

Sequenced Parts Delivery System

General Motors of Canada – Oshawa Car Assembly, Ontario (Plant 2)

Project Overview:

Mainway has worked with fascia manufacturers since 1988 to convey and store their products. They have developed revolutionary methods of handling the light weight yet bulky fascias. Existing Mainway storage systems at Decoma's Polycon plant in Guelph, Ontario, were used as the basis of the GM over-the-road conveyance delivery concept.

The Line:

General Motors, Oshawa, ON, Plant Two Fascia (bumper) line for the Pontiac Grand Prix and the Buick Century and Chevrolet Impala.

The Situation:

General Motors needed to replace an existing fascia delivery conveyor at their plant in Oshawa, Ontario. Automotive bumpers were required for assembly of the 2008 Pontiac Grand Prix (GMX 367) and the Buick Century / Buick Regal (MS2000). The system must be reconfigured in 2007 for the Impala fascia.

The Challenges:

Fascias are delivered to the assembly station in exact sequence to match the assembly line car build.

To replace the heavy steel fascia shipping racks with a moulded plastic slave pallet designed to carry a single fascia.

To design a plastic pallet that could carry and protect any one of several models of fascias (both front and rear).

All equipment had to meet Ontario's strict Health and Safety guidelines and all production requirements.

To design and supply trailers with loading automation to carry fascias and empty pallets over the road between the warehouse and the assembly plant.

A restraint system for the parts was required to ensure fascias were not damaged while traveling over rough roads.

To design a system at the warehouse to stage, then load, a trailer with 78 fascias.

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The Challenges:

To design/supply an automated conveyor on the same trailer to receive empty pallets at the same time the sequenced fascias were being loaded.

The floor area available in the sequencer's facility for the trailer loading conveyors was only 80 ft long by 10 ft wide.

To design an automated conveying system at the GM plant to offload fascias and load empty pallets.

The dock area available at GM required parts to travel up and over the assembly line on a single level of conveyor.

The assembly line unload station had minimal floor space beside the line.

Empty pallets needed to be conveyed from the unload station and stacked automatically for return to the warehouse sequencing system.

The Solution:

Mainway's solution was a lighter, faster and more flexible delivery conveyor that handled individual fascias all the way from the sequencing warehouse located in another facility to the car assembly line at GM.

The systems were designed to be fully automatic from the warehouse to the assembly line.

Trailer loading/unloading sequence was maintained through every sorting or staging function.

Two styles of stackable vacuum formed plastic pallets were supplied to enable conveyance of the fascias while supporting and protecting the paint finish.

Mainway consulted with professional safety engineers prior to the design of the systems. They selected low voltage (24 VDC) powered rollers for conveying the fascias and pallets. The conveyors are also supplied with emergency pull cable stops mounted along the side.

A conventional trailer system was built with four levels of storage conveyors and pneumatic clamping for mutilation protection while in transit. The conveyors on the trailer were operated by 24VDC power, control wiring, and air at the dock.

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The Solution:

The trailer loading system using conventional belt and live roller conveyors combines fascias from two load points into the proper sequence. The sequence is confirmed by the customer's error proofing system and staged on zoned accumulating roller conveyors. A telescoping and vertically pivoting belt conveyor loads three trailer levels, while stacks of empty trays are conveyed onto rollers under the loading system. The pivoting load conveyor is designed to recognize different trailer conveyor configurations and automatically adjust the load heights.

Mainway provided a pivoting and telescoping belt conveyor to dock with the delivery trailer and strip each level of parts in sequence onto a single line. The parts were then conveyed overhead on rollers toward the unload station.

The unload station received parts on a steeply declining belt conveyor.

The unload station discharged the single empty pallet under the delivery line then conveyed it overhead where it was stacked four high. Stacks were then automatically loaded into the trailer by a second extendible belt conveyor at the same time the fascias were offloaded from the trailer.

The Results:

Heavy, expensive steel shipping racks weighing more than 10,000 lbs. per trailer load were replaced by durable, stackable, plastic fascia pallets that weighed less than 5 lbs each. The fascias were delivered to GM in the exact build sequence. The system is very reliable, compact and easy to maintain, and it loads a trailer at the warehouse in 45 seconds and offloads it at GM in less than 7 minutes. Only three trailers are required to supply two shifts of assembly at General Motors. There was no mutilation of parts in the system. The trailer can return 104 empty pallets and deliver 78 fascias per trailer load.