4-8-4 Type Locomotives on the Northern Pacific

Ten Baldwin Engines, Built in 1934, Are Doing Exceptionally Fine Work

IN 1934, The Baldwin Locomotive Works built ten locomotives of the 4-8-4 type for the Northern Pacific Railway. These locomotives, designated by the Railway Company as Class A-2, were designed for passenger service. They have driving wheels 77 inches in diameter, develop a rated tractive force of 69,800 pounds, and rank among the largest of their type thus far built. They can traverse curves as sharp as 20 degrees, and are suitable for operation on grades up to 2.3 per cent.

● It is a pleasure to acknowledge the courtesy of the Railway Company in furnishing data and photographs used in the preparation of this article.—*Editor.*

The Class A-2 locomotives were specially designed to burn Rosebud coal, which is a species of sub-bituminous coal found in Montana. It occurs close to the surface and is obtained by strip mining. The coal as mined has a moisture content varying from 22 to 28 per cent, ash 7 to 9 per cent and a heating value of 8,750 B.t.u. per pound. To burn a sufficient quantity of this fuel, Class A-2 is provided with a grate area of 115 square feet, and the stoker —a Standard modified type B—has a capacity of 25,000 pounds per hour. The firebox has a long combustion chamber, and contains a brick arch supported on five water tubes. The superheater is a type E. Worthington feed-water heaters are used on five locomotives, and Wilson feed-water conditioners on the remaining five.

Class A-2 has a one-piece cast steel locomotive bed, with integral cylinders. Walschaerts valve motion is used, and when working in full gear steam is cut off at 81 per cent of the stroke. The valves have a steam lap of $1\frac{5}{8}$ inches, an exhaust clearance of $\frac{3}{8}$ inch, and a maximum travel of $7\frac{3}{4}$ inches with a lead of 9/32 inch. The crossheads are underhung, and the guides are of the multiple bearing type. Boxpok driving wheels centers of hylastic vanadium steel, furnished by the Standard Steel Works Company, are used. The main wheels are cross-balanced.

These locomotives are doing fine work in heavy passenger service. Six of them are operating on the Fargo and Yellowstone Divisions between Jamestown, North Dakota, and Livingston, Montana, a run of 664 miles. Between Jamestown and Glendive, a distance of 323 miles, the profile is undulating, with maximum grades of 1.1 per cent. Between Glendive and Livingston, 341 miles, there is a gradual ascent westbound, the maximum grades being 0.5 per cent.

During the summer months, train loads average from 12 to 19 cars, and in one case 21 cars were handled east-bound out of Livingston.

The monthly mileage per locomotive averages approximately 9,000. During the winter, when trains average about 12 cars, the monthly mileage per engine averages between 7,500 and 8,000. Overhauling is done during the winter months, so that all the locomotives can be kept in service throughout the rush season, which lasts from June 1 to September 15.

The remaining four Class A-2 locomotives are in service on the Rocky Mountain Division between Livingston and Missoula, Montana, a run of 240 miles, on which two mountain ranges are crossed. In this service, each locomotive averages approximately 7500 miles per month. Helpers are used on the steepest grades, which reach a maximum of 2.2 per cent out of Butte and Helena, and 1.8 per cent between Livingston and West End.

Up to the end of September, 1937, the Class A-2 locomotives had made total mileages of between 125,000 and 150,000 per engine without receiving classified repairs. Tires were first turned after making 90,000 miles. During a 30-day interval last summer, while making a test to determine the maximum mileage between washouts, locomotive 2659 made in this period 17,874 miles, representing remarkably high availability.

In view of the success achieved by the Class A-2 locomotives, eleven additional locomotives of generally similar design are now being built by Baldwin. Eight of these are intended for service on the Northern Pacific, and three on the Spokane, Portland and Seattle Railway. With this addition to its motive power equipment, the Northern Pacific System will be well supplied with the most modern type of power to handle the air-conditioned "North Coast Limited" and other high-class passenger trains moving over its lines.

One of the Ten 4-8-4 Type Locomotives Built by Baldwin for the Northern Pacific in 1934.

This locomotive has covered 17,874 miles in a 30-day period.

Cylinders .....28″ x 31″	Tubes—Diameter ....3½″ & 2¼″	Wheel Base—	Weight on drivers .....293,500 lb.
Drivers, diameter .....77″	Number ....3½″, 217; 2¼″, 50	Driving .....20′ 8″	Weight, total engine....489,600 lb.
Boiler, diameter .....88″	Length .....19′ 6″	Rigid .....13′ 4″	Weight, total tender....388,350 lb.
Steam pressure .....260 lb.	Grate area .....115 sq. ft.	Total engine .....48′ 5″	Tank capacity ...20,000 U. S. gal.
Firebox, length .....162″	Water heating surface..4,964 sq. ft.	Total engine and tender...95′ 3″	Fuel capacity .....27 tons
Firebox, width .....102¼″	Superheating surface ..2,174 sq. ft.		Tractive force .....69,800 lb.