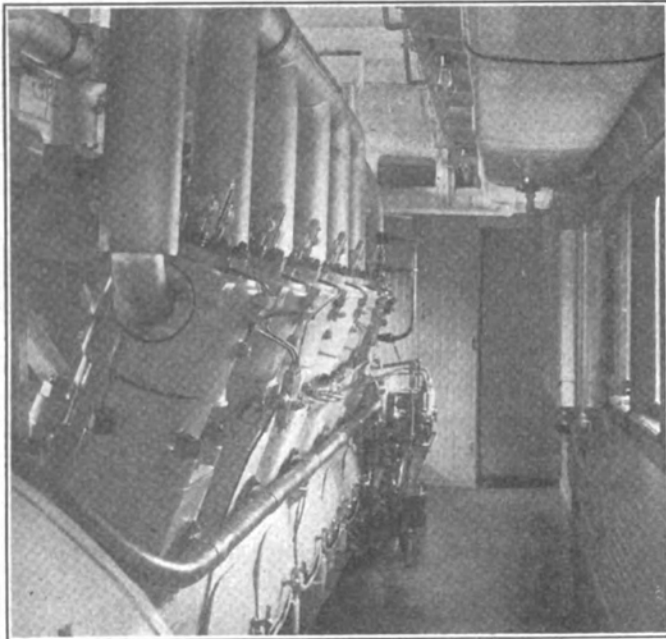


have, however, been introduced in the later designs of motor cars. The cooling water for the Diesel engines is now re-cooled in a number of radiators similar to those used for gasoline motor trucks, mounted on the roof of the car as shown in one of the illustrations. Cooling is effected by means of a fan-blower driven directly from the main engine and is thus independent of speed. The motors are now arranged to be connected either in series or in parallel.

In addition to low fuel costs, one-man operation and little time or attention required at terminals, experience has shown that Diesel-electric motor cars can make a greater mileage



Engine Room of 250 Horsepower Diesel-Electric Motor Car

per day, spend less time in the shop and run for much longer periods without a general overhauling than steam locomotives. They are capable of making 50,000 to 60,000 miles per annum. Even after being taken in for overhauling after some 60,000 miles it has been found that the largest item of expense is for dismantling and reassembling.

While the Diesel motor car or locomotive will undoubtedly be still farther perfected and adapted to a wider railroad field of usefulness, indications point to a much more general employment of this general type of motor in the near future.

The Co-Operative Switching of Joint Tracks Succeeds at Seattle

EARLY IN 1918 PLANS were formulated by the operating officers of the United States Railroad Administration on the Pacific Coast for the unification of the terminals of the railways entering Seattle, Tacoma and Everett, Wash. These plans were put into effect about September 1, 1918, and remained in operation until the termination of federal control. (See *Railway Age*, September 1, 1918, page 203.)

On March 1, 1920, the various facilities were returned to their respective owners and independent operation of both freight and passenger terminals was resumed, with the exception that a so-called zone plan of switching was developed by the Northern Pacific, the Chicago, Milwaukee & St. Paul, the Oregon-Washington Railroad & Navigation Company, and the Great Northern, to apply to certain districts where these roads were jointly interested or where two or more of them had private tracks serving the same industry. The thought underlying this zone plan was that

one locomotive could perform the switching service for all of the interested roads at such points. Seven such zones were created, two of which were assigned to each road with the exception of the St. Paul, which assumed charge of one.

The arrangement which has been perfected provides that the line handling the switching within this zone shall furnish the locomotives and crews and assume all of the expense incident to the joint operation, the cost being divided on the basis of the number of cars handled. A daily report is made to the officer in charge of the zone, showing the time that each locomotive enters and leaves the zone, the time spent in it and the number of cars moved into and out of the zone for each of the participating companies. The intra-zone switching revenue collected is credited to each zone separately, while locomotive expense is charged at a flat rate varying from \$9 to \$10.50 per engine hour according to the class of locomotives used.

Joint interchange tracks have been established convenient to most of the lines entering the city. Certain tracks have been set aside for receipt and delivery of cars to each line. The arrangement requires that direct interchange be made with the railroads operating each zone. The usual interchange reports are submitted to cover the movement of all cars. Joint car inspectors have supervision over the equipment moving in interchange and when necessary make light repairs for all lines, this expense being divided on a car basis as is the cost of joint yard checkers working on the interchange tracks. The maintenance of the interchange tracks is distributed on the basis of ownership.

Enginemen and switchmen engaged in zone switching are considered joint employees, when within the limits of the zone, for the purpose of determining liability. All expense incurred on account of loss or damage to engines or tracks, or because of the injury or death of a joint employee or third person is considered part of the zone switching expense, while the loss or damage to cars or contents is assumed by the road for whom the car is being handled.

The carding system for cars is in force throughout the terminals and all cars are returned to the delivering line, loaded or empty. When cars are switched to or from a track belonging exclusively to one road within the zone the tariff rate is charged and such cars are not counted as zone expense, nor is the time of the locomotive or crew engaged in switching upon such a track charged to the zone. Reclaim is allowed on cars switched to tracks jointly owned or used.

It has been found desirable to make interchange reports of all cars moving to or from zones in order to maintain proper car records. A copy of the daily yard check is furnished by each zone to all of the lines interested. The agents and general yardmasters of the lines operating the various zones are held jointly responsible for these records and for the proper performance of the switching service. The maintenance of tracks within a zone which belong exclusively to one road is handled by the owner, while the maintenance of tracks owned or used jointly is divided on a car basis. Each road looks after its own demurrage.

Under the unified plan of terminal operation put in effect during federal control, the switching cost of handling cars in the Seattle terminal varied from a minimum of \$2.09 in June, 1919, to a maximum of \$3.56 in January, 1919, whereas the zone cost per car to all lines during 1921 was approximately \$1.61. While the figures covering the cost of switching all cars, including those handled by non-zone engines for all lines are not available, the average cost per car for two of these lines was approximately \$1.68. In comparing these figures due allowance should be made for the fact that the yards were not as congested in 1921 as they were during the war. However, the cost of switching has been greatly reduced and the service improved by the plan.

We are indebted for this information to J. H. O'Neill, general manager of the Western lines of the Great Northern.