

MAGNETEK ENGINEERED SYSTEMS

United States Air Force Base Lean Transformation Project



Project — United States Air Force Base Lean Transformation Project, Aircraft Maintenance Facility

Application — Automated Electrified Paint Line Monorail System for Aircraft Wheels and Struts

Products Used —

- IMPULSE®•P³ Series 2 Adjustable Frequency Crane Control
- FABA® Conductor Rail System
- Telemotive 18K Radio Remote Control System
- SLTX™ Transmitters

CHALLENGE

- Integrate wheel and strut manufacturing lines through a shared paint process line
- Meet stringent requirements to use Lean Manufacturing principles
- Reduce the amount of labor required to manually paint wheels and struts
- Reduce the number of lines to increase efficiency

SOLUTION

- Engineered a customized system that automated and integrated nine carriers from two lines through a single process line consisting of two paint booths, two ovens and a wash booth
- Automated the painting delivery system of the wheels and struts
- Provided application expertise to achieve maximum performance to fulfill Lean Manufacturing principles
- Increased efficiency by combining two separate lines that share the same process

This United States Air Force Base's aircraft maintenance group was faced with significantly increased workloads but no increase in personnel or work area. Striving to provide quality jet aircraft parts, on time and within budget, Lean Manufacturing principles were implemented in the facility to reduce flow days and boost productivity through waste reduction.

Each maintenance area was improved through employee and management involvement on process improvement teams. Work areas were studied, ideas were discussed and analyzed, then Lean Manufacturing principles were applied throughout the facility. The end goal of the overall Lean transformation project was to improve productivity with zero overtime.

A customized overhead materials delivery system was designed and installed that automated and integrated nine overhead monorail carriers from two separate wheel and strut delivery lines through a single, shared paint line process. Magnetek's application expertise was provided to meet the goals of this overall Lean transformation project.

Magnetek's Engineered Systems Group designed a custom monorail control system that streamlined and automated the wheel and strut paint line process. The monorail carriers were powered by IMPULSE®•P³ Series 2 adjustable frequency drives that are capable of working in a variety of high performance environments. Not only are the IMPULSE drives designed specifically for crane and hoist applications, they also offer more versatility than traditional contactor controls and a smaller footprint for flexible installation. Programmable Logic Controllers (PLC) were used in conjunction with the IMPULSE drives to control traffic flow and run the automation process.

ADVANTAGES OF USING MAGNETEK'S ENGINEERED SYSTEMS GROUP

- Expertise in crane, hoist and monorail control systems
- Experience in automated electrified monorail systems
- Turn-key design, programming and field start-up
- 100 years of combined experience in the Engineered Systems Group



A low-profile FABA® Conductor Bar System was installed for power and control of the automated monorail system. This conductor bar system facilitated the just-in-time production and delivery required by the end user. Also, stringent safety guidelines needed to be met, and the FABA system is designed to ensure maximum protection against accidental electrical contact as the conductor bar is enclosed in a PVC housing that is non-flammable and chemical resistant. The FABA system also met the stringent efficiency guidelines of the end user as its design ensures continuous electrical contact and maximum load control without chains, belts or moving parts, reducing the need for maintenance.

A combination of a Telemotive 18K radio control system with SLTX radio transmitters and fixed mounted operator's pushbutton stations were incorporated for manual intervention throughout the system. The 18K receivers were custom engineered to meet the application's specifications. The SLTX heavy-duty wireless radio remote controls were selected because they are designed to withstand harsh environments and use military grade auxiliary function switches, fulfilling the end user's needs.

The two pushbutton stations for manual control installed inside the paint booths are Class I, Div. 1, Intrinsically Safe, meeting hazardous location safety specifications. Also installed are two Human Machine Interface (HMI) computer touch screens for inputting data and reporting system status. Each of the nine carriers on the system utilizes Radio Frequency Identification (RFID) technology to maintain logic flow throughout the system.

Magnetek's Engineered Systems Group provided a complete turn-key controls solution by designing the entire custom monorail control system, programming the PLCs and HMIs, and performing on-site start-up services and performance testing to meet the customer's application requirements.