

Backgrounder

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Thoroughbreds Reborn: VIA's F-40 Fleet

ABOUT THE LOCOMOTIVES

In more than a century of diesel-powered railroading, only a select few locomotives have possessed that rare combination of speed, strength, stamina and reliability to earn them a reputation as “thoroughbreds of the rails.” The General Motors Electro-Motive Division (EMD) F-40 is a member of this elite stable of diesel-electric motive power.



Like many of the most successful innovations, the F-40 was born of adversity. Amtrak – the U.S. equivalent of VIA – desperately needed new locomotives for both its short- and long-haul passenger trains. Two previous attempts failed to deliver rugged, reliable and versatile locomotives to replace the life-expired motive power Amtrak acquired from the freight railways at its inception in 1971.

EMD rose to this challenge and produced the first F-40 in 1976 under a crash development program that built on the solid performance of its four-axle GP40 series of freight locomotives, adapting many of its prime systems for the specialized requirements of passenger service. Amtrak's first series of F-40s dramatically improved its service reliability and costs, leading the corporation to eventually purchase 216 of these robust machines. As well, the F-40 soon found a market among commuter rail operators, including Toronto's GO Transit.

When VIA was in a position to acquire new and much-needed motive power in 1986, the updated F-40PH-2 won the competition. As on Amtrak, VIA's F-40s replaced the 1950s vintage diesel-electric locomotives, which the Crown corporation acquired when it took over the former Canadian National and Canadian Pacific passenger services in 1978.

The F-40's continent-wide service record proved it would be up to the diverse demands of VIA's far-flung transcontinental system. It became equally at home on the head end of everything from fast Quebec-Windsor Corridor trains to remote northern services to the lengthy eastern and western transcontinental runs. Impressed with the service delivered by the first 20 units, VIA placed two additional F-40 orders in 1987 and 1988. The final unit, 6458, was delivered in July 1989. The F-40 diesels constitute 70% of VIA's motive power fleet.

Longevity is one of the hallmarks of the F-40. Although Amtrak has retired and replaced its fleet, most of these locomotives have gone on to second careers on a wide variety of railways, ranging from northern Canada to Panama. In addition to the nationwide service VIA's units continue to provide, the F-40 is now found powering everything from the commuter trains of Montreal's Agence Métropolitaine de Transport to Ontario's Agawa Canyon tour train to the remote passenger services of Labrador's Tshiuetin Rail Transportation. A few have even been modified for freight service.

ABOUT THE PROJECT

VIA's fleet of 54 EMD F-40 diesel-electric locomotives is being completely rebuilt and technologically updated under a five-year contract valued at over \$100 million with CAD Railway Industries Ltd. (CAD) of Lachine, Quebec. This project is a key component of the Government of Canada capital investment plan, announced in 2007, to improve the sustainability and reliability of Canada's passenger rail system.

The VIA F-40 program will completely renew these locomotives literally from the wheels up, preparing them for another 15 to 20 years of even better performance at less than half the cost of buying new equipment. Only two passenger-specific diesel locomotives are currently available in North America and, under recent orders with commuter rail agencies, these units have cost up to \$5.5 million each.

Under this rebuilding program, CAD will strip the locomotives down to the shells and fully renew the steel car bodies. The components of each system – such as the diesel engine, electric traction motors, trucks, couplers and brake gear – will be thoroughly inspected, tested and rebuilt. New systems will be installed to meet today's environmental and safety standards. VIA expects to see a reduction of greenhouse gas (GHG) emissions of up to 12% once the work has been completed, which is in addition to a company-wide GHG reduction of 16% since 1990.

As well, the better-than-new F-40 fleet will produce fuel savings of five million litres per year and reduce maintenance costs by 8% annually. The increased use of advanced microprocessors will contribute significantly to the entire slate of economic, environmental, safety and crew comfort improvements to be gained from the program.

A major improvement to the F-40s is the addition of a separate diesel engine specifically for the generation of the head-end power (HEP) required to light and heat or air condition the trains they pull. Previously, this power was generated by the main diesel engine. This required that it continue running at high speed even when the trains were stationary.

Now, the main engine will be brought down to a low idling speed when stopped at stations, while the required 480-volt AC current is produced and fed from the separate HEP "gen-set" to each car of the train. This will not only reduce fuel consumption and emissions, but also engine noise.

The separate HEP gen-set will also enable the rebuilt F-40s to deliver all 3,000 hp from the main diesel engine for traction purposes. As a result, VIA will be able to reduce the number of units used on its longest and heaviest trains, such as the Montreal-Halifax *Ocean* and the Toronto-Vancouver *Canadian*. The F-40s released from these services will then be assigned to the additional trains VIA will be adding on its Quebec-Windsor Corridor routes.

This dispenses with the need to purchase additional locomotives for these new frequencies.

A layover heating system is being added to each F-40 and this will enable both diesel engines on each unit to be shut down when sitting for long periods in terminals and yards, providing major fuel, emissions and noise reductions.

Another major environmental benefit from rebuilding the F-40 fleet is that approximately 120 tonnes of steel from the basic structure and key components of each unit will not go for scrap, but will be fully recycled for another 15 to 20 years of productive service.

In addition to locomotive 6402, eight more locomotives will be received from CAD this year and then 15 per year. The program will be completed in December 2012. The fully renewed and improved F-40s will be recognizable by their new green, silver and gold paint scheme, and the timely slogan on their flanks: "A Green Choice."

In combination with the 21 General Electric Genesis locomotives (designated P-42) acquired in 2001, the rebuilt F-40s will give VIA one of the most reliable and fuel-efficient motive power fleets of any passenger rail operator in North America.

ABOUT THE ECONOMIC BENEFITS

The F-40 project is part of an unprecedented investment in passenger rail modernization and expansion by the Government of Canada that is stimulating job creation, skills development and private sector activity across the country. The \$100 million contract is creating 90 new jobs and 450 person years of employment at CAD, as well generating spin-off economic benefits for its Canadian suppliers.

As well, CAD has undertaken an infrastructure expansion program as a result of being awarded the F-40 remanufacturing contract. This expansion will position CAD as the largest remanufacturer of locomotives in Canada and as a major competitor in locomotive remanufacturing throughout North America.

ABOUT VIA RAIL CANADA

As Canada's national rail passenger service, VIA Rail Canada's mandate is to provide efficient, environmentally sustainable and cost-effective passenger transportation, both in Canada's business corridor and in remote and rural regions of the country. Every week, VIA operates 503 intercity, transcontinental and regional trains linking 450 communities across its 12,500-kilometre route network. The demand for VIA services is growing as travellers increasingly turn to train travel as a safe, hassle-free and environmentally responsible alternative to congested roads and airports. In 2008, VIA safely transported 4.6 million passengers – the most since 1989 – and set an all-time record of \$299 million in revenue.

ABOUT CAD RAILWAY INDUSTRIES LTD

Based in Lachine (Montreal), Quebec, CAD Railway Industries Ltd. is an international re-manufacturer of locomotives, rail cars, power generation units and components. CAD Railway is a wholly-owned subsidiary of Global Railway Industries Ltd., an integrated rail product and service provider for the locomotive, railcar and track & signal railway markets in North America. Global Railway Industries shares are listed for trading on the Toronto Stock Exchange (TSX) under the symbol "GBI".

VIA RAIL CANADA F-40 TECHNICAL SPECIFICATIONS

Model:	F40PH-2
Builder:	General Motors Electro-Motive Division
Prime mover:	16-645E3C
Cylinders:	V16
Power output:	3,000 hp (2.2 MW)
Head end power:	500 kW
Continuous tractive effort:	19,958 kg (44,000 lb)
Wheel arrangement:	B + B (four axles)
Track gauge:	1,435 mm (4 feet 8½ inches)
Weight:	117,936 kg (260,000 lb)
Top speed:	153 km/h (95 mph)
Built:	London, Ontario, November 1986-July 1989
Rebuilt:	Lachine, Quebec, December 2007-December 2012
Total active fleet:	54
Fleet numbers:	6400-6421, 6424-6429, 6431-6446, 6448-6449, 6452-6458

IMPROVEMENTS

Description	Benefit
<ul style="list-style-type: none"> Cleaner burning engine Automatic engine stop/start system Fuel heating HEP diesel generator Layover heating 	Fuel saving
<ul style="list-style-type: none"> Odometer De-misting air to windshield Electronic fuel monitoring Low speed system (max. 10 miles/hour) 	Improved operation
<ul style="list-style-type: none"> All new copper air piping All new receptacles and switches All new relays (70% less due to microprocessor) All new wiring 	Improved reliability
<ul style="list-style-type: none"> Emergency horn Higher intensity headlight (Xenon) added Improved event recorder with crash hardened memory 	Improved safety and security
<ul style="list-style-type: none"> Removal of corrosion and anti corrosion 	Locomotive life protection applied
<ul style="list-style-type: none"> Cooling fan sequencing Independent dynamic braking Microprocessor controls LED indicator lights Electronic braking system 	Lower maintenance
<ul style="list-style-type: none"> Electronic engine governor 	Operation efficiency
<ul style="list-style-type: none"> Automatic horn sequencing Cab air-conditioning Ergonomic improvements in cab Improved cab heating and ventilation Improved third (jump) seat added Microwave oven added Anti-glare shield on windshield added 	Operator comfort and convenience
<ul style="list-style-type: none"> New paint scheme 	VIA image

- 30 -

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