

CANADIAN PACIFIC 3100-3101

4-8-4 Class K-1-a



3100 when new (1928)

Late in the summer of 1928, a significant new locomotive design emerged from the Angus Shops of the Canadian Pacific Railway. This was embodied in two heavy Northern type engines numbered 3100 and 3101. Used during the running-in period between Smiths Falls and Montreal, they were later put in heavy passenger service between Toronto and Montreal, supplementing the two smaller and older 4-8-2s, 2900 and 2901.

3100 and 3101 were the first locomotives of their type on the Canadian Pacific and, as events were to show, the last. They embodied many features new to Canadian railway practice, and remained on their designed service for more than 25 years.

The hope of the designers was to produce an engine which best combined high tractive effort with low engine weight. These were the first locomotives in Canada to employ the one-piece cast-steel frame. The single frame casting for each locomotive weighed 23 tons, which represented a saving of about two tons over a fabricated frame of the same capacity. The cylinder and valve chest casings were also in the form of a single casting, the first such instance in Canada; this resulted in additional strength with a 25% weight reduction. The tender frame was also a single casting.

Additional weight saving was effected in the construction of the boiler. Nickel steel was used to a greater extent than in previous designs, resulting in another substantial weight reduction. Nickel alloys were used in all reciprocating parts and in many minor cast components.

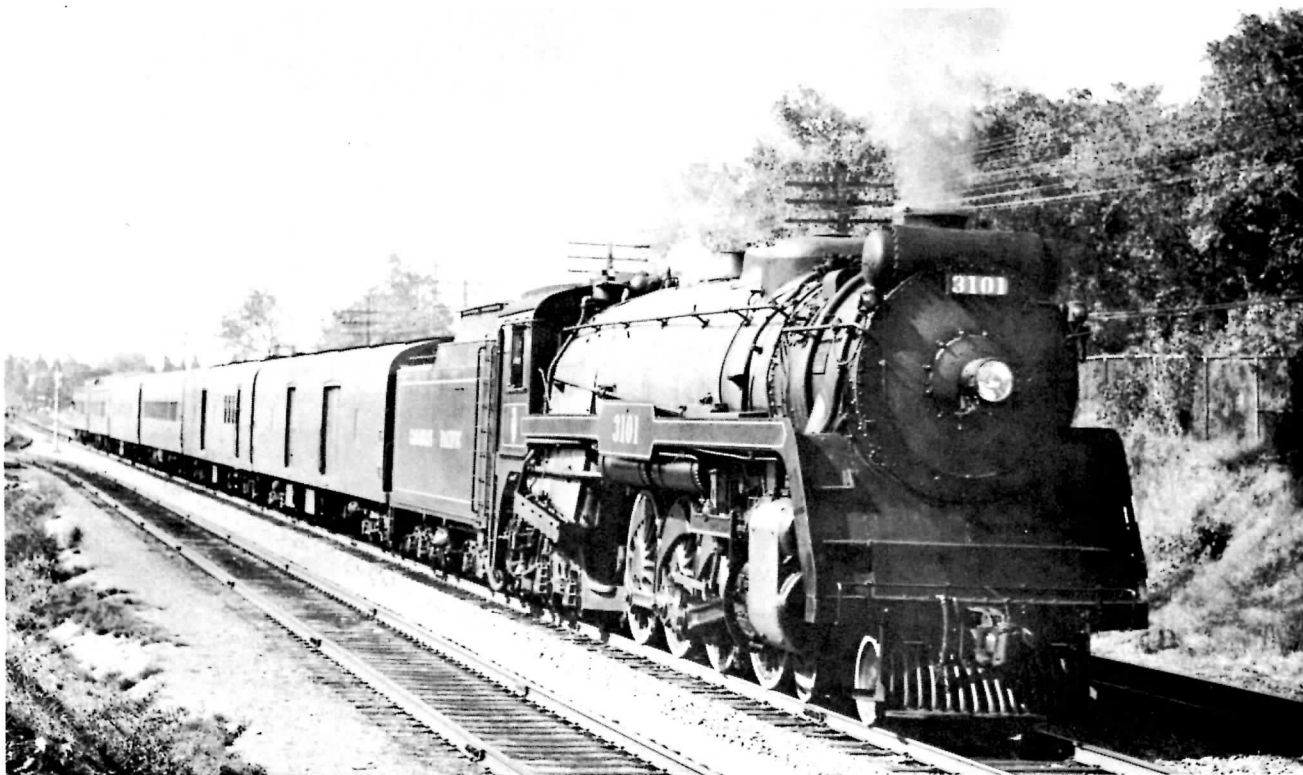
Despite the comparatively low engine weight, the high tractive effort of 60,800 lb. resulted from the employment of steam at 275 lb. pressure, considerably higher than any other Canadian locomotive at the time. This tractive effort was slightly higher than that of the Canadian National's 6100-class 4-8-4s introduced the pre-

vious year, though the starting effort of the latter, which were fitted with boosters, was slightly higher than that of the Canadian Pacific engines.

3100 and 3101 were employed almost exclusively between Montreal and Toronto until displaced by the omnipresent diesel in March 1954. Before they were many years old, their appearance was modified by the installation of "elephant ears" smoke deflectors, and the engine number was moved to the centre of the running board which was widened to receive it; this was a distinctive feature of many of the Canadian Pacific's larger engines. A photograph of 3100 in this condition appeared in Bulletin 52. The smoke deflectors were later removed.

Upon the introduction of diesels on the passenger service between Toronto and Montreal, 3100 and 3101 were employed for a time east of Montreal, but before long were converted to burn oil fuel and transferred to the Western Region operating out of Winnipeg. At this time they lost their maroon, black and grey passenger colour scheme to appear in more conservative black, though retaining the gold striping on the running board and tender sides. After about three years in Western service, however, they were relegated to storage where they remain at time of writing, awaiting an uncertain future.

In the summer of 1947 it was believed in many railroad circles that 12 additional 4-8-4s, to be modernized versions of the 3100s, had been ordered for service between Toronto and the Lakehead. Unfortunately, this belief proved groundless, and they remained the only examples of their type on the Canadian Pacific, which may seem strange in view of the enthusiasm with which the Canadian National adopted the Northern type. Nevertheless, many of the innovations of the design of the 3100s were adopted in building the many Hudson (4-6-4) and Royal Hudson locomotives for which the Canadian Pacific is famous. The two Northerns were thus not without influence on Canadian steam locomotive development.



3101 at Montreal West, Sept. 20, 1954. (F.Sankoff Photo)

Numbers	3100-3101	Tubes	7, 3 $\frac{1}{2}$ " and 59, 2 $\frac{1}{2}$ "
Construction	Angus Shops, Can. Pac. Rly.	Flues	196, 3 $\frac{1}{2}$ "
Class	K-1-a	Length of tubes	20'6"
Maximum Height	15'7"	Combustion chamber, length	5'0"
Maximum Width	10'8"	Heating surface, firebox and arch tubes	422 sq.ft.
Weight (engine plus tender)	709,000 lb.	Heating surface, tubes and flues	4509 sq.ft.
Weight (engine only)	423,000 lb.	Superheating surface	2112 sq.ft.
Weight (on drivers)	250,000 lb.	Firebox	140 3/16" x 96"
Rigid Wheelbase	19'9"	Grate area	93.5 sq.ft.
Engine wheelbase (total)	45'9 $\frac{1}{2}$ "	Valves	7" travel, 14" diam.
Overall wheelbase	87'0 $\frac{1}{2}$ "	Lap: 1 1/8"; lead	$\frac{1}{4}$ "
Length overall	97'5 $\frac{1}{2}$ "	Cylinders	25 $\frac{1}{2}$ " x 30" stroke
Driver diameter	75"	Tractive effort	60,800 lb.
Boiler, type	Conical	Factor of adhesion	4.12
Boiler, diameter outside, first ring	84 $\frac{1}{2}$ "	Valve gear	Walschaert
Working pressure	275 lb./sq.in.	Tender capacity	12,000 gal., 18 $\frac{1}{2}$ tons

Plans for these locomotives will be found in the book "One Hundred Years of Steam Locomotives" and in the October 1928 issue of "Canadian Railway and Marine World", a predecessor of "Canadian Transportation".



3101 in storage at Weston Shops, October 1957. (W.Krawiec Photo)

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