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The C. M. & St. P.'s New Electric Locomotives

What may be classed as one of the notable achievements of the Westinghouse Electric & Manufacturing Company during the past year, was the completion of the largest and most powerful electric passenger locomotive ever built.

This locomotive is one of ten being built by the Company for the Chicago, Milwaukee & St. Paul Railroad Company, to be used between Harlowton, Montana, and Avery, Idaho, a distance of 440 miles, or approximately the same distance as between East Pittsburgh and New York.

These locomotives will be used in passenger service and will handle such famous trains as the Columbian and the Olympian, which are made up of eight to twelve steel Pullman cars. On grades similar to that of the Pennsylvania Railroad at the Horseshoe Curve, one of these locomotives will haul such a heavy train at a speed of approximately 25 miles an hour, and on level grades will be able to attain the maximum speed of 65 to 70 miles per hour, which is the greatest speed permissible.

The construction of these monster engines presented many difficult problems to both the Engineering Department and to the Shop, and a portion of the Engineering Department was actually moved down to the railway shop so that it could give immediate attention to all items requiring engineering or drafting information. In other words, it placed the draftsman and the engineers right on the job so that the shop force could be advised of the various questions as they arose, without losing time in making up drawings. In like manner, the production of this locomotive was materially hastened.

More than two hundred persons were directly interested in this construction, and these are all shown in the illustration excepting the men on night turn. Technical Students on the Westinghouse Graduate Student Course did a large part of the wiring of the control mechanism with its infinitude of contactors, relays, cut-outs, and various safety devices.

Following is a table of the sizes and ratings of these locomotives:

Classification	4-6-2-2-6-4
Total Weight of Locomotive	275 tons
Weight on Driving Wheels	336,000 pounds
Number of Driving Axles	6
Weight on Leading Bogie Truck	66,000 pounds

Weight on Trailing Pony Truck	41,000 pounds
Total Wheel Base	79 ft., 10 in.
Driving Wheel Base	16 ft. 9 in.
Rigid Wheel Base	16 ft., 9 in.
Diameter of Driving Wheels	68 inches
Diameter, Bogie and Trailer Wheels	36 inches
Capacity—One Hour Rating	4200 horsepower
Tractive Effort—One Hour Rating	66,000 pounds
Height from Rail to Top of Cab	14 ft., 6 in.
Height from Rail to Top of Locked Pantagraph	16 ft., 7⅞ in.
Height from Rail over Heating Boiler Stack	17 ft., 0 in.
Width over Cab	10 ft., 0 in.
Length of Cab	78 ft., 0 in.
Length Overall	88 ft., 7 in.
Voltage of Trolley	3000, Direct Current
Normal Height of Trolley Wire	24 ft., 0 in.
Gauge	4 ft., 8½ in.

Service Capacity: One of these engines will alone handle the largest trans-continental trains over the electrified section between Eastern Montana and the Pacific Coast, including the intervening mountain ranges.

One of the problems encountered was that of placing the cab with its equipment upon the trucks, and special lifting devices were necessary whereby three cranes could be used at one time. This was one of the most intricate, if not the heaviest lift that has ever been made.

It has been asked, "What are the advantages of the Electric Locomotive over the Steam Locomotive?" Briefly, this is the answer:

To operate heavy trains at higher average speeds is the object sought for by progressive railroad men. The application of heavier and more powerful locomotive equipment is necessary. To supply this, with the established reliability and safety of operation, with a lessened destruction of rails and road-bed, and with even more pleasant working conditions for the operatives, was the problem solved by the engineers and shops in building this great locomotive. It represents the present maximum in single cab construction, carrying within one room, with the exception of the main motors themselves, all control and auxiliary equipment, including a vertical tube train heating steam boiler with water and fuel oil storage tanks. Fullroad clearances were availed of and such wheel,

running gear and equalization arrangements were adopted as would not impose undue concentration of weight on the track, either vertically or longitudinally. All engine parts and equipment are fully spring-borne with the exception of axles, wheels and journal boxes. The power is transmitted to the driving wheels through a non-friction spring drive.

The result is an engine—the most powerful in passenger service in the world—with unexcelled tracking qualities, flexible and easy on the track and capable of hauling the heaviest trans-continental passenger trains at the highest permissible speeds.