

CASE STUDY



US Manufacturer for Wheel loaders investigates using Omni-directional AGVs for chassis marry-up, trim, hot test, and wheel

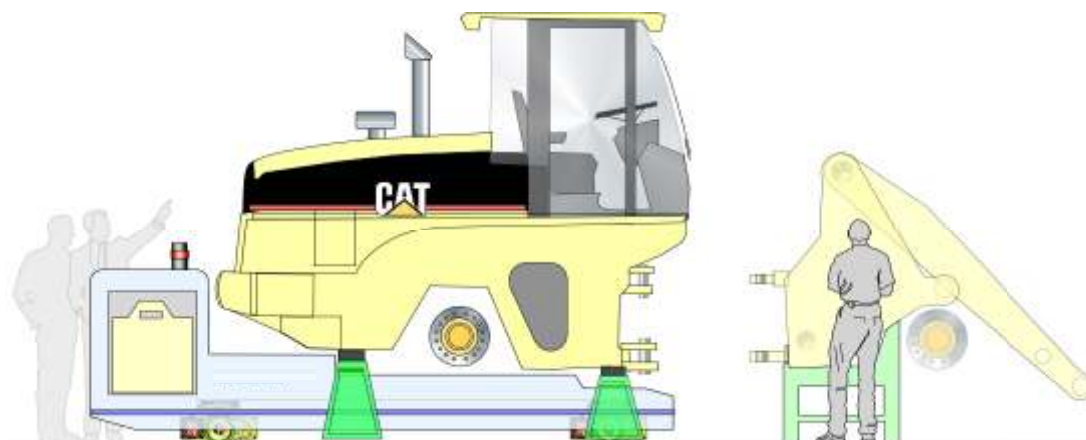
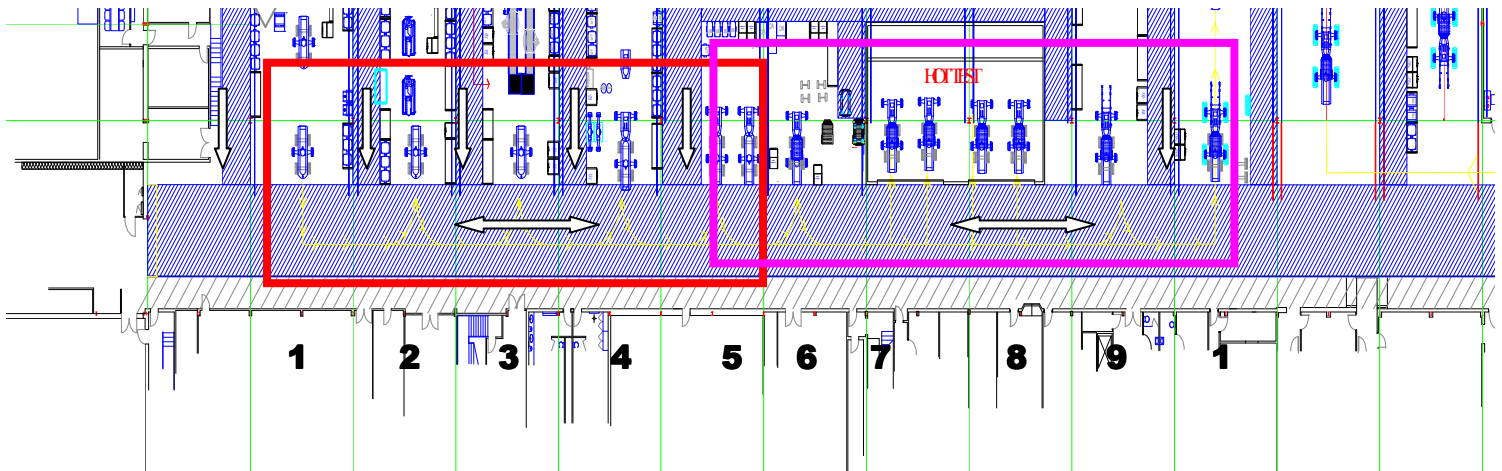
mount for a non-synchronous stall build line with protection for future line process.

Challenge: Replace a manual driven system with an automated flexible assembly system for a 2-shift operation that is easy to use, reliable, and operator driven to provide ability to react to the ever changing worldwide regional market niches.

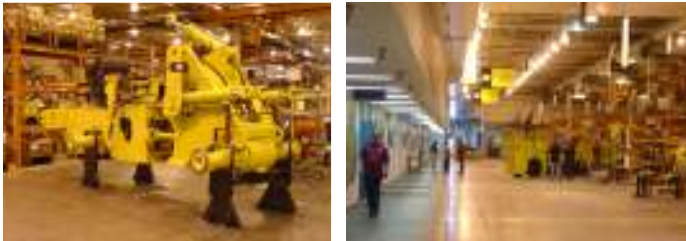
Solution: Provide an AGV system including two LP powered 35-ton capacity self loading AGVs serving assigned work zones.

Benefit:

- Increased productivity
- Safety hazards minimized in a high traffic area
- Eliminate facility and product damage
- Production staffing flexibility
- Process flexibility



Continuous improvement strategies applying Lean manufacturing principals drove this design of a production system consisting of manufacturing cells linked together with a functionally integrated system for inventory and production control that uses less of the key resources needed to make Wheeloaders. The 7-key areas of waste reduction include transportation, inventory, motion, waiting time, over-production, processing itself, and defective product.



The assembly system is broken into 2-zones; with one Omni-directional AGV serving Stalls 1-5 and the other AGV serving stalls 5-10. (Each also serves as a backup for the other at a reduced thru-put).

The AGV will move WIP automatically in a sequential order ie Stall 1 to 2, 2 to 3, 3 to 4, 4 to 5, and return empty to Stall 1 providing all the benefits of an in-line process. Each Stall has a Ready-Button, which the Stall operator will activate once his work is completed. This signal confirms to the AGV that it can approach the Stall for pickup. A call button will allow an override for immediate pickup, and set up as a "keyed operation" controlled by the line supervisor. Load exchange time is 8-minutes. Takt time is 55-minutes matching the line pace supporting a lean manufacturing environment. A Line rhythm is established, ensuring production moves forward as in a line-process.

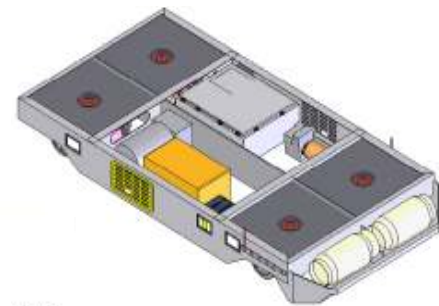


Navigation is accomplished with Siemens' non-invasive inertial guidance technology provided through Savant Automation driving system flexibility, reliability, and

supports plant maintenance's requirements for an open architecture control system with real-time system monitoring and diagnostics capability.

Sequenced Line Build Characteristics

- Lean Manufacturing Cornerstone
- Setting a Rhythm Driving Results
- Clear Identification of Bottleneck Operations
- Clear Identification of WIP Status driving:
 - "Continuous Improvement"
 - "Status Message" to associates
 - "Line Condition" message to Supervisors
 - "Production Plan" status to Management



The **Wheelift chassis module** provides a degree of flexibility not obtainable through other technologies. Worldwide niche markets drive manufacturing flexibility for product customization and configurable work processes. Wheelift Transporters and AGVs facilitate this requirement.

Manufactured in Iowa, **Wheelift** Transporters and AGVs are custom developed to each application including close positioning die loading, roll transfers, assembly, and general material handling. Load deck and fixturing is built to suit with load capacities to 500+ tons and deck heights as low as 18". Power options include LP gas, diesel, battery, or on-board generator. Electric or hydraulic drives are standard. For more information on our Wheelift Transporter and inertial/wire guidance AGV systems, please visit us at www.wheelift.com

Headquartered in Iowa, **Doerfer** develops application specific, custom manufacturing systems and machinery - many which revolutionize the way our customers manufacture, assemble, move, package, and test their products. We thrive on your toughest process challenges for manufacturing. For more information on our capabilities, please visit us at www.doerfer.com