

ASSEMBLY

Assembly Then & Now: The Dodge Main Plant

By Austin Weber



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When Chrysler's Belvidere Assembly Plant (the home of the new Dodge Dart) opened in the middle of a northern Illinois cornfield in 1965, the automaker was in the midst of a decade of growth. At the time, Chrysler's flagship plant was the massive Dodge Main complex in Hamtramck, MI, just outside Detroit.

Dodge Main looked similar to Ford's more famous Highland Park factory, which was the birthplace of the moving assembly line. In fact, the basic layout of the two manufacturing complexes shared many common features, which was partially due to the fact that the same architect (Albert Kahn) designed both facilities. Each plant boasted its own powerhouse and multistory reinforced concrete buildings that housed machine shops and assembly lines.

Dodge Main was officially called the Hamtramck Assembly Plant when it opened in 1911. At the time, Dodge was a major supplier to Ford Motor Co. It fabricated most of the parts and components that were used to assemble early Ford vehicles, including the famous Model T. But, the business relationship ended abruptly in 1914 when John and Horace Dodge unveiled a car of their own, which featured an all-steel body.

After the 35-hp, four-cylinder touring car was introduced, the Dodge brothers embarked on a major expansion project that tripled their factory's floor space. By the 1920s, the fully integrated facility comprised more than 30 buildings that produced almost every part needed to build an automobile.

In fact, Dodge Main nearly rivaled Ford's famous River Rouge plant in terms of vertical integration. The only thing that it lacked was a steel mill. However, at the time of their sudden deaths in 1920 (John and Horace Dodge contracted Spanish influenza while attending the New York Auto Show), the Dodge brothers were planning to build such a facility.

At its peak during World War II, 40,000 people worked at Dodge Main, which comprised 67 acres and 5 million square feet of floor space. However, the complex became more and more inefficient by the 1960s when Chrysler built new plants in Belvidere and St. Louis. For instance, final assembly took place in a six-story building (see below) that required numerous conveyors and unwieldy material handling.

Dodge Main closed in 1980. But, a new automotive plant soon rose on the site. When General Motors' controversial Detroit-Hamtramck plant opened in the mid-1980s, it featured 2,000 programmable devices, including 260 robots. Today, that factory is the home of the Chevy Volt.

The following eyewitness account of operations at Dodge Main in the mid-1950s was written by A.E. Schweitzer, a retired Chrysler engineer, in the March 2005 issue of *WPC News* (excerpted courtesy of the WPC Club Inc., a nonprofit organization dedicated to "the preservation, restoration and enjoyment of Chrysler products"):

"The body-in-white assembly operations started on the 8th floor of the Body Building, where body bucks on oval floor conveyors held the floor pan assemblies, cowls, side quarters with wheelhouses, door frames and roof panels all clamped together in fixtures for both spot and gas welding. Major stampings were carried to the upper floors from the press rooms and rail docks via overhead conveyors running through conveyor housings located on the outside walls of the building.

"Smaller stampings were brought to various floors from the press areas or receiving, via elevators in skid boxes. Wheelhouse, floor pan and other subassemblies were fabricated off-line, near by. The assembled bodies were then transferred to body finish trucks which were riding on the metal finishing conveyor lines, where exposed joints were solder filled and metal finishing was performed. After these operations, final body inspection and repair before painting was performed.

"The finish-painted bodies, still on paint trucks, were held in a body bank on the 4th floor of the paint shop, from which they were scheduled into the trim shop, lifted by one of two electric hoists to feed the two trim lines that began on the 5th floor of Assembly Building No. 2.

"Most of the body trim and related trim subassembly operations performed at Dodge Main were performed in Assembly Building No.2, a six-story building which was 1,000 feet long and 100 feet wide, running in an east to west direction.

“The sixth floor was devoted to body cloth and vinyl roll goods and leather hide storage, table and die cutting facilities, flat interior trim work manufacturing, and front seat cushion and back sewing and assembly.

“The fifth, fourth and nearly one half of the third floors were devoted to the main body trim lines, occupied by two parallel floor-type assembly conveyors running the full lengths of the building for a total length of over 2,500 feet for each conveyor. Three synchronized, DC-powered, variable-speed drives powered each line.

“The bodies were carried through the system on trim trucks fabricated from angle iron and steel tubing designed to support the body through all of the trim operations. Four casters supported the truck, the two on the left side were guided by an open-channel track, the other two on the right riding free on a six-inch channel, flanges down. A pusher plate was welded to the center section of the truck, which was engaged by a pusher dog attached to the six-inch pitch floor chain, on 16-foot centers, guided by double angles and supported by bronze replaceable rider plates.

“Maximum production line speed of each conveyor was 16 feet per minute, providing a maximum capacity of 60 bodies per hour for each line, or 120 bodies per hour for the two lines. The two chassis assembly and final assembly lines had the same capacities. It was rarely necessary to run either conveyor system at the maximum potential speed to meet the prevailing production schedule.

“The other half of the third floor, after body trim operations were complete, was devoted to a storage bank of finished bodies between trim and final, and the convertible top sewing and the top-to-body assembly area. At the west end of the floor were the instrument panel, arm rest and visor assembly units, as well as the beginning of the final assembly line. Fully trimmed bodies, still lacking front fenders and hoods, and still on their trim trucks, were scheduled from the body bank onto the final assembly lines.

“Bodies on trucks were manually removed from the bank, turned 90 degrees and pushed onto the final line, which started in a bridge connecting assembly Building 1 with Assembly Building 2, which housed the final line and all final-related subassembly operations.

“The first operation on the final line was the placing of a front-end fixture on the front of the trim truck that located and supported the radiator yoke, stamped and painted grill components, as well as the inner fender panels and fenders. This fixture method was required to support the front-end sheet metal, prior to body drop and subsequent assembly to the frame.

“While the body assembly operations, now with the front-end attached, were nearing an end on the third floor body final line, the chassis were being assembled on the 2nd floor in the adjacent, Main Building 2, several hundred feet away. The chassis were being assembled upside down, thus making rear spring and axle subassemblies, including rear brakes and drums, and front-end assemblies much easier to assemble to the frame, as well as the installation of brake and fuel lines and exhaust systems.

“Front suspensions, brake and drum assemblies were added and brake lines connected. The frame, already painted by the supplier, now received an additional coat of chassis paint to include the added components. The chassis were being assembled to the schedule determined by the model mix originating from the body bank between trim and final. Pre-assembled wheels and tires were added at this time per schedule.

“The assembled chassis were transferred to the last leg of the final line, via an overhead combination hoist and turn-over fixture that placed the completed chassis on the flat top final line. The chassis were now right side up, riding on their own wheels, in position to receive their engines and other items, on their journey to the body drop.

“It was at this point where the body was removed from the trim truck via hoist on the 3rd floor and lowered to the waiting finished chassis moving at the same speed on the 2nd floor directly below. After body drop to the chassis, body bolts were installed and torqued, gas tanks connected and filled with one gallon of gas.

“Radiator hoses were next installed, radiators filled, final under-hood wiring connected, batteries installed, the hood bolted on its hinges, and the car started and driven off the line to a waiting roll-test where all mechanical functions would be tested.”

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Austin has been senior editor for ASSEMBLY Magazine since September 1999. He has more than 21 years of b-to-b publishing experience and has written about a wide variety of manufacturing and engineering topics. Austin is a graduate of the University of Michigan.

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