

eliminating serious injuries. Notable exceptions to this general situation are found in the public utility industry which has reduced fatalities 25 per cent and permanent partial disabilities 20 per cent during the last two years, and in the paper and pulp industry.

It is well known that periods of rising employment necessitate the training of new men, shifting of employees from one job to another, and other actions which are apt to be unfavorable from the standpoint of safety, whereas, during periods of reduced employment, many of these adverse conditions disappear. Industry has demonstrated, however, that all injuries, excepting permanent partial disabilities, can be reduced regardless of changes in industrial activity.

From 1928 to 1929, working time in 1500 industrial plants increased 11 per cent but the average fatality rate decreased almost 5 per cent and the frequency of temporary disabilities about 4 per cent. A decrease in working time of 17 per cent from 1929 to 1930 was then followed by a drop of 24 per cent in the frequency of temporary disabilities and a 5 per cent drop in fatalities.

The experience of our section has, in many respects, been similar to this. The records of 162 plants in our section that have reported in each of the last three years show a drop in frequency of 35 per cent from 1928 to 1930; most of which was made during the last year. Severity in these plants, however, rose about 21 per cent from 1928 to 1929 and decreased about an equal amount from 1929 to 1930. Variations in the frequency of fatalities largely account for the fluctuations in our severity. While the frequency of permanent partial disabilities has been up and down during this period, the severity of these injuries has steadily decreased, particularly during 1930.

The most consistent improvement in the section during the last two years is in the steel industry. Among 71 foundries the total frequency rate increased from 1928 to 1929, but was down sharply during 1930. The frequency of fatalities and permanent partial disabilities has increased steadily since 1928. Consequently, severity has risen from 1.51 to 1.88, and, in 1930, to 2.28. Although injury rates for similar establishments in the non-ferrous metallurgical industry were very high during 1929, 1930 rates compared quite favorably with 1928.

Seventy-three plants in the steel industry, on the other hand, decreased frequency 39 per cent and severity 15 per cent in comparison with 1928. Severity was higher in 1929 than in either 1928 or 1930 but frequency declined in each year of the period. The industry's fatality rate was highest in 1929 and lowest in 1928 but the frequency of permanent partial disabilities declined in each year of the period, the total decrease being 20 per cent.

This improvement was general throughout the various departments of the steel industry. Departmental records, available from 1929 and 1930, only, show that, out of 22 departments, frequency dropped in twenty and severity in eleven. The reductions in frequency and severity by structural and rail mills, seamless tube mills, plate mills, tin plate mills, and general mechanical departments were particularly outstanding because improvement was shown in both rates for each type of injury. On the other hand, departments that have particularly high fatality rates for 1929 and 1930 such as blast furnaces, general labor and coke plants showed no appreciable improvement in this type of injury.

Only seven departments in the steel industry with frequency rates higher than average, and of these, sheet and tin plate mills, open hearth, and seamless tube mills are most important because of their large exposure. These departments also have higher than average permanent partial disability rates, but, with the exception of the open hearth, low fatality rates. Fatalities, on the other hand, occur most frequently in open hearth, coke plants, blast furnaces, general labor, and general mechanical departments. In fact, these five departments account for over 50 per cent of all fatalities that occurred in the industry during 1929 and 1930, although their combined exposure is only slightly more than one-third of the total for all departments.

Permanent partial disabilities, however, are widely distributed. In proportion to man-hours worked, structural and rail mills, merchant mills, rod and wire mills, blooming and billet mills, transportation, open hearth, and seamless tube mills, have had the largest number of injuries of this type. Furthermore, those with the highest frequency rates for these injuries also have the highest severity rates.

You have noticed that the open hearth appears frequently in the high rate group, yet, some of our members have demonstrated quite conclusively that open hearth operations can be made as safe as any others in the industry. Sixteen of these departments, in 1930, had frequency rates below 10.0 and of these, all but four had severity rates below 1.0. In other words, the plants with the high frequency rates for this department are having the serious injuries.

You have no doubt noticed that a great deal of this report is given over to the steel industry, and in this connection, it may be in order to mention that the next year will no doubt see a system of departmental reports carried on into the machine industry, where I believe it will be a big help to all of us who are connected with that phase of the Metals Section. No doubt, most of us have a system of our own in our individual plant, but are not able to bring it out into a more detailed report.

It is a matter of general belief that accident experience in the Metals Section during 1931 will be even better than the past year. Operations, on the whole, have been low, but one of these days business will pick up, production schedules will be increased, then again will come the possibility of higher injury rates. Therefore, now is the time for plants and departments with records that are below par to look around, find their difficulties and correct them.

CHAIRMAN HENSEL: We are all very grateful to Mr. Schendel for reading this report and for giving us some sidelights on it. Have any of you noticed how the various departments of the steel plants have been split up in the annual report published by the Council? Have you any questions or any suggestions on the way the entire report has been handled?

G. G. GRIEVE (The National Safety Council, Chicago): The National Safety Council wishes all members of the Council to send in their 1931 accident reports. The number has grown each year and the increase should be continued in spite of the depression and hard times. Information on accidents in many industries is becoming more reliable. This is partly due to the increase in the number of reports.

MR. SCHENDEL: What is being done about getting accident records in the machinery industry by departments?

MR. GRIEVE: We are working on that. The idea is to enable members to compare the records of their entire plant and also records in the individual departments. For example, those with forge departments can check their records by comparing with other forge shops. The idea as applied to the machinery division seems a good one.

The first year the method was used in the steel industry we received departmental reports from about ninety-five percent of those reporting, which was exceptionally good. Last year the idea was followed out in the electric railway industry; we had a large increase in the number of reports and approximately seventy-five per cent covered experience by departments.

CHAIRMAN HENSEL: During the past year I showed various department heads where they stood as compared with some fifteen or twenty similar departments of other companies. Some of those fellows were surprised to find that they stood near the top and others that they stood near the bottom.

D. E. SHANNON (Fort Pitt Malleable Iron Company, Pittsburgh, Pa.): I suggest the report be given in chart form to give us a chance to take notes.

CHAIRMAN HENSEL: I think that is a good suggestion. It will be taken up with the program committee of another year.

The next paper will be delivered by C. P. Waite, assistant supervising engineer, the Travelers Insurance Company, Chicago.