



The biggest news



FROM EMD: Biggest News Since 1939.” TRAINS’ headline was set in the usual conservative 18-point type, but the words fairly screamed from page 3, atop the July issue’s lead “News & Editorial Comment” story. Electro-Motive, proclaiming its “most important announcement since the 1939 introduction of the FT,” unveiled an all-new line of locomotives on June 3, 1965.

At first glance, the EMD-supplied line drawings of the nine new models that occupied pages 8-9 appeared to be little more than refinements of the builder’s already successful line of SW, GP, and SD models. Substance had long since trumped style in the locomotive business, however, and the substance of

EMD’s new line was a brand-new prime mover, a successor to the legendary 567 engine.

Enter the 645.

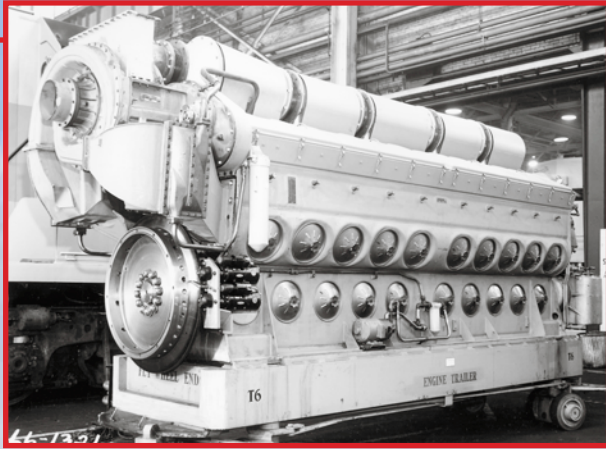
Like the 567, EMD’s new engine took its designation from its cubic-inch-per-cylinder displacement. From the 8-cylinder, 1000 h.p. normally aspirated engine in the SW1000 to the turbocharged 20-cylinder power plant in the 3600 h.p. SD45, each of the nine new models would be 645-powered.

Superceding all 567-engine models in EMD’s domestic catalog, the so-called 1966 model line included two end-cab switchers with 8-cylinder 645’s, the SW1000 and SW1500 (with corresponding horsepower ratings), and two normally aspirated 2000 h.p.

road-switchers with a 16-645, the GP38 and SD38 (B-B and C-C, respectively, of course). A turbocharged 16-645 powered the 3000 h.p. SD40 freighter and a steam-generator-equipped SDP40 passenger version. Atop the list, packing a 20-645 rated at 3600 h.p., was the SD45, also available in the SDP45 version. Initially, a twin-engined, 6000 h.p. DD40A was offered, but it found no buyers and was dropped from the catalogue (although UP later commissioned its own, unique DDA40X Centennials).

A two-cycle, 900-rpm machine with a 9¹/₁₆-inch cylinder bore and 10-inch stroke, the 645 was the direct descendant of the 567. Indeed, the new power plant kept many of its predecessor’s dimensions and specifications, including

1965: EMD INTRODUCES THE 645 ENGINE



Who would have dreamed that a handful of black prototype units would sire more than 10,000 U.S. locomotives and sustain Electro-Motive for over two decades?

By Greg McDonnell
Photos, J. David Ingles collection

since 1939

KEN CRIST; INSET PHOTO, EMD

cylinder-spacing, stroke, crankshaft, and compression ratio. Moreover, the 567 block could accommodate 645-series power assemblies and thus be upgraded and updated.

It was no secret that the venerable 567, introduced in 1938 and rated at 1350 h.p. in its first 16-cylinder application, the FT of 1939, was being taxed and turbocharged to the limit to produce 2500 h.p. in the GP35 and SD35. Inasmuch as a 392,000-lb. locomotive can be kept secret, EMD had played its plans for a 567 successor close to the vest. By 1964, though, an unlettered six-motor hood unit numbered 434, painted in plain blue and yellow to match units it ran with, was seen testing on Santa Fe freights—and tongues began

to wag. The 434, was, according to the caption of a May 1965 *TRAINS* news photo, a “rumored prototype of a new line of locomotives containing a high-horsepower replacement for the 567-series engine . . .”

EMD kept mum, but behind 434’s unmarked blue hood, the mysterious C-C unit secreted the first locomotive application of the as-yet-unannounced 645, not to mention the builder’s new AR10 alternator, the foundation of a new A.C.-D.C. transmission. Constructed on an SD35 frame, the 434 had six new D-77 traction motors slung on its Flexicoil trucks plus a host of technological and engineering innovations and improvements. The 434’s anonymity belied that it heralded not just a new mod-

“Black as Model T’s,” half of EMD’s eight test-bed 645-engine prototype SD40’s, devoid of all marking save road numbers, roll under I-80 and into Laramie, Wyo., on Union Pacific in May ’65. UP wound up buying 434A-H, as its 3040-3047.

el—the SD40—but an entire new generation of EMD locomotives.

BY SPRING 1965, the cat was pretty much out of the bag. Nine black cats, to be precise, as, to quote *TRAINS* Editor David P. Morgan, “black-as-Model T” 645-powered test-bed locomotives were outshopped from La Grange during February-April of that year. Joining blue EMD 434 in road tests and demonstration tours were eight more SD40 prototypes numbered



Outshopped in 1964, disguised in blue and yellow to test on the Santa Fe, EMD 434 rested at the Chicago Great Western's Chicago facility on February 20, 1966. Later sold to Gulf, Mobile & Ohio as No. 950, this historic unit has been upgraded and is still in daily service for CN as Illinois Central 6071!



J. DAVID INGLES

On the following July 1, the first pre-production GP40, EMD 433A, was at the same spot, next to a CGW NW2 and coupled to three EMD test vehicles: F unit 462, test car ET-909, and SD45 4351. With just four or five trains a day, CGW's main line was underutilized and made for a handy EMD test track.

434A-434H, plus a single pre-production GP40 numbered 433A. They bore no identification except the numbers on the cabs and in the indicator boxes.

On the heels of the official announcement of its new 645 line, EMD's salesmen, it seemed, were inking orders for the new models almost as fast as the test-beds barnstormed their way across the U.S. and Canada. Eclipsing the 83,000-mile, 11-month 1939 tour of FT A-B-B-A demonstrator 103, the 11 pre-production 645 prototypes racked up over a million miles in road service on nine railroads.

In fall 1965, workers at La Grange began lowering 16-645E3 engines and AR10 alternators onto the frames of the first production 645-powered locomotives, 14 GP40's assigned order No. 7851, which by November would emerge as New York Central 3036-3049.

Delivered ahead of lower-numbered sisters 3000-3035, the polished black GP40's hit the road on Central's hottest freights. They weren't pretty, with their solid-black garb accented only by a white frame stripe and the necessary NYC identification, but anyone introduced to the 645 by these shiny black Central hoods cruising along Broadway in Buffalo with a hot Super-Van intermodal train, or wheeling New York-bound hotshot NY-4 across the Canada Southern at a mile a minute or better, knew instantly that the EMD ad man who penned the "fast and sure!" copy wasn't exaggerating.

"Fast and Sure!" The headline anchored a distinctive Tom Fawell painting of NYC GP40's on a Flexi-Van train in the centerspread EMD advertisement in May 1966 TRAINS, but the slogan could have been applied to the sales

performance of the new 645 line. Almost overnight, EMD's order books were bulging with contracts for the new line. More than 1000 645-engined locomotives rolled off the La Grange assembly lines in 1966, and the customer list looked like an *Official Guide* index, from Atlantic Coast Line, Bangor & Aroostook, Chicago Great Western, and Detroit, Toledo & Ironton through Texas Mexican, Union Pacific, Vermont Railway, and Western Pacific.

By the end of 1966, the sound of the 645 was anthemic of contemporary railroading, from the robust vocals of Cuyahoga Valley SW1000's laboring in the industrial canyons of Cleveland to the chant of Maine Central GP38's echoing over the White Mountains through Crawford Notch, N.H., and the turbocharged howl of SD40's assaulting Sand Patch, Horseshoe, Sherman, and the Selkirks. High-nose Norfolk & Western GP40's rolled Red Balls across the former Wabash, and multiplied Indiana Harbor Belt SW1500's lugged transfers across Chicago. GO Transit hauled Toronto commuters behind custom HEP-equipped GP40TC's, while *Empire Builder* and *Western Star* passengers rode behind Great Northern SDP40's which provided them with steam heat and a 645 symphony to accompany the scenery.

THE 20-CYLINDER SD45, heavy hitter in the 645 lineup, was the quintessential Sixties muscle machine. The first-ever '45, EMD demonstrator 4351, debuted in December 1965, and in contrast to the somber black of the 645 prototypes, EMD decked out 4351, and then siblings 4352-4354 (during the first half of 1966), in a dramatic rendition of GM corporate blue and white. Great Northern, the first to purchase "America's most powerful single-engine diesel locomotive," had *Hustle Muscle* stenciled on the hood of No. 400, first of its eventual fleet of 27 SD45's.

Hustle muscle, indeed. Even standing still, the SD45 looked and sounded powerful, with its pug nose, flared radiators, and the impatient champing-at-the-bit chant of its big V-20. To stand in the presence of two or more '45's waiting on the signal to get out of Bakersfield or Birmingham, Williamsport or Whitefish, was to feel the presence of power. To be at Alliance, Ohio, on a cool autumn evening when a trio of SD45's—beckoned by the three vertical lights of a PRR signal—shook the depot to its foundation and threatened to loosen the platform bricks as they worked westward with 100 cars of coal, was to *know*



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No anonymous black test units, these, EMD's SD45 demonstrators 4352-4354 (in mixed order) roll west from Detroit at Romulus, Mich., on April 8, 1967, with a Norfolk & Western freight on the old Wabash, bound for Decatur, Ill. The trio would later serve D&H and EL; EMD 433A became IC 3075.

power. Ditto to stand atop Tunnel 2 in the Tehachapis as seven gray and scarlet SP SD45's—four up front, three deep in the train—clawed their way toward Bealville with an eastbound freight. To feel the energy generated by 25,000-plus turbocharged 645 horses telegraphed through every nerve in your body was to *know* the 645.

If there were any suspicions that EMD might have been a bit overzealous in its announcement heralding the 645 engine as the biggest thing since 1939, they were dispatched in the dust kicked up by GP40-hauled Super-Vans, drowned in the turbocharged howl of V20's, and overwhelmed by the volume of first-year 645-model sales. If anything, EMD may have underestimated the potential of the new power plant it formally introduced on June 3, 1965.

Who, even among the engineers on the original design team, would have dared to dream that a handful of drab black prototypes would sire more than 10,000 645-powered locomotives in the U.S. and thousands more worldwide? Or that the nine-model catalog of 1965 would soon swell past a dozen as such logical extensions as the GP39 and SD39 came about, along with custom machines like the full-cowl F45, FP45, SDP40F, and F40PH; UP's monster Centennials; and Milwaukee Road's light-footed SDL39. The 645 would sustain EMD for over two decades, through the Dash 2 era and to the end of 50 Series production in 1987. Thanks to the passenger trade, the 645 would remain in production along with the F40PHM-2 until the end of 1992.

Yes, the 645 was indeed the biggest news since 1939 . . . and then some. ■



LOUIS A. MARRE

On December 8, 1965 (above), the third and fourth of the first 14 production 645-engine locomotives, New York Central GP40's 3039 and 3038, rest at Riverside Yard in Cincinnati, the site of NYC's last steam run eight and a half years before. In March '65 near Detroit, the same unit leads two sisters south on NYC's Dearborn Branch (below) as they approach the DT&I crossing at Schaefer Tower.



HENRY G. GOERKE