Genesis Case Study #: SO1015-001
Application: Multi-Process Robotic System
Market Segment: Industrial
Product: Large Earth Moving Construction Equipment
Cycletime: 5 Minutes – 2+ Hours

Summary
The system was designed for stud and block welding on a frame for large construction equipment. Four tools were used to perform the task (stud head, block head, weld torch, and pneumatic marker head). Stud and block trays are pre-loaded and placed into a manual conveyor for the specific part to be processed. The robot moves to the conveyor location, picks the tray tool from its stand, and picks the stud and block tray and loads it on the tray location on the robot transporter. The robot then moves to the appropriate station and begins to do the stud welding and block tacking for the position of the part. The TRW stud head was used to weld the stud. The TRW block head fused the block in place by sending an electrical charge through the block to short the block to the frame. The MIG welding torch head was used to weld the block after the block head set the block in place. To provide part placement location information for a downstream, manual operation; the pneumatic marker was used to make an indent in the frame where the TRW stud head was too big to access. The operator would use a manual stud gun to place the block where the pneumatic gun made a mark. The robot would pick up the needed tool for the given process.

Project Challenges
- Produce a completed part with multiple processes without having to move the part among machines
- Size and weight (up to 20,000 LB0 of the part and multiple part orientations dictated by the processes.
- In-process monitoring of the stud welding to flag a potentially faulty weld
- Ergonomic loading of the various stud and block trays for ease of operation relative the part positioning
- Robotically automating process equipment for the first time
- Over ten different sizes of stud, bosses, and blocks
- Head placement and cable management that facilitates maintenance while providing access by the robot

Genesis Solution
- Two-station, single-robot workcell consisting of Genesis Modular servo track and positioners and Kuka robot equipment
- Track-mounted, automatic tool change system with a cable management system independent of robot dressout
- Allen Bradley PLC – based controls system and operator interface
- Turnkey programming by Genesis Applications Engineers
- On-site startup support and system training