

# INTEGRATED TECHNOLOGY SYSTEMS INCORPORATED: DESIGN AND IMPLEMENTATION OF A STREAMLINED PROCESS

Julie Geary Fortune, Anthony J. Donatelli, and Cathryn Sterling  
University of Alabama in Huntsville  
Huntsville, Alabama 35899

[fortunej@ise.uah.edu](mailto:fortunej@ise.uah.edu)

[donatea@email.uah.edu](mailto:donatea@email.uah.edu)

[Cathryn.Sterling@rdec.redstone.army.mil](mailto:Cathryn.Sterling@rdec.redstone.army.mil)

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## ABSTRACT

This project consisted of designing and implementing a new manufacturing line for electronic faucets at Integrated Technology Systems, Inc. (ITS) in Huntsville, Alabama. ITS was preparing to relocate the plant and had an opportunity to make significant changes to the manufacturing process. The streamlining effort was accomplished utilizing value stream mapping, cellular layout with modular equipment, visual kanbans, and standardized work practices. The proposed new manufacturing process could be evaluated using simulation tools. The results of these efforts yielded incremental increases in efficiency, eliminated waste, and the laid the foundation to enable increased production. ITS estimates that these efforts will translate into a 50% decrease in labor, a 30% increase in overall production, and an estimated annual savings of \$250,000.

## COMPANY HISTORY

Integrated Technology Systems (ITS) is a designer, manufacturer, and provider of infrared technology in potable water control products. The company recently changed its name to Synapse. It is 90% owned by Chicago Faucets and 10% locally owned. ITS's only customer is Chicago Faucets who resells their products to others.

## STATEMENT OF PROBLEM

The objective of this project was to streamline the faucet assembly process. This was accomplished utilizing:

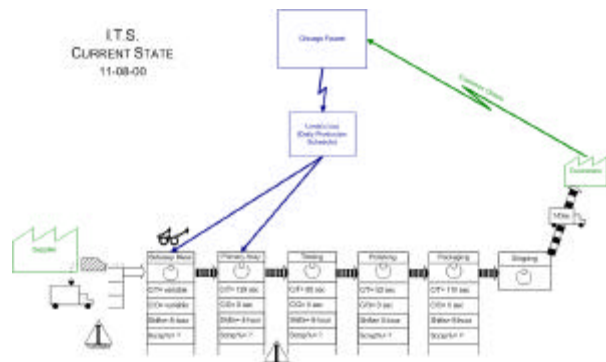
- Value Stream Mapping
- Cellular layout with modular equipment and kanbas
- Standardized work processes
- Evaluation of the streamlining process

## SCOPE OF WORK

The scope of work designed for this project consists of five main phases to complete the stated objectives. They are as follows.

### Phase I and II: Streamlining the Process while moving the company

The current process was evaluated utilizing value stream mapping as seen in Exhibit 1.



**Exhibit 1: Current Map**

The current map of the process yielded the following information:

- Current process is a push system
- Process is smooth after subassembly point
- Takt time is 1 faucet every 10 minutes
- Production rate: 50/day

A future map was proposed as shown in Exhibit 2.



e-faucet line. The associates held a kaizen event to discuss how to implement the new process on the new line. Although the line was in the infancy stage, the results were impressive and are as follows:

- Workbench boards were placed perpendicular to the worktable. This allowed for various size tubs to be attached allowing for a very flexible organization of parts, tool, jigs, and poke-a-yokes.
- Rolling racks with sliding trays or tubs were purchased and used as visual kanbans to let the team know when to make more subassemblies. The sliding trays allowed for easy access to the parts and easy part rotation allowing for stock rotation.
- A routine was established for the assembly thus beginning to utilize the work standardization philosophy.
- Assembly time was reduced with the implementation of the new process. The goal was to decrease the takt time in half and it was obtained.
- A single person maintained the visual kanbans by rotating the stock and verifying when new items needed to be made.
- Now everyday the number of faucets tested, number passed, and number failed (as well as the reason for failure) are tracked.
- No control charts are in place but are planned in the future. An acceptable range for when the electronic faucet should start to work has been established. The faucets are tested to make sure they fall in that range utilizing a slide ruler with a kind of fake hand at the end which will set the faucet in motion. The neatest thing by far that has been implemented is the use of a palm pilot for tracking. The palm pilot is pointed at the faucet and records the faucet serial number and can spy any defects and tell what they are. This allows for the faucet to be reworked and keeps an electronic record of all faucets.
- Previously workers interrupted the assembly routine to restock their supplies. This has been eliminated by each associate leaving a restock order at the end of the day in the shipping area. The shipping personnel arrive earlier in the day than the other associates and refills their supplies. This eliminates wasted motion and inventory.

#### **Phase V: Assessment of Improvements using Simulation**

Improvement ideas and implementation were still ongoing at the project timeline ending. This process was not evaluated utilizing simulation techniques due to the fact that the process was still

evolving and not yet standardized. It is not recommended to simulate a non-standardized process such as the one described. The variability seen in a non-standardized process makes the simulation model less accurate and therefore less useful.

A suggestion for future evaluation of this company is to complete the work standardization and take the improved production line and with the aid of simulation, determine the production rate and detect any bottlenecks in the process.

As a part of the continuous improvement of this production line, simulation should be a tool used to evaluate proposed future improvements in order to assess their impact without disrupting production. Several products such as ARENA™ and Process Model™ would be capable of this endeavor.

#### **Economic Analysis**

The results of these efforts yielded incremental increases in efficiency, eliminated waste, and laid the foundation to enable increased production. ITS estimates that the efforts of the project team will translate into a 50% decrease in labor, a 30% increase in overall production, and a \$250,000/year savings in faucet production. Simulation will allow further savings by avoiding downtime while evaluating potential new processes.

#### **CONCLUSION**

In summary, the project team was successful at streamlining the faucet manufacturing process while assisting in the move to a larger facility. This effort resulted in a bottom line savings of \$250,000/year. Introducing simulation as a continuous improvement tool will allow further savings in noninvasive analysis of the process.

#### **ACKNOWLEDGEMENTS**

The team would like to acknowledge the entire team at ITS especially Lucille Tillotson and Linda Harris.

#### **REFERENCES**

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## **BIOGRAPHIES**

Julie Fortune has B.S. in Biochemistry from the University of Missouri-Columbia as well as B.S.E. in Industrial and Systems Engineering from the University of Alabama in Huntsville (UAH). She has 12 years experience in the pharmaceutical industry as well as 2.5 years as an engineer at Teledyne Brown Engineering. She is currently a Graduate Teaching Assistant at UAH teaching Engineering Economy while working on her M.S.E. in Industrial Engineering with an emphasis on Engineering Management.

Anthony Donatelli is a Project Engineer for the Region 1 Center of the Alabama Technology Network located at the University of Alabama in Huntsville. Mr. Donatelli has a B.S. in Industrial and Systems Engineering and is currently pursuing an M.S.E. in Engineering Management from UAH. He has experience in value stream mapping, simulation, production control, line balancing and standardization, facility layout, and as a lean manufacturer trainer.

Cathryn Sterling is currently finishing her B.S. in Industrial Engineering at UAH with a minor in Spanish. She will be pursuing a Masters in Engineering Management from UAH as well as continuing her athletics on UAH's volleyball team. She has experience in line balancing, value stream mapping, time studies, work standardization, and facility layout, as well as currently working with computer aided design programs for UAH Smaplab on Redstone Arsenal.