



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

Senior Design Project Description

Company Name	<i>Ametek - Controls Southeast Inc (CSI)</i>	Date Submitted	<i>Nov 2, 2018</i>
Project Title	<i>Research and Development of a Material Tracking System for Fabricated Parts (AMETEK_MT)</i>	Planned Starting Semester	<i>Spring 2019</i>

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical		Electrical	
Computer		Systems	4
Other ()			

Project Overview:

AMETEK, Inc. is a leading global manufacturer of electronic instruments and electromechanical devices with annual sales of approximately \$4.0 billion. AMETEK has more than 15,000 colleagues at nearly 150 manufacturing locations around the world. Supporting those operations are nearly 100 sales and service locations across the United States and in 30 other countries.

Ametek - CSI is a division of Ametek Corporation and is located in Pineville, NC. CSI provides thermal maintenance systems and specialized process equipment for heating, cooling and control of liquid/vapor processes in the petrochemical, chemical, and refining industries. CSI does this through a combination of proprietary products and engineering methods developed over 40+ years of practice. The flagship products are ControTrace® engineered tracing, ControHeat® jacketing and SxSeal® Sulfur Traps. As a technology-neutral supplier, CSI evaluates all aspects for each project to deliver the most optimized heating or process equipment solution available – maximizing savings for both capital and ongoing operational costs. Some product examples:



UNC CHARLOTTE

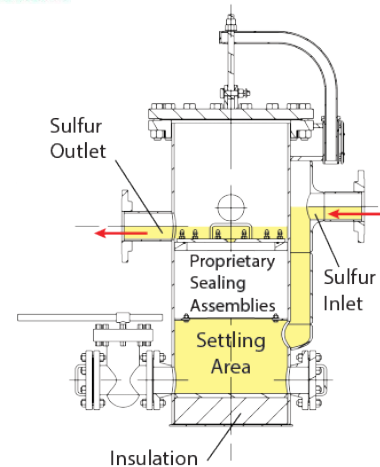
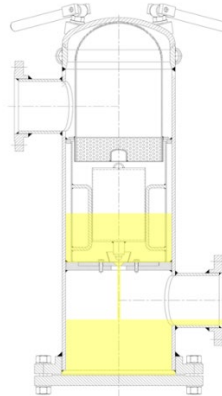
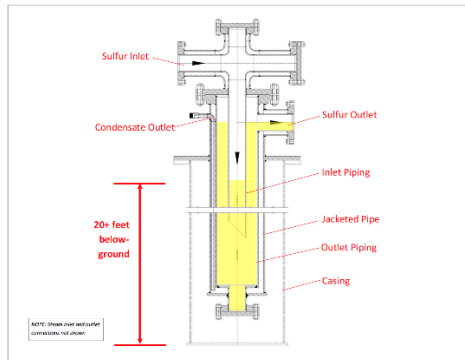
The WILLIAM STATES LEE COLLEGE of ENGINEERING





UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING



CSI fabricates products with various metallurgy using components such as pipe, fittings and bar stock. Due to the severe service applications for the products, material tracing of the component parts all the way through the fabrication and assembly process is required. At the product delivery, documentation of this traceability is required to be delivered.

The current system is very manually labor intensive and as such, prone to errors. These errors affect inventory accuracy and thus shop efficiency. Documentation errors increase costs and can delay shipments. The scope of this project is to investigate solutions that can automate the data collection and materials tracing for the products as they progress through the shop for higher levels of integration.

Initial Project Requirements:

CSI has a wide variety of custom configured products. See the list below:

TRACING & HEATING SYSTEMS	PROCESS EQUIPMENT	FABRICATION
ControTrace®	SxSeal® 2000 Sulfur Trap	Jacketed Piping
ControHeat®	SxSeal® 1000 Sulfur Trap	Power/Process Piping
TraceBOOST®	SxView™ Sulfur Sight Port Assembly	Specialty Fabrication
Heating Circuit Sub-Systems	SxSample™ Assembly	Polymer Piping and Manifolds
Jacketed Piping		
Jacketed Valves		
Flexible Metal Hoses		
ControCover		
Tracing Accessories		

For this project, the team will need to document each type of material that has traceability requirements. For this input material, the process flow for the configured product will need to be understood along with the current manual way of capturing the material “heat” information and



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

maintaining traceability through the product fabrication process. Once understood, research will be conducted to define alternate systems that can automate this process in a cost efficient way. Engineering Economy principles will be used to do return on investment calculations for potential solutions. From the solutions evaluated, a recommended system will be selected and an implementation plan developed for this system.

Expected Deliverables/Results:

Produce a development/implementation plan to create a materials management system which would have the following features:

- All materials would be assigned a bar/QR (or similar) code upon arrival at CSI. The code would be connected to the piece in a permanent way.
- MTR's (Material Traceability Report) for each material would be scanned, stored, and forever be linked to the material via the bar/QR (or similar) code.
- Materials can be placed on hold electronically (versus physically) if additional quality review is required.
- Segregate materials to specific sales/job orders electronically.
- When multiple pieces of raw materials are used to make a single component, the system should have the ability to link all of those items together so that they can be tracked together.
- Movement of each piece throughout the fabrication process can be tracked, with the ship date included in the documentation.
- System will communicate with CSI's ERP (SQL interface) to prevent information from having to be maintained in two separate systems.

The plan could include purchasing external software or developing new software. The software would need to interface with our ERP. The plan should include a budget for all costs (labor, materials, software, etc.), return on investment justification and an implementation plan for the project.

Disposition of Deliverables at the End of the Project:

All documentation to be delivered to Ametek at the conclusion of the Expo.

List here any specific skills, requirements, knowledge needed or suggested (If none please state none):

- Ability to use Microsoft SQL Server Management Studio to access ERP tables and define interfaces
- Familiarity with Industrial Fabrication components and nomenclature
- Design reviews will be done at CSI's site in Pineville, NC.
- Multiple trips will be required to the site for data gathering sufficient to understand the requirements and product flow
- SEGR – Engineering Economic Analysis passed with a B or better.