

Diesel Engine Assembly System

This project represents the integration of ATW's LogiTrack LT-40 AEM as the main transport for Diesel Engine assembly and test. It began as joint Simultaneous Engineering white paper design for assembly of multifamily 12.7 and 14 liter engines with extensive model proliferation in a batch of one production. The system included complete engine assembly from machined block load to tested engines off the line and included major subassemblies. Early application of a PC based network provided real time work instructions and control for operators on local HMI's throughout the system, and kitting was employed extensively. A simulation was performed on the system to determine the best approach to a flexible mode of operation with the AEM and onboard lifts were incorporated into the carriers to optimize operator ergonomics.



System Overview

- Takt time of 126 seconds.
- Engine weight: 750 lbs at load to 3000lbs at unload.
- 3 Main line systems consisting of:
 - o Short block – 200ft. powered roller conveyor
 - o Basic Asm. – AEM System 1,150 linear feet.
 - o Trim Asm. – AEM System 1,550 linear feet.
- Major Subs – Cylinder Head and Piston Asm.
- Small subs – various off-line stations directly feeding the main assembly line to prepare various parts such as crankshafts, cam shafts, oil pans, fuel pumps, etc.
- Stations – Over 240 locations incorporating a mix of Automatic, Semi-Automatic and manual operations.
- AEM Trolleys - VFD with controlled stop/start.
- Carriers - Adjustable height w/360° rotating fixture
- AEM Time released grouped based Indexing

System Values & Benefits

- Clean and quite assembly environment.
- Effective visual management.
- Low WIP pull system.
- Optimum Ergonomic / Safe transport.
- Future system production volume growth/expansion.
- Improved quality through use of RFID, BC scanning, smart pick bins, IPV, defect tracking / diagnostics / monitoring and alarm notification.

System Highlights

- No Faults forward process operation
- 4 Lineside kitting areas for reduced floor space & Handling.
- AEM Carrier also utilized to deliver parts/kitted totes to reduce handling equipment.
- AEM carrier interface automatically with Multi-Spindle torque stations and Cold Test.
- Aisle crossing under the AEM track allow part delivery to both sides of assembly process.
- The AEM layout contains off-line spurs for "special build" low production volume engines.
- AEM Cold Test Area is configurable to test every engine or a reduced sampling.
- PC/PLC based distributive controls system using Ethernet communication network to Host level computer system.
- Operator displays at each station to visually indicate the next sequential work piece at the start of each part index.