yearly. Refuse at the end of cuts should be eliminated and the eroded material dug away. Adequate drainage in all cases by means of proper sewers or ditches must be provided. Ditches in all cases must be deep enough and with sufficient gradient not only to carry away the surface water rapidly but to drain as much as possible of the sub-soil as well.

Water-pockets in fills constructed of clay materials offer another danger, due to slides. Usually, due to a strata of porous material surrounded by denser, more impervious soil, the water is held from escaping properly. The supporting top ballast is thereby weakened and many derailments have occurred because of the track structure at such points suddenly giving way under the wheels of a train. The bottom of these water-pockets must be tapped by the proper method of drains. Slopes may be sodded to prevent sliding. Various types of vines—alfalfa or Bermuda grass—not only serve to prevent sliding, but also arrest considerable drifting snow.

Windstorms have caused many train derailments, due to blowing cars off sidings onto main lines of other tracks, or blowing trees, telegraph poles, or other obstacles across the rails. Derails must be provided for at all dangerous points, especially on descending grades. Trees should be cut back to a safe distance from the track wherever possible. In some sections of the southwest, winds are an especial hazard due to the light, sandy top soil drifting. The placing of sand fences, oiling of sandy soil adjacent to railroad tracks, and the planting of resistant vegetation are some of the more common preventives of such accidents.

Wooden trestles on our important lines are rapidly giving way to steel but on our less important lines they will probably be with us for a long time to come. In some cases the tops of wooden trestles have been covered with sheet metal to prevent their ignition from engine coals. Vegetation should be carefully cut away from wooden abutments and inspections carried on systematically to see that this item is not neglected. Weed burners should be carefully followed and all fire in ties carefully put out. If this is not done all or a portion of the ties in a single panel of track may be consumed, permitting the rail to push out of gauge or to depress under traffic, and thus lead to a costly train accident.

Nor is the highway crossing free from its hazards. Planks should be taken up before freezing weather begins and all dirt on top of the ties and underneath planks cleaned out.

Flange-ways should receive special consideration and all ice, snow, or other material cleaned out carefully. Too many derailments have occurred due to snow and ice in flange-ways.

On gravel or dirt ballasted highways there is an added danger due to vehicles dragging stones or dirt upon the crossing and into the flange-way. Here it con-

acts under traffic, as more and more is deposited, until eventually the wheels of a passing train are lifted up and over the rail. Highway repairmen operating road-scrappers are sometimes careless or ignorant of these dangers. Track foremen should make it their duty to advise all such persons of the possible consequences of this dangerous practice.

So far very little has been said about inspections. It is, however, by regular and careful track inspections that incipient dangers may best be found and corrected. The trackmen, the foremen and the supervisors should train most carefully the men upon whom they are to rely. With sections rapidly becoming longer and longer, it is not always possible for the foreman to supervise his gang and also patrol his track. The track inspector therefore becomes the first line of defense. He must be able to think clearly and rapidly in whatever emergency may arise, always remembering that the safety of the train service rests in his hands.

Moreover, the foreman himself must be ready at all times of high wind, heavy rain, or any unusual weather conditions to patrol his track, and to him is given the power to preserve the lives of passengers and trainmen, and to him is given the privilege of speeding up the wings of transportation.

WEDNESDAY MORNING SESSION

October 3, 1934

Report of Committee on Prevention of Highway Crossing Accidents

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The speaker said in part: The report of this committee for the year 1933 again shows a slight reduction in the number of accidents and fatalities at railroad highway crossings and a substantial reduction in the number of injuries for the fifth consecutive year since the year 1928. The record is as follows:

Year	Accidents	Fatalities	Injuries
1928.....	5,800	2,568	6,667
1933.....	3,235	1,511	3,697
Reduction	2,565 (44%)	1,057 (41%)	2,970 (44%)

Casualties during the four months of June, July, August and September in the Careful Crossing Campaign, compared with the same period, 1928 to 1933, inclusive, were as follows:

Year	Accidents	Fatalities	Injuries
1928.....	1,799	858	2,092
1929.....	1,827	749	2,140
1930.....	1,371	640	1,505
1931.....	1,103	496	1,196
1932.....	899	432	1,022
1933.....	990	491	1,124

It will be noted that automobile registration in 1933 was 23,827,290, and represents an increase of 1.4 per cent over the preceding year; this is quite comparable with the number of automobiles registered in the peak year of crossing accident casualties.

Gasoline consumption, which is a fair barometer of automobile use, was 16,025,562,000 gallons during the year 1933; which is an increase of a trifle less than 2 per cent over the preceding year. The increasing use of smaller cars with greater mileage per gallon of gasoline, indicates that the traffic over and across railroad tracks was fully equal to that of 1932.