



FIREWINGS SYSTEMS

INTRODUCTION

Firewings Systems is a service based organization focused on automation equipment in the manufacturing sector of our economy. We have experience with several programmable controllers choosing to focus on the Siemens product families, supporting them since 1985.

The original Simatic S5 platform was replaced by the S7 platform in 2002. Siemens still actively supports the S5 due to the volume of machinery still functioning in America. The S7, featuring Profibus and Profinet networks, is the world leader in industrial automation.

Our service products include:

- Solution Consulting
- Hardware Specification
- Wiring and Panel Building
- CAD Drawings
- Complete HMI & PLC programming
- Install and Start-up
- Maintenance and Programming Training
- On-site and Remote Diagnosis
- Language Translation
- Documentation and Report Generation

We work for equipment manufacturers and distributors, as well as the end users. We have clients whose customers know us as their training or service department.

Our network associates have skills in Mitsubishi, Omron, Allen-Bradley, Klockner Moeller, and Automation Direct programmable controllers. The HMI experience is equally extensive.

Service is our passion.

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OUR HISTORY

Who would know that Micro Processor class at Case Western Reserve would spark the ignition of the Electrical Engineer's career? The German giant, Siemens, was coming to America.

- Distributor Growth** The reputation of German precision was well earned but came at a price. Phillip Morris making 12,000 cigarettes per minute and Husky's injection molding crown were supported by sophisticated technical staffs. Complex S5 development software and cultural issues hindered broad acceptance. Orlando Bakery saw the advantages as automation connected the whole plant. Firewings was born from the 24/7 support commitment. We programmed, installed, and modified bakery equipment until the program graduated a self-sufficient maintenance staff.
- Technical Support** Siemens purchase of Texas Instruments in 1992 launched a national training need. Firewings took the opportunity to go full time in 1994. We focused on the German S5 products while the TI-505 family led the expansion effort. We have worked with 20+ distributor offices providing mostly training and service tasks.
- S7 launch** Electronic advances changed the manufacturing landscape in the late 1990s. The S7 family obsoleted both the S5 and TI platforms 5 years after introduction. Siemens gained market share during this transition period because they make their own components. The reliability of the S5 components has been a blessing and curse. Many manufacturers are reluctant to upgrade as long as parts are available.
- Field Upgrades** We have completed a 5 press upgrade program at one manufacturer. Mechanically sound, the machines were converted in place saving both time and money. Several emergency procedures have been performed because the failed component was not available.
- Adoptions** Our focus on the brain of the machines has taken us into numerous industries. We have repaired several production lines where the equipment manufacturer is no longer in business. Documentation is the key to supporting that which you have not built.



PRODUCTION SUPPORT



The depth and capabilities of Simatic components make expertise an ever evolving challenge. We constantly upgrade our knowledge on the new developments. Several Siemens divisions have contracted us to service their customers. We have developed custom machine-specific training classes for a variety of customers.

- Manufacturing** Service calls have developed into decades of support. We help capable maintenance staffs modify their own equipment. Orlando Bakery, Hood Packaging, ConAgra, and Siemens plants have used us to expand their capabilities on a regular basis. Employee training has been a consistent theme.
- OEM** Original Equipment Manufacturers partner with us to give their customers the best product available. Peerless has standardized on another control in America but use Siemens in Europe. We wrote programs, tested, and installed machines in Italy, Spain, Germany, Switzerland, and China.
- Onsite** We try to be accessible to customers 24/7. Experience has proven that machines fail more on the off shifts. Our first priority is to a production machine.
- Teleservice** The S7 product family has a very useful remote access tool that can be used over a telephone line. The proper components must be present on both ends. Access can be password protected to prohibit unauthorized use. We have saved days of downtime by finding failed hardware and have the replacement ready when we arrive.
- Partnership** We build strong relationships with your floor people. Trust is earned by repeat success where learning is always an underlying theme. Hours are saved by knowing the questions to ask.
- Upgrades** Cost and downtime are major concerns in rebuilding equipment. Many staffs can mechanically repair their machines in place. We prepare the replacement system for rapid install and start-up.



TRAINING



Education of support people has always been important in maintaining equipment on the production floor. The ISO-9000 standard has made training an absolute necessity. The S5 family is a very dependable and flexible product line, yet is complex to troubleshoot. The TI-505 has a strong history in the process industry. The S7 has been developed as the next generation using PROFIBUS as its foundation.

SCHEDULED TRAINING

Beginning in 1992, we were very active at several distributor branches with S5, TI, and S7 courses. Siemens certification program centralized training 10 years later with both S5 and TI obsolete.

CUSTOM PROGRAMS

We offer a variety of programs to fit our clients needs. Our ability to create hybrid training sessions is unmatched in the industry. Boeing, ConAgra, and Hood Packaging plants have benefited from a week focused on their application

ON-SITE TRAINING

Bringing training to your people has never been so affordable. Costs for sending people away to school go well beyond tuition. We can instruct at your plant for a fraction of the factory price tag.

TRENCH TEACHING

We expect every service trip to be a teaching opportunity. An open forum builds confidence for the front line workers. Budgets and schedules limit exposure in a training setting. Direct support staff involvement is encouraged whenever possible,

MODULAR SESSIONS

We developed a program that separated the S5 training into 4-hour modules. Several sessions were tested at regular customer sites. Our plans for a self-paced S7 version wait for an opportunity.



EXPERIENCE



Siemens is strong in several industries due to their speed and communication advantages. We have floor time with every manufacturer mentioned below. We prefer to help the user better understand their equipment.

- Plastics** Two intelligent processors were developed specifically for the plastic industry. The IP 244 temperature control and IP 252 valve control were designed into **Husky** and **Van Dorn** injection molding machines during the S5 days. **Maillefer Extrusion** applies S7 throughout their product line. **HPM** and other compression presses were upgraded on the plant floor. We have adopted **Quarta** extrusion lines at 2 **Toro** plants. Our code runs the **Nitrojection** gas assist machines
- Rubber** We wrote code for **NRM** and **McNeil** tire building machines. Relay logic was converted to PLC control on latex test machines at **Kiltex**.
- Food** Food preparation applications add environmental stresses to the control formula. Temperature, humidity, and flour dust challenges did not affect performance at **Orlando Baking**. The S7 programs developed for **Peerless** remain as their European standard. Servo modifications to **Bosch** lines at a **ConAgra** plant were the first outside of Germany.
- Steel** We developed HMI and PLC programs for **Bliss** and **Shuler** forging press rebuilds at **Hirchvogel** and **Dana**. Tech support for applications at **LTV**, **Mittal**, **AK Steel**, and **Blue Scope**. At **Mentor AGV**, we integrated infrared serial communications on automatic transfer cars. Our code ranges from CNC instructions in an IP-246 servo card to Win CC Scada in a **Hatteberg** forge.
- Paper** Siemens strength in paper gave us opportunities on **Jagengerg** sheeters, **H&K** and **Bobst** printing presses, and **Koscheik** bag lines. We adopted a **Wintech** winder at **Troy Laminating**.
- Process** **Plating Technology** lines across the US run our code. We developed several waste water treatment applications. Our equipment was instrumental in the development of the gas heat pump at **Battelle**.



ORLANDO BAKING



Need for PID

Our first good opportunity to sell Siemens S5 based on capability came from at the Orlando Baking Company. They were interested in our ability to control 64 PID loops from one controller. The “R” processor was just introduced when we quoted the system. We committed to excessive tech support to insure success. Anderson-Bolds would not permit me to write code and we had no integrators ready so they asked me to help during my off hours. Firewings Systems was born from this Orlando need.

Automating the Ovens

Success after success turned John Orlando from a skeptic to a believer. We sold sensors, valves, operator interfaces, and Siemens S5 PLC on every project. A line designed to form 4 products was modified to run 17. Unique solutions to automation issues became a common occurrence. John stopped sharing information with competitors as our reputation grew. An automation team formed within the maintenance staff.

Linking the Lines

The automation team formed the new plant engineering department. Key members brought many ideas back from “Bakery Engineering School.” We approached them with a plan to make the plant self-sufficient within 5 years. The central control theory gave way to a coordinated network scheme. The 95U fit the forming equipment needs perfectly. Our flour delivery system became the fastest in the industry.

Modular Training Developed Two 4-hour windows per week were scheduled for training. We designed a program to cover a different topic at each session. Each module built off the previous. Breaks in the schedule were routine. A review session brought us back on track. Brian began writing ladder code, Chris made the drawings, and I focused on HMI and networking.

After 5 years as my top customer, my role decreased as their competence increased to the point where major projects were my main need. September 11th killed the restaurant business and crippled the bakery. I moved on to the next challenge.

Prototype for future

A skilled maintenance staff can modify their equipment with programming assistance.

The dynamics of the 15-year run as software engineering consultant brought valuable insight and experience that could rarely be found elsewhere. Tech advances are relentless, fueled by fresh ideas and energy. The automation life cycle came full circle. Rapid initial growth, turned to optimization, gave way to maintaining control, which slid to keep the equipment running.



SIEMENS - URBANA PRESS CONTROL UPGRADE



Twin HPM 150 Ton Plastic Molding Presses with Commander II Controls

Siemens plant engineering department hired us to upgrade the failing controls for more productivity. The existing control parts were becoming increasingly expensive and rare. Our strategy was to prepare a new sub-panel to replace the custom control with minimal downtime. We upgraded one press to prove the system before working on the second. The field inputs were converted to 24VDC and the outputs were isolated by individual relays to protect the cards from aging valves.

Productivity had such a dramatic increase that 3 more presses were scheduled for similar upgrades.

HPM 400 Ton Molding Press interfaced with robotic part removal

This machine was similar to the twins but had an added interface with a robot. We added the interface code and screens to the TP 170B that is used to change the molding parameters of all the HPM presses. The diagnostic screen aids in the maintenance troubleshooting of each press.

Vertical compression press upgrades

The operator places a specified weight of a fiberglass and plastic compound in the open cavity. Dual start buttons protect the operator during the closing portion of the cycle. The press opens automatically when the part is cured. We built the sub-panel using Siemens S7-314C and MP277 technology. We replaced a drum sequencer based control system in each machine.

The HMI and machine function were designed to function similar to other existing presses to reduce operator training.

Plant Personnel Training

We encourage plant assistance to keep the costs down and give ownership of the modified equipment. All our technicians are experienced instructors in the Siemens control equipment.

Documentation

We produce a maintenance manual complete with wiring diagrams, printed programs, and operating instructions. Our support team is on call to assist with troubleshooting.



BOSCH LINE



Bosch H&K Aseptic Filler Servo Transfer Upgrade at ConAgra Plant

Problem: The current hydraulic transfer system is subject to temperature changes due to workload. The effect on web position consistency creates several bad issues in the process. Hydraulic fluid is always a potential contamination source.

Solution: Servo controlled transfer gives a smoother tunable movement throughout the workspace. The encoder position feedback will make the station start trigger easily adjustable through the HMI interface.

Components **Control**

Siemens S5-135U system uses a 3 parallel processor configuration to handle all the machine control. This platform was obsoleted by the S7 system in 2002. Profibus protocol is the network of the S7 family.

Servo Siemens 911U servo control drive is used to handle the position and speed movement of the transfer.

Mechanical

Location and size issues are overcome with a special Rexroth table designed to more than handle the load.

Interface

Siemens makes an IM-306 card for the old S5 system to connect to modern Profibus controls like the 911U drive.

Team

Hershel Yates –ConAgra- Project leader
Dave Anderson –ConAgra- Control technician
Blair Sachs – HDS- Mechanical design and install
Bob Pillan –Electromatic- Servo drive control
Andy Banyots –Firewings- Software interfaces and control

Project Brief

The project had corporate attention as it was internally generated through plant engineering and the OEM was not involved.

The design team met several times to review progress and gain confidence as the components were configured and tested offline. Over preparation and contingency plans were essential as failure was not an option.

The system with load was tested at the HDS plant prior to install.

The 1 week installation went so well that reduced cost packaging stock was tested with exciting results

Follow-up

Encoder feedback was used to change the valve sequencing. Position replaced timers in station triggers. Recipe profiles were added to give simple parameter changeover for speed changes.

Results

Lower cost packaging has been in production for several months with even lighter weight packaging being tested. (save estimate \$400K/year)

This was the first major upgrade, in the Bosch Aseptic Packaging Division outside of Germany, which was successfully completed by a non-Bosch team.

Bosch was so impressed by the results that they hired Hershel Yates for their North American Service Group



HOOD PACKAGING



Small steps payoff big

The German manufacturer was sold during the install of a \$10M production line. Maintenance had to find support for their new equipment. We had only two brief service visits to the plant prior to Roger's call. We came in to find the most complex Siemens application I have encountered. The S7-417 safety PLC connected to 7 other S7 processors over 8 Profibus networks. The main cabinet is a walk-in box featuring banks of drives, breakers, starters, fault monitors, and controllers. Only the hardware manual set containing several thousand drawings were documented in both German and English. The program code was promised in English but not delivered. Tech support became erratic as performance/payment negotiations broke down.

Transition to Independence

Our relationship grew stronger as we solved more production issues. The language barrier hindered our tracing efforts. Failures in the safety circuit were compounded by passwords restricting access to the code. Help came from the installation technician who stayed in the US to service equipment built by the new parent company.

Training moved to the top of needs list. Several techs from other Hood plants were brought in to take advantage of the Siemens training. We focused on shortening diagnostic time through the use of software tools. Normally, 95% of the failures are field devices like encoders, valves, and motors. This application has shown 40% of the issues occur between communication components. These faults are typically sporadic and are difficult to locate. A well organized and heavily alarmed process narrows the search.

Teleservice saves time

Cost prohibits having every spare part at the plant. We view status over the telephone using modems and optional equipment. Hardware failures can be diagnosed and after physical confirmation ordered for urgent delivery. Cost and stress are reduced by quick diagnostics while potential help becomes global.

Translating the Program

Technical German is extremely difficult to decipher. We selected the sections of the program that were related to messaging, start-up inhibit, and PLC data exchange as our starting point. It took a team effort to bridge the gap between alarms and the component that faulted.



OEM story - PEERLESS



Specification from Italy

This maker of industrial bakery mixing equipment had an order for their largest automated mixer. The company wanted Siemens S7 control due to strong Italian support. We were originally brought into the project to train the design engineers on the Siemens control. Mechanical delays squeezed to the delivery deadline. Training turned to programming. We joined the start-up team for the installation at Bauli in Verona, Italy. The mixer was such a success that we returned for 3 more projects in subsequent years.

European Standard

Siemens became the European standard. Allen-Bradley was the standard control in North America. We were hired to program the mixers going overseas for the next several years. Customer wishes made each project a derivative of the standard. Features developed for the U.S. market, were also needed in Europe.

Team Efficiency

We were able to reduce the start-up team each trip as members became more capable. The team was reduced from a design engineer, programmer, electrician, and mechanic to an electrical engineer and a field service technician. The pinnacle of our service came when we were asked to bring wrenches as it would be a solo trip to Spain for twin mixers 150 miles apart. Semi-fluent in Spanish, we pulled and connected the control cables, tightened the drive belts and plumbing, mounted and wired a reversing starter, replaced overloads, commissioned the machine, and trained operators and support. We represented the manufacturer in production optimizing meetings during install.

5 Countries in 7 trips

We worked on machines in Italy, Spain, Germany, Switzerland, and China. We were able to communicate in the native language on each trip, becoming decent in Spanish and Italian. The HMI screens in Italy, Spain, and Germany were translated into the native language.

I achieved a personal goal of playing golf in each country, my world tour. In Italy, I was privileged to enter a local Stableford tournament where I was the top American.



Andrew Banyots – Personal Profile - 2009

Education: Case Western Reserve University Cleveland, Ohio
Electrical Engineering B.S.
Beta Theta Pi Fraternity President
Baseball team

Career Experience:

1985-1987 Anderson-Bolds Inc. Columbus, Ohio

Industrial Electrical Distributor
Field Industrial Salesman – 20 counties
Direct customer sales of industrial computers, PLCs,
Proximity switches, solenoid valves, and heaters.

1987-1992 Anderson-Bolds Inc. Cleveland, Ohio

Siemens Products Manager – state of Ohio – 3 offices
Sales marketing and technical support for salesmen in all offices.
Design marketing strategies and promotional seminars.
Customer training and technical service support for Siemens customers.
Demonstration equipment and stock management.

1987 founded Firewings Systems Inc. Cleveland, Ohio

Customer demand for programming services not offered by Anderson-Bolds led to formation of company to perform supplementary services.

1992-1994 Great Lakes Controls Cleveland Ohio

Siemens purchase of Texas Instruments PLC division led to new expanded distribution channel.
Siemens Products Manager – Ohio, PA, and New York territories
Sales, marketing strategies, and technical support. Record bonuses for product growth. Develop
Programming and maintenance training programs.

1994-Present Firewings Systems Inc. Cleveland, Ohio

Full time pursuit of my own company.
Siemens programming and training services has grown to cover high tech machinery on the East coast. Complete project services including design, programming, installation, and start-up. Projects installed in Italy, Spain, Germany, China, Canada, and Mexico. Currently developing retrofit team to convert obsolete S5 controls to modern S7 controls on high priced European equipment.

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