

# Co-Ordination of the Various Branches of the Mechanical Department.

By W. U. Appleton, Superintendent of Motive Power, Canadian Government Railways, Moncton, N.B.

A system for regulating and combining the various branches of the mechanical department into one organization that will produce satisfactory service in the general repair shop and the operating department, obviously, must be broad and definite in its principles. Harmony between the various officers is essential, and the relationship between the branches must be very intimate. Success cannot be obtained if the general repair shop and the operating departments are not closely allied, as if the shop superintendent is working with the one object, "output," and the operating officers are not making every effort to obtain the greatest mileage from the locomotives, consistent with good service and economy, failure is sure to result.

In order to get results, it is necessary that we should have that co-operation, whereby the shop superintendent and all his subordinate officers are giving the same attention to proper repairs as to output, and it should be the object and pride of every master mechanic and his subordinate officers to obtain the greatest mileage between shoppings with the least number of failures. To repair a locomotive quickly, cheaply and properly, should be the ambition of the shop superintendent. To maintain it in service, with a minimum expense and the greatest number of miles between failures and shoppings, should be the aim and object of the master mechanic.

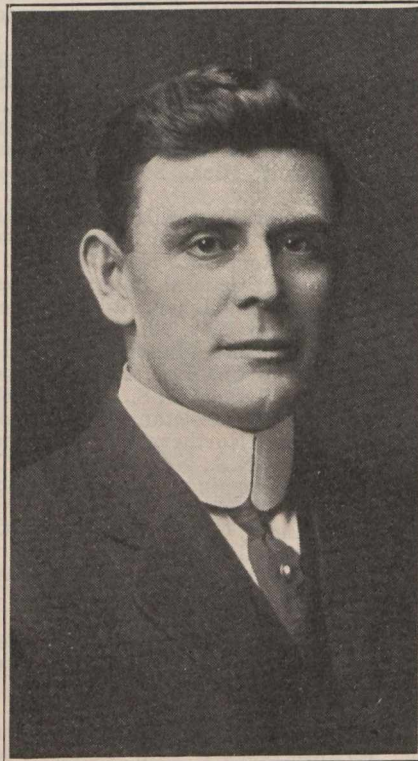
When locomotives are sent to the shop, there should be some system of defining the class of repairs required, and the writer believes that three classes, as described below, is the best method from the different points of view and sufficient to take care of all repairs. No. 1—General repairs, including a new firebox, a new cylinder or other such extra heavy repairs. No. 2—Ordinary general repairs. No. 3—Specific repairs that may be carried out at the roundhouse or shop. Abbreviations as follows should be used in conjunction with the numbers to describe specific repairs:

- No. 1, Repair—  
Convers. means conversion to superheater, etc.  
Boil. means new boiler.  
F. B. means firebox.  
Cyl. means cylinder (1 or 2).  
Fra. means frames.  
Int. means internal examination.  
Ext. means external.  
Der. means derailment.
- No. 2, Repair—  
Ext. means external.  
Der. means derailment.  
T. means new tires.
- No. 3, Repair—  
T. T. means tires turned.  
Fr. W. means frame welded.  
An. T. means annual test.  
In. means internal examination.  
TU. means fixing up tubes.  
DB. means driving boxes.  
Der. means derailment.

No. 1 or no. 2 repairs should not indicate any difference in the condition of the locomotives when turned out of the shop, as far as the operating department is concerned, as the distinction is only made for the information and assistance of the shop force in effecting repairs, and either of these repairs should represent a locomotive in first class condition in every respect, and capable of making the standard mileage of its class, according to the physical characteristics of the division on which it is employed and the service it is in.

The condition of all parts of the locomotive should be as nearly balanced as

possible, in order to obtain the greatest mileage with the least loss of service, and it is false economy to turn locomotives out of the shop, represented as having received the above classes of repair, with certain parts somewhat worn, due to having been renewed a short time previous to shopping. For instance, it may seem wasteful to renew tubes or some part of the machinery that is apparently still capable of making considerable mileage, but as these parts will become defective and make renewal necessary before those that were brought up to standard of shop practice, the result usually is: locomotive out of service when badly required—delay in effecting repairs—and higher cost of doing so on account of lack of facilities



W. U. Appleton,  
Superintendent of Motive Power, Canadian  
Government Railways.

at locomotive houses as compared with shops.

No. 3 Repair—This differs entirely from those referred to. It represents specific work and may be done at locomotive houses or shops, and is sometimes the result of an accident or failure of some particular parts, but is generally due to ordinary wear and tear of certain parts of the locomotive that are subject to the most severe service. The parts subject to the greatest wear would not, if the locomotive is properly maintained while in service, represent sufficient work to justify a no. 1 or no. 2 repair, and in order to enable these parts to continue their work until the locomotive is generally worn to the extent necessary to justify a shop repair, it is usually economical to effect such repairs.

The latter class of repair generally consists of partial renewal of tubes and flues, rod bearing work, lining up wedges, examination of pistons and valves, refitting main driving boxes and sometimes tire turning, and removal of lateral play from

wheels. The parts requiring attention will, of course, be found to vary considerably with the different classes of locomotives, as well as with the different classes of service they give and the subdivisions on which they are employed. In some classes of locomotives, on some subdivisions, the tubes and flues will run from shopping to shopping with very little trouble, while others on the same division, or the same class on other division will require partial renewal when little more than half the required mileage has been accomplished.

The constant introduction of larger power is so changing conditions as to make the question of doing no. 3 repairs at locomotive houses one of considerable controversy, and the question naturally arises as to the best method of taking care of this work. In the writer's opinion the no. 3 repair should be continued and not confused with the heavier repairs under classes 1 and 2, this being important in order to determine the condition of the power at all times, based on mileage made according to class of repairs, and to avoid expenditures being made on the power that should not be necessary.

Facilities at locomotive houses are generally inadequate to take care of this work, except on the smaller and medium classes of power. At locomotive houses where there is a heavy fluctuation in traffic, it is an advantage to have a no. 3 repair gang, as it enables those in charge to hold their staff together and they can be employed to advantage on running repairs when necessary.

In general repair shops, where the work is done on schedule and arranged so that the locomotives will be turned out at regular intervals and no. 3 repairs cannot be taken care of without interfering with the regular work, it is a debatable question as to the advisability of breaking up the organization in order to take care of this work, although under existing conditions there is usually no alternative. The changing conditions will, no doubt, make it necessary to provide certain space in general repair shops for this class of work, where it may be done at lower cost than at locomotive houses, but where locomotives have to be hauled or worked a long distance, to get to the general repair shop for such repairs, it might be advisable to provide a small shop for this class of repair, if the number of locomotives tributary to the same is sufficient to justify it.

To enable the shop superintendent to plan his work and maintain his schedule, it is only fair that he should be given all the advice possible as to the class of repair, and a list of the important parts that require replacement at least 30 days in advance of the locomotive going to the shop. While it may not always be possible to do this on account of locomotives being damaged in accidents, there is no reason why it cannot be done to a very large extent in ordinary service. A form for reporting the work, as shown herewith, has been found to be very satisfactory.

When making out this report of shop repairs required, master mechanics should devote particular attention to the note advising them to describe any special or unusual defect.

We all know that when a group of locomotives is built from the same drawings,