

The Railway and Marine World

July, 1912.

The June Railway Mechanical Conventions at Atlantic City.

The two great railway conventions of the year, the Master Car Builders' Association and the American Railway Master Mechanics' Association, were held at Atlantic City, N.J., the former on June 12 to 14, and the latter on June 17 to 19. The most important features of these annual conventions are the reports of the standing and special committees, the principal ones of which are given on this and following pages, either in full or in abstract:—

The Maintenance of Superheater Locomotives.

The Master Mechanics' Committee, R. D. Smith, Superintendent of Motive Power and Rolling Stock, Boston and Albany Rd., chairman, and of which H. H. Vaughan, Assistant to the Vice President, C.P.R., is a member, reported as follows:—

Your committee was instructed to consider and report on: The best metal for cylinder and steam chest bushings; the best metal for valve and piston rings; the best means of lubricating superheater locomotives.

In order to obtain as much data as possible upon which to base its report, the committee issued a circular of inquiry to the members; the different questions and an outline of replies received being as follows:

The total number of superheater locomotives in service on the railways answering our circular is 2,222, of which 1,748 are of the fire-tube type and 474 of the smoke-box type. So far as the committee is able to ascertain, there are about 2,500 superheater locomotives of the fire-tube type now operating in the United States and Canada, so that the replies represent 70% of the total number of locomotives now in service, using highly superheated steam. This is an exceptionally large percentage and indicates the great interest taken in the use of superheated steam on American railways. In addition to the 36 railways mentioned, replies were received from a number of roads stating their experience had been so limited they did not feel justified in answering the circular.

The following types of superheaters are in use on the railways replying to the circular: Schmidt, Cole, Emerson, Vaughan-Horsey, Baldwin, Jacobs and Vauclain. Of these types, the first four are fire-tube superheaters and the other three smoke-box superheaters.

The results are not based on any particular type of locomotive, as many different classes or types were reported as having superheaters, among which are Pacifics, Consolidations, Mallets, Prairie, Mikado, Mountain and 10-wheelers.

Superheater locomotives have been operating on American railways for 11 years, but most of the 36 roads referred to have been operating them for at least one year.

As might be expected, the steam pressures and degrees of superheat vary considerably on the various types of locomotives on different roads, the maximum steam pressure being 220 lbs. per sq. in., and the minimum 150 lbs. per sq. in. The degrees of superheat, that is, the excess in temperature of

superheated steam over the temperature of saturated steam at same pressure, varies from 100° to 250° F. for fire-tube superheaters and from 10° to 65° F. for smoke-box superheaters. The temperature of superheated steam as used in locomotives rarely exceeds 600° F.

Twelve roads reported that cylinder and steam-chest bushings on superheater locomotives wear out more rapidly than on locomotives of the same classes using saturated steam, and 20 roads replied that there is no perceptible difference in the wear of cylinder and steam-chest bushings between locomotives using superheated steam, as now operated, and those using saturated steam. All roads reporting more rapid wear on superheated steam than on saturated steam locomotives have superheaters of the fire-tube type, giving a high degree of superheat, but all roads having superheaters of this type do not report more rapid wear of bushings.

Fourteen railways report that valve-packing rings of superheater locomotives wear out more rapidly than those of saturated steam locomotives of the same classes, and 17 roads state there is no appreciable difference between the wear of the rings on superheater locomotives as now operated and those of saturated steam locomotives.

Sixteen roads report they have found Hunt-Spiller gun iron the best metal for cylinder and steam-chest bushings, and one other road intends to use this iron for cylinder and steam-chest bushings of new locomotives. Nine roads state they are using grey iron for bushings, three roads use the same metal for the bushings of superheater locomotives as is used for saturated-steam locomotives, and one road is undecided as to the best metal.

All the roads favoring the use of Hunt-Spiller gun iron for bushings also favor its use for piston and valve packing rings, and two other roads report using this material for rings but do not use it for bushings.

The ordinary "L" type of spring packing ring is used for valve packing on practically all the railways, and most of them use the ordinary rectangular section rings for piston packing.

Have you used and do you favor the use of packing rings having equalizing holes drilled radially through packing rings to eliminate pressure caused by steam leaking under them? The object of this question was to learn whether any American railroads had adopted packing rings having equalizing holes drilled radially through the ring. Of 36 roads replying, there are but four which have used this type of packing ring and the replies indicate there is no particular benefit to be derived from such a design.

The use of piston rod or valve stem extensions is so closely allied to the consideration of the wear of cylinder and steam-chest bushings, we thought it advisable to include this question in our circular. Replies also placed us in position to better understand conditions under which superheater locomotives are operating. Eighteen roads use piston-rod extensions and 12 use valve-stem extensions, but three of the 18 roads

using piston-rod extensions are eliminating them.

Eight roads favor the use of piston-rod extensions, nine favor the use of valve-stem extensions, and six advocate the use of piston-rod extensions on superheater locomotives having large and heavy pistons. Eleven roads are opposed to the use of either piston-rod or valve-stem extensions and two are undecided as to their desirability.

Twenty-three roads report there is no unusual difficulty in properly lubricating the cylinders and steam chests of superheater locomotives as they are now operating. Five roads report it is difficult to properly lubricate superheater locomotives, and three state that trouble was experienced at first, but the use of a different grade of oil has overcome the trouble. One road using balance slide valve states it is difficult to properly lubricate the valve, but no difficulty is encountered in lubricating the cylinders. Reports indicate it is no more difficult to lubricate locomotives with smoke-box superheaters than to lubricate the ordinary saturated steam locomotive.

Twenty-nine roads report using hydrostatic feed lubricators with entirely satisfactory results. There is but one road using mechanical feed lubricator exclusively. Of the roads now using hydrostatic lubricators, four had formerly tried mechanical feed lubricators. The advantages of the hydrostatic lubricator are its reliability, simplicity of construction and ease of regulation as compared with the considerable number of moving parts of mechanical feed lubricators and the tendency of the latter to wear and get out of order.

Atomizers are used on three roads to deliver oil to steam chest of superheater locomotives and results are reported as satisfactory, but we are of the opinion that without atomizers, when the oil is discharged into the steam passageway above the entrance to the steam chest it is partially atomized, which would seem to be desirable. Replies indicate no advantage is derived from the use of an atomizer.

There are a number of different arrangements of oil pipes on superheater locomotives which may be divided as follows: The most common arrangement is that in which the oil is delivered at the centre of steam chest and at the centre of cylinder. Another arrangement is that in which the oil is discharged into the steam passageway above the entrance to the steam chest, with an independent connection to the centre of the cylinder. Some roads use oil connections to both ends of the steam chest, with an independent connection to the centre of the cylinder. A common arrangement, and one that is growing in favor, has a connection which discharges oil into the steam passageway only. It is claimed that the oil is thoroughly mingled with and distributed by the steam. A few roads report having oil connections to the centre of the steam chests only.

Twenty roads consider it necessary to lubricate the cylinders of superheater locomotives independent of the steam chest, eight roads that it is unnecessary and two are undecided.