

THE
CANADIAN
PACIFIC
1957
GERMAN
DIESEL

From Kiel to Kazabazua

German Diesel Tested On Company Lines

SINCE INAUGURATION of the Company's motive power dieselization policy, we have grown accustomed to the stereotyped designs of Canadian diesel locomotives from the three large manufacturers. Anyone "in the know" can tell a CLC Fairbanks-Morse, an M.L.W., or a General Motors unit on sight, in much the same manner as habitués of the highway identify Fords, Dodges, Cadillacs or Studebakers.

Consequently, it came as a bit of a surprise to Canadian railway men during the past summer, to catch glimpses of a small diesel locomotive carrying the number 1000, which resembled nothing ever seen on this side of the Atlantic before. No. 1000 goes by the trade nickname "MaK" which is an abbreviation of the real name of its owners and manufacturers, the Maschinenbau Kiel Aktiengesellschaft, of Kiel, West Germany. Having a considerable following on the continent and elsewhere, the owners of this unusual looking but very efficient unit decided to introduce their locomotive in the Western Hemisphere.

In one particular respect, No. 1000 resembles a steam locomotive, that is in its running gear which consists of eight spoked and counterbalanced driving wheels, 49 $\frac{1}{4}$ " in diameter, which are connected by means of side rods. The unit was built in Kiel in 1953 and, after extensive tests in Europe, it was sent as a demonstrator model to Cuba. Following this, at the beginning of May this year, the engine was loaned to Canadian National Railways for trials on that company's lines in the Montreal area and in Nova Scotia. In July, No. 1000 was turned over to Canadian Pacific Railway, for two months' tests. The Company had the unit until the end of August, when the engine was returned to builders' agents who are having winchization modifications made by the Canada Machinery Company at Galt, Ontario, prior to conducting tests under cold season conditions on Canadian National Railways in northern Ontario.

The means of transmission and utilization of the energy produced by the diesel engine, is another way in which this 66 $\frac{1}{2}$ -ton road switcher departs from its counterparts used on Canadian railways. The locomotive has mechanical rather than electrical transmission to the wheels, hence the use of a jack or layshaft which transmits motion to the siderods, and through them to the driving wheels. Coupled between the MaK eight-cylinder diesel engine and the layshaft is a Voith torque converter, similar to an automobile fluid drive, which has been applied to more than 1,000 other diesel-propelled railway units, manufactured in the British Isles and on the Continent. Naturally, the use of mechanical transmission dispenses entirely with the need for generators and electric traction motors, which are familiar features of diesel-electric locomotives.

No. 1000 is rated at 800 horsepower. It is half-an-inch short of thirty-six feet long over coupler pulling faces. The locomotive has an overall height of 13'11 $\frac{1}{2}$ ", an extreme width of 9'7 $\frac{1}{2}$ ", and a rigid wheel base of 30'8". These specifications reflect the smaller clearances of European trains and as a consequence, the MaK unit is very compact machine by North American standards.

The locomotive was tried in three types of service by the Company: at first it was used in terminal yard and transfer service; later

it handled freight trains, and finally it was operated in mixed and passenger service. Tests proved it more particularly adaptable to the latter two services, as the unit was found to be rather too light to provide adequate braking power when handling heavy terminal transfer trains.

On the other hand, No. 1000 acquitted itself very well in its other tests. No serious road failures occurred and while it is a little early to draw final conclusions, the engine would appear to be suitable particularly for branch line traffic, in wayfreight, mixed train or passenger service. To provide a rough comparison, it might be said to possess approximately the capabilities of a diesel equivalent of the D-4-g class steam locomotive.

Since the locomotive is a diesel-mechanical unit, it possesses no short-time rating common to the diesel-electric variety, and

By Omer S. A. Lavallee

Photos by Roger Boisvert

as a result, it can be used for prolonged periods hauling fairly heavy trains at low speeds. A gear shift arrangement permits use of the engine in two travel ranges:

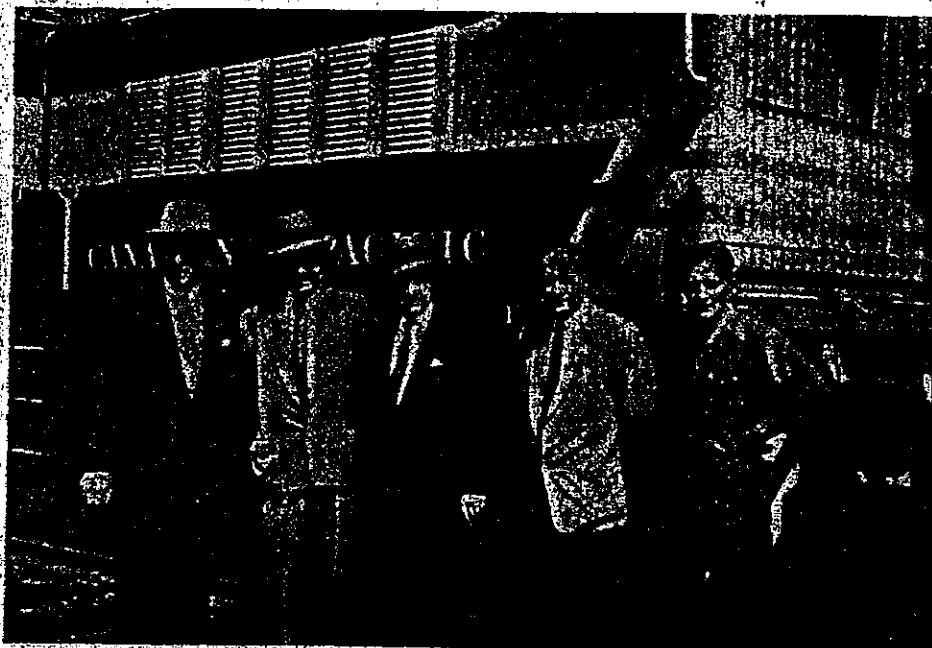
- 1—Switching service with a maximum speed of 30 miles per hour, and a starting tractive effort of 39,710 pounds.
- 2—Road service with a speed of 48 miles per hour, and a starting tractive effort of 24,090 pounds.

The gear thus provides versatility in operation, though the setting may only be changed when the locomotive is at a standstill.

After the Company received the locomotive early in July, one of its first operational tests was out of Ottawa on the Waltham Subdivision, handling ballast from the Shawville gravel pit, and on the Maniwaki Subdivision pulling wayfreight. Later the locomotive was sent to Farnham, operating on the Adirondack and St. Guillaume Subdivisions in wayfreight service, and on the Stanbridge Subdivision with trains of crushed rock from Bedford. Following a short spell in the Montreal Terminals on transfer trains, No. 1000 worked for some time on the St. Maurice Valley Subdivision out of Trois Rivières.

The variable speed gear demonstrated its advantages particularly in the latter tests. The low gear, enabling a maximum speed of 30 m.p.h., was used on northward, passenger and mixed, upgrade trips between

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Observation of tests on the St. Maurice Valley Subdivision was conducted by mechanical officials headed by L. B. George, centre, Assistant Chief of Motive Power and Rolling Stock. Pictured, left to right, are Messrs. D. F. Haney, H. W. Hayward, Mr. George, W. F. Sinclair, and W. B. "Pat" Patterson, dynamometer engineer in charge of car No. 62.

GERMAN DIESEL Cont'd

Trois Rivières and Grand'Mère, while a change was made to the higher speed gear on the return trips downgrade. Generally speaking, the low gear is of value in way-freight and switching service, while the higher gear displays its true advantage on light mixed and passenger trains.

While at Trois Rivières, the locomotive was inspected in operation by Mr. R. A. Emerson, Vice-President, Operation and Maintenance, Mr. F. A. Bengler, Chief of Motive Power and Rolling Stock, and Mr. L. B. George, Assistant Chief of Motive Power and Rolling Stock. Previously, as noted in the October-November issue of "Spanner", No. 1000 had been inspected by the President, Mr. N. R. Crump, in a special demonstration at Windsor Station, Montreal.

Testing of No. 1000 was carried out with the aid of the Company's dynamometer car, No. 62, which can be seen coupled behind the locomotive in one of our illustrations. This unit, built in 1928, is fitted with instruments which chart the performance of the locomotive on paper. These graphic records are later examined by mechanical men and performances assessed accordingly.

No. 1000 weighs some 66½ tons. The rated 800 horsepower of the MaK eight-cylinder, four-cycle, supercharged engine, is at its maximum speed of 750 r.p.m. The engine uses a solid-injection fuel system, and the power is transmitted through the Voith Turbo Transmission to the wheels, by way of a layshaft and siderods. The layshaft and driving wheels are all counter-balanced in conventional style. The locomotive is built up on a plate frame, consisting of ¾" side plates welded together and strengthened by cross-members.

While the eight-coupled wheels limit No. 1000's ability to take severe curves, the locomotive is equipped with what is known in technical circles as a Beugnot lever system. These levers link each pair of axles on either side of the layshaft and perform the function of allowing the end pair of wheels to deflect sideways slightly when entering a curve, at the same time causing the adjacent pair of drivers to deflect the opposite way. The siderod bushings slide transversely on their pins, to permit this deflection, which is limited to a few inches.

The system of controls is unusual, in that the throttle is a hand wheel in a vertical plane, somewhat reminiscent of a ship's wheel. The "safety control" emergency feature is provided by a second wheel within the first which must be kept compressed against the first wheel during operation. There are duplicate sets of controls in opposite corners of the cab, to enable the locomotive to be operated equally well from either side, or in either direction. The locomotive is equipped with the standard Westinghouse brake equipment, as well as with a hand brake.

The cab is mounted almost in centre position, can be entered from either side running board, and resembles an abbreviated version of the Scenic Dome



View from Dynamometer car cupola shows MaK-hauled passenger train southbound approaching St. Maurice River bridge at mile 15, St. Maurice Valley Subdivision.

which is so characteristic of our latest passenger equipment.

Different as the "MaK" locomotive is, its test by the Company is another step in the modernization programme currently in effect, designed to provide the latest and most efficient motive power for Company trains. It is rather too early to assess the performance of the locomotive definitively, as it belongs to an order of constructional technique which is quite different to that to which we are accustomed. Nonetheless, the interest attached by our officials to

the trials of this unit testify to the Company's long-standing interest in motive power experimental work, which was initiated more than fifty years ago. It is presently being carried forward during a period in which other large rail transportation companies have been content to let experimentation in the hands of locomotive manufacturers.

Motive power men will, no doubt, await with interest the further data which will be forthcoming following the winter test of No. 1000 on the Canadian National system.



No. 1000, dynamometer car 62, and wayfreight, stands in Trois Rivières, Que., yard, surrounded by interested officers and employees.

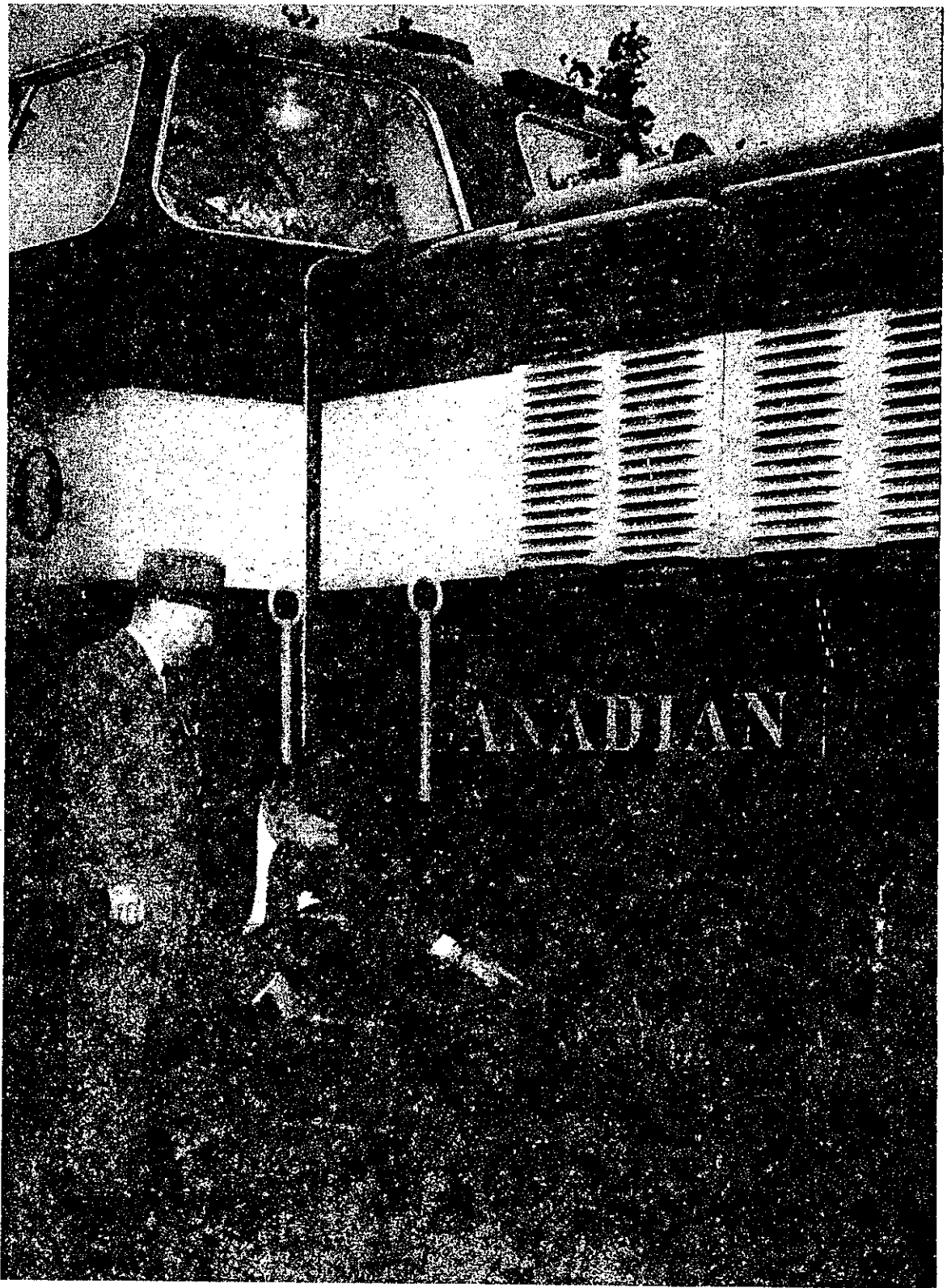
Hyman Isenstein

Locomotive Engineer Hyman Isenstein brought in train No. 8 for the last time recently and retired at Calgary with 47 years service. A leading member of the Jewish community, he served on the Welfare Fund and the Executive Board of Peretz Institute.

W. H. Smart

Section Foreman W. H. Smart, Dominion City, Manitoba, retired with 25 years service. He won a military medal in World War I during four years overseas. He served the Dominion branch of the British and Foreign Society as president, of the United Club on the board of stewards. A son, Allan, is with the maintenance of way forces.

"Fluid Drive" Diesel



N. R. Crump, president of the Company, left, and R. A. Emerson, vice-president, operation and maintenance, examine a German-built "MAK" unit that employs a hydraulic form of transmission similar to that used in fluid drive automobiles. Built at Kiel, Germany, this unit has roughly the same appearance as a diesel-electric switcher, except that its cab is a cupola-like dome.

This hydraulic diesel unit, which has been undergoing extensive tests on Company lines in Eastern Canada, was inspected recently by Mr. Crump and Mr. Emerson at Windsor Station in Montreal.

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