

Engineering Services

Huffman Engineering, Inc. Simplifies Process Control Engineering Management with Synergis Adept

CUSTOMER:

Huffman Engineering, Inc.

Profile: Provides engineering design and control systems integration to industrial and utility customers.

Headquarters: Lincoln, Nebraska

Challenges:

- Required to document complex customer processes.
- No standards to re-purpose documents or to manage revisions.
- Lacked consistency in how the project files were managed

Solutions:

- Configuration management has significantly improved.
- There's a complete system to manage its complex web of process control documents
- Huffman now has a single source of truth for all CAD, PLC and HMI files.

Process plants depend on highly specialized control systems. They are an integrated product combining software, mechanical equipment, and sensors. Huffman Engineering, Inc. has become a leading partner to manufacturers, utility plants, and the life sciences industry by designing and implementing sophisticated control systems for industrial facilities. Using their knowledge of engineering, information technology, and business, system integrators like Huffman Engineering, integrate plant equipment to automate manufacturing and processes from the plant floor to the enterprise level.



Huffman Engineering uses Synergis Adept to manage CAD drawings and related documents such as specifications. They also manage the programs created to run Programmable Logic Controllers and Human Machine Interfaces.

No two projects are alike, says Jay Steinman, a mechanical engineer at Huffman Engineering. The company is a full-service vendor, building control panels and the interface equipment between plant equipment and computers, and providing the software to run and interact with the system. Much of their work is for heavily regulated industries including water/wastewater and life sciences. A typical project in water/wastewater would be to build controls for every valve and gate and to install sensors that monitor flow and water quality. A project in life sciences might be to install the serialization control system consisting of vision systems and laser marking systems for a new machine that bottles pills. In both cases, Huffman Engineering does not build the machines, but adds the controlling technology to the equipment.

The processes are complicated, and most of their clients work under intense regulation pressure, requiring strict adherence to manufacturing and testing protocols. "It all must be thoroughly documented," says Keith Mandachit,

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a senior engineer and Huffman Engineering's IT manager. "We can't just build it and send it out. We have to provide a lot of specification and testing documentation."

Huffman Engineering also provides industrial network security services. In a recent electric utility project, the company was brought in to consult on cyber security. They discovered the utility was using the same computer network to run both their facility and their business operations. The business side was connected to the at-large Internet, putting the security of the power facility potentially at-risk. Huffman Engineering created a completely separate network to cut off the utility's internal control system from the outside world.

A Need to Nail Down the Single Source of Truth

Each project creates a tremendous amount of engineering data and reference information, in the form of CAD drawings or models, project management and work process forms, certifications, documentation of systems, documentation of testing, PLC programming, and more. On the company network file storage, projects were organized into separate folders, but there was no standard protocol for how to repurpose documents or to manage revisions. As Huffman Engineering did more and more projects for their clients as well as creating control systems, there was a lack of consistency in how the project files were managed as part of the project.

Over time the company created an ad hoc, manual revisioning system for CAD drawings using network file folders. "Then with the engineering side we were storing programs and specifications within our project folders," says Steinman. "Sometimes people would make revisions, but you never knew which files were the latest revision. Many of our projects touched the same systems. As projects moved along and control software was reused or modified, it was not being tracked across multiple projects. We didn't have that single source of truth with those programs."

It is not uncommon for Huffman Engineering clients to ask for CAD drawings or other documentation years after the work has finished. "Even though we give them a copy of everything, they still rely on us for their files," says Steinman.

The screenshot shows the Adept Document Dashboard interface. On the left is a tree view of the Configuration Management Record containing files like DWG1.dwg through DWG4.dwg, Functional Specification.docx, HMI Program.apa, PLC Program.acd, and Site Acceptance Test.docx. The main area is a table with the following data:

Child Version	Filename	Status	Adept Version	Revision Comment
Dock [2.0]	DWG1.dwg	In	2.0	Field Modifications
Dock [2.0]	DWG2.dwg	In	2.0	Field Modifications
Dock [2.0]	DWG3.dwg	In	2.0	Field Modifications
Dock [2.0]	DWG4.dwg	In	2.0	Field Modifications
Dock [1.0]	Functional Specification.docx	In	1.0	Revised per customer comment
Dock [2.0]	HMI Program.apa	In	2.0	Modifications during Site Acceptance Testing
Dock [3.0]	PLC Program.acd	In	3.0	Modifications during Site Acceptance Testing
Dock [0.0]	Site Acceptance Test.docx	In	0.0	N/A

At the bottom of the table, there are navigation tabs: Where Used, Children, Versions, WP Versions, Workflow, Audit Trail, Extended, Drawing Info, Transmittal, and Thumbnail.

With Adept, Huffman has best practices in place to maintain revision levels and one single source of the truth.

Huffman Engineering, Inc.

Every time a drawing is copied and shared, it creates another version that can, over time, be modified. Having more than one copy of any particular drawing or model means there is no single source of truth.

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Project numbering as a tool for record keeping was another area where Huffman Engineering realized they needed a new way to work. For years, projects were just named for the numerical order they came to the company, by client. Often a client would request bids on three separate projects: Huffman engineers would simply name them Project 1; Project 2; and Project 3. “But they might not actually happen in sequential order,” says Mandachit. “Project 3 might be the first one we did; Project 1 might be the last one we implemented.” It might be easy enough for those working on the project to keep track through the sequence mismatch, but when others in the company became involved, projects were easily confused. Employees were wasting time looking for data in the wrong places.”

Huffman Engineering is a certified member of the Control Systems Integrator Association (CSIA). Certified control systems integrators are required to be audited for engineering processes every three years. CSIA defines configuration management (CM) as a technical discipline that establishes the systematic control and recording of changes that are made to the hardware, software and documentation so that a system or a subsystem component maintains its integrity throughout the system development lifecycle. “Every time we have been audited and we got to the section on project configuration management, we would pass but with a ‘C’ not with an ‘A,’” says Mandachit. “We wanted to get an ‘A’; we felt it was very important to improve this aspect of our business process.”

Finding the Answers in Synergis Adept

Through the CSIA community, Steinman and Mandachit heard a presentation about configuration management. The company realized it had much to gain from getting its engineering document management under control. At first, the team looked at GIT and Subversion, open source tools designed to automate file management for software developers. However, they were not suitable for most engineering document types, and employees who evaluated these products found them hard to use. Next they looked at a software product that did only one thing, create a versioning system for PLC programs — but it lacked configuration management. They further explored the use of Microsoft SharePoint technology, but found it needed too much customization. After examining its various capabilities, a decision was made to invest in Synergis Adept as it was the only solution that could satisfy all requirements. “We wanted that ‘A,’” says Steinman. “We knew it would be difficult to estimate ROI because it is incremental amounts of time being saved. But we knew we had to spend some amount of money to get what we needed.”

Huffman Engineering chose to go with Synergis Software’s “Quick Start” form of implementation. With help from one Synergis implementation consultant, they were up and running in three days. The company has chosen to pull older data

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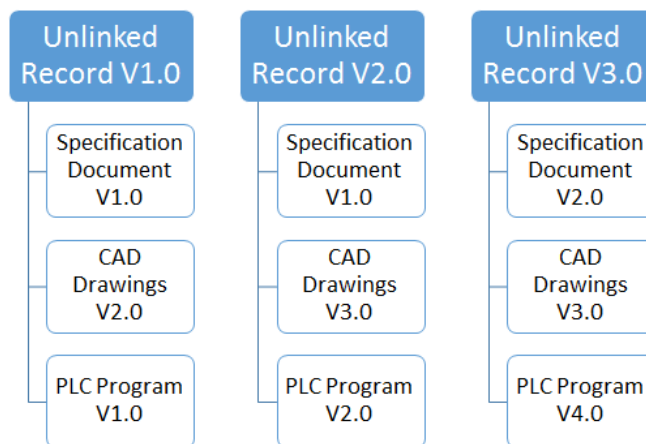
(legacy data) into the system on an as-needed basis. A couple of years earlier, the company did a serious archiving project and now Steinman and others pull older project data into the Adept system when needed. Projects that were in process when Adept was deployed are not being migrated; all new projects are starting in Adept. Unlike complex Product Lifecycle Management (PLM) systems that require all engineering data to be uploaded before anyone uses the new software, Adept makes it easy for users to add new files and folders to the system as needed.

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Like most Adept users, Huffman Engineering is managing CAD drawings and related documents such as specifications. They also use it to manage the programs created to run programmable logic controllers (PLC) and human machine interfaces (HMI). Each software file created is stored with the related project, but easily made available in Adept to be tracked for configuration management.

The company takes advantage of an Adept feature called Unlinked Records, and are being rather inventive in their implementation. Unlinked Records is a feature in Adept intended to be used to include various records not in electronic format, such as drawings on paper, a box in storage, or other documents on paper regarding a project. Unlinked Records could also be filenames and record numbers being saved for future use. An Unlinked Record is the electronic stand-in for the record, with a note on where to find it and what the connection is to the project.



Unlinked records are used to track related documents and their versions at various points in time.

Huffman Engineering organizes its records method based on pieces of equipment, since they are tracked and maintained after they are manufactured and installed. Unlinked Records are created for every piece of equipment to track all the supporting files that make up its configuration and their specific versions. “Prior to Adept, we didn’t really have all this information so easily accessible. We would be hunting around on our server trying to find where all

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these different files were, so we could put them together,” says Mandachit. The company wanted to do better in their configuration management process; with Adept and the Unlinked Records feature they found the key to this improvement. “We believe to truly satisfy the [audit] requirements requires the solution we have in Adept,” says Mandachit.

The screenshot shows the 'Document Dashboard' interface. On the left is a file tree with the following items: Configuration Management Record, DWG1.dwg, DWG2.dwg, DWG3.dwg, DWG4.dwg, Functional Specification.docx, HMI Program.apa, PLC Program.acd, and Site Acceptance Test.docx. On the right is a table with the following data:

Filename	Status	Adept Version	Revision Comment
_Configuration Management Record	In	2.0	After Site Acceptance Testing
_Configuration Management Record	Versioned	0.0	As-Shipped System
_Configuration Management Record	Versioned	1.0	Before Site Acceptance Testing

At the bottom of the table, there are navigation tabs: Where Used, Children, Versions, WIP Versions, Workflow, Audit Trail, Extended, Drawing Info, Transmittal, and Thumbnail.

The use of Synergis Adept's Unlinked Records gives the company a best practice for configuration management unrivaled in the control systems integration industry.

Another pleasant surprise was how easy it was for Synergis Adept to publish drawings as PDF files using Adept PublishWave. Not all Huffman engineers have a copy of AutoCAD. Before Adept, anyone who needed to print a drawing would need to contact the CAD department to get a print. Now anyone who needs to print a drawing can use the PDF version created by PublishWave. “It is a huge time-saver for our CAD manager, who has to respond to every request,” adds Mandachit. Adept with PublishWave also manages when the PDF was created, so that if changes occur to the original AutoCAD drawing it is easy for a user to know there is a newer version.

A Better Way to Manage Control Systems Engineering

Huffman Engineering now has a complete system in place to manage its complex web of process control engineering documents, drawings and programs. It believes its use of Unlinked Records gives it a best practice for configuration management unrivaled in the control systems integration industry. “We looked around and found Adept is able to do everything we needed,” says Steinman. “We have best practices for maintaining revision levels and we have our single source of truth.”