

# [IPRO 306] Improving Global Supply Chain Management



**SLOAN**

*Sloan Valve Company*

**Project Sponsor: Steven Rodgers, Sloan Valve**

**Faculty Advisor: John Caltagirone**

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## DESCRIPTION OF THE IPRO PROGRAM

### *The Interprofessional Projects (IPRO®) Program at Illinois Institute of Technology*

An emphasis on multidisciplinary education and cross-functional teams has become pervasive in education and the workplace. IIT offers an innovative and comprehensive approach to providing students with a real-world project-based experience—the integration of interprofessional perspectives in a student team environment. Developed at IIT in 1995, the IPRO Program consists of student teams from the sophomore through graduate levels, representing the breadth of the university's disciplines and professional programs. Projects crystallize over a one- or multi-semester period through collaborations with sponsoring corporations, nonprofit groups, government agencies, and entrepreneurs. IPRO team projects reflect a panorama of workplace challenges, encompassing research, design and process improvement, service learning, the international realm, and entrepreneurship. (Refer to <http://ipro.iit.edu> for information.)

The *IPRO 306: Technology and Business Innovations to Improve Operations* team project represents one of more than 40 IPRO team projects for the Fall 2009 semester.

## Acknowledgements

The IPRO 306 project team would like to acknowledge the tremendous support and enthusiasm displayed by the Sloan Valve team. Without their help, we would not have been successful in our objectives, nor would we have been able to experience such a tremendous learning experience.

### Sloan Valve Team

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**Steven Rodgers**

**Brian Capo**

**Kevin Balster**

**Karen Pixler**

**Michael Skrypek**

**Jane Klink**

**Steve Mader**

**Jim Gabelhausen**

**Monique Divarco**

**Hetul Thakkar**

# I. Executive Summary

The IPRO 306 team was tasked with assisting a major plumbing manufacturer, Sloan Valve, in optimizing the global supply chain. Due to the scope of the project and the desire of the team to produce the greatest impact on Sloan Valve, IPRO 306 was involved with 3 projects during the fall of 2010.

Sloan Valve is a 104 year old privately held manufacturer and global distributor of commercial valves and plumbing fixtures. The company was built on the invention of the Flushometer, a type of high efficiency, low maintenance valve that was a far departure from the valves that flooded the marketplace. However, through the perseverance of the inventor and founder, William E. Sloan, the flushometer eventually became the standard in commercial construction. Over the years, Sloan has kept the innovative and determined spirit of its founder and has realized continuous growth through strategic acquisition and new product development.

Currently, the Sloan Valve network contains 8 different facilities: 4 manufacturing, 3 in the US and 1 in China, 1 foundry that supplies all of the castings for manufacturing, and 3 distribution centers (DC). The Franklin Park location serves as the corporate headquarters, as well as, a primary manufacturer and replenisher of the distribution centers. Sloan currently employs over 500 people and has estimated annual sales over \$50 million.

The first project was to define the term “Green” and understand how “Green” aligned with the Sloan Valve mission statement. This involved research through white papers, interviews with Sloan Valve management, and interviews with Sloan Valve suppliers. The goal was to establish a foundation for a green supply chain by use of benchmarks and policies.

The second project worked with Sloan Valve on their Overall Equipment Effectiveness (OEE) program. The team’s focus was determining what Sloan Valve in terms of their OEE program. Their current program was explored and analyzed. The team then went on to develop a new method for

collecting data that is necessary to calculate the OEE of the machinery used by Sloan Valve. The team developed data collection sheets that will be beneficial for Sloan Valve in determining the OEE of the equipment used at Sloan.

The third project worked with Sloan Valve on optimizing their inventory management system. The goal was to improve product tracking by implementing new part status’.

## II. Purpose and Objectives

### Team Purpose

#### Green Team

- To define “Green” – internally and externally – as there is currently no standard definition of “Green”
- To benchmark corporations
- To create a strategy for a Green supply chain
- To develop metrics for the supply chain
- To create a Green policy

#### Lean Team

- To develop an overall method of documenting and entering data pertaining to the performance of the specific machinery involved in the manufacture of products as per efficiency calculation requirements for the OEE method.
- To generalize the methods developed for the specific machinery to all machines and to ensure easy understandability and efficient chronicling of data into datasheets on the floor by workers.
- To identify the relevant people on the floor to be in charge of data collection.

## SKU Team

- Errors occur because on hold inventory is controlled manually
- Orders are booked at the Incorrect plant
- Inventory exists at locations where it will not be utilized or be identified easily
- No easy way to determine inventory in wrong location or SKU stocking plan by plant
- No reports or procedure to manage inventory outside of standard cycle counting reports
- No way to allow for different stages in new product development

## Team Objectives

- Meet or exceed the expectations of Sloan Valve and Mr. Caltagirone
- Establish a foundation for a Green supply chain by benchmarks and policies
- Improve production efficiency by identifying machine & operator downtime
- Improve product tracking by implementing new part status'

# III. Organization and Approach

## Green Team

The Green Team worked closely with Sloan Valve's Brian Capo, Global Distribution Manager and Michael Skrypek, Commodity Manager – Raw Materials. The Green Team and Sloan advisors agreed to meet once per week at 7:00 am on Mondays. Emails were frequently exchanged throughout the week.

Members of the Green Team were first tasked with defining “green” as it applies to Sloan Valve. This was done by researching various corporations and looking at their approach towards green practices and sustainability. This research was compared to the Sloan Valve mission statement to create a definition of “green.” After defining green, the Green Team sought to understand the extent to which different members of the supply chain aligned with Sloan Valve's green values by creating a questionnaire. The Green Team then needed to quantify the subjective questionnaire results. A green

scorecard was created with various categories by which suppliers could be rated. Finally, using the guidance of the questionnaire and scorecard, the Green Team composed a green policy and statement.

## Lean Team

The Lean Team's first step was to examine Sloan Valve's OEE data collection system in place. This was the way the team knew what they were working with and what Sloan Valve had already tried. Also if any part of Sloan's system worked it could be used rather than starting from scratch. The next step was to sit down as a team and see what kind of ideas the team could come up in respect to the task at hand. Once initial ideas were developed, the team had to present the ideas to the key players at Sloan with whom the team was working with. The team got an idea of what the Sloan wanted from the program. This allowed the team to further modify the data collection system based on the needs of Sloan Valve. The team and management at Sloan then met with one of the operators and setup guys of a machine used at Sloan. This allowed the team to get input from people who will use the data collection sheets. The input allowed the team to determine what modifications were needed to make the data collection sheets user friendly.

## SKU Team

The SKU Inventory management group was lead by Jane Klink, Global Materials Manager. Ms. Klink was in charge of the strategic planning and execution of the project. The team was well supported by Hetul Thakkar who works as a Material Analyst, Karen Pixler as the IT Business Analyst and Kevin Balster, the Manager of IT Business Solutions.

The SKU and Sloan teams agreed to meet twice a week on Thursday and Friday, from 8Am to 11Pm and 1Pm to 4PM respectively. During the week, constant feedback through e-mail was made as well as phone conferences when further details were required. Constant feedback with the instructor about the status of the project and ways to approach the different challenges took place by e-mail, phone and scheduled meetings.



The first step was the analysis of the initial state, focusing on the problems already identified by Sloan Valve in their inventory management system: Lack of formal procedures, difficulties to identify inventory within the distribution centers, orders being booked at wrong plants, on hold inventory was controlled manually, inventory exist at location where it will not be used.

When meeting at the company, both teams worked towards the tasks defined for that specific time frame, as a whole but also as individuals when explicit work was divided. At the end of every meeting, a recap of the objectives accomplished during the day was done, highlighting the positive and negatives aspects of the day at Sloan Valve. A detailed project plan was formed in very beginning and every week team ensured that everything was going according to plan and tasks were accomplished within the designated time frame thus keeping project always in motion.

This approach of constant communication and feedback and a close interaction between the SKU team and Sloan team help the project to constantly move forward and keep a steady momentum. Even though challenges arose at certain points, both teams worked together to move pass them and finally fulfill the expectations defined on the expected results at the project plan.

## IV. Analysis and Findings

### Green Team

- Conducted research on interpretations of Green
- Created a Green questionnaire to interview suppliers & Sloan management
- Created a scale to rate suppliers based on their Green policies
- Created a Green statement and policy

## Lean Team

### Analysis

- Manual data sheet to collect information was not optimized
  - Analysis of previous data sheets identified:
    - Unstructured data input
  - Interview of management/responsible user highlighted:
    - The Data sheet where the data was collected has not been optimized for computer analysis
  - Round Table with worker:
    - Confusing input variables
- Inefficient process to input into the data into the sheet
  - Analysis of previous data sheets identified:
    - No standard process to fill in the data
  - Interview of management highlighted:
    - Worker filled out sheet during break time
  - Round Table with worker:
    - Worker was not trained in using the data sheet

### Findings

- Optimization of data sheet process by implementing standard process and data sheet
  - Round Table with worker and management
  - Consultation of IT responsables
    - Implemented a basic data sheet

- Legend for the workers for orientation
- Legend references to achieve computer analysis

## SKU Team

- Develop new part statuses
- All domestic part statuses ~50,000 updated to the correct new status in SAP
- Reports are created and owner buy in is achieved to maintain and control inventory based on new SKU statuses
- Orders are now booked at correct plant.
- Quality issues are now managed easily & accurately.

## V. Conclusions and Recommendations

### Green Team

Interviews conducted with Sloan Valve Co.'s suppliers gave insight into the value of being green. All suppliers interviewed attempted to use recycled material whenever possible and had made significant efforts to reduce energy usage, reduce material waste, and maximize shipping capacity. The obvious reason for those efforts was to reduce costs. This illustrates that many green initiatives are cost effective, and therefore beneficial to both the environment and the business. The questionnaire helped the green team create the scorecard by which suppliers could be rated. Sloan Valve Co. intends on adapting the green scorecard for use when choosing new suppliers. The Green Team to compose a green policy and statement. Sloan Valve wanted to firmly declare their stance on green initiatives. Sloan Valve intends to use the green policy and green statement to ensure that their products are aligned with their values and mission statement. Sloan Valve intends to ensure that their product meets their standards by holding their suppliers to the expectations of the green policy and green statement. We recommend that future IPRO Teams work to expand on the concept of "Green," research new ways to evaluate suppliers, and focus on internal green improvements.

## Lean Team

In the Fall 2010 semester, the Lean team within IPRO 306 developed a more efficient and accessible OEE data input sheet to be used by Sloan machine operators. Through analysis of the OEE formulae, interaction with multiple levels of management, observation of multiple machines, and focus group sessions with workers, we were able to eliminate unnecessary components from the existing OEM worksheet as well as implement new components that both simplified the experience for the operators as well as provide more valuable information for management. We recommend that subsequent IPRO teams continue to explore OEE as we believe that and integration of the data input sheets and SAP would further benefit Sloan.

## SKU Team

The SKU Team was able to create new part status', and update all 50,000 SKUs to the correct new status' in SAP. Reports are now created and owner buy in is achieved to maintain and control inventory based on new SKU statuses. Orders are also now booked at the correct plant. Quality issues are now managed easily and accurately. The SKU Team recommends that future IPRO projects expand the use of SAP beyond inventory management, including employee management, to achieve maximum efficiency.

# VI. Appendix A

## Team Roster

Team Member	Major	Email Address
Burim Bakalli	Information Technology Management – Database Management	<a href="mailto:bbakalli@iit.edu">bbakalli@iit.edu</a>
Martin Biller	Business Administration	<a href="mailto:mbiller@iit.edu">mbiller@iit.edu</a>
Paramin Chavalit	Business – Finance/International Business	<a href="mailto:pchavali@iit.edu">pchavali@iit.edu</a>
Andrew DiCosola	Information Technology and Management	<a href="mailto:adicosol@iit.edu">adicosol@iit.edu</a>
Joohyung Eom	Mechanical, Materials, Aerospace Engineering	<a href="mailto:jeom@iit.edu">jeom@iit.edu</a>
Stephen Falk	Materials Science and Engineering	<a href="mailto:sfalk@iit.edu">sfalk@iit.edu</a>
Ashika Sita Jayanthi	Molecular Biochemistry and Biophysics	<a href="mailto:ajayanth@iit.edu">ajayanth@iit.edu</a>
Monika Krauszowska	Biochemistry	<a href="mailto:mkrauszo@iit.edu">mkrauszo@iit.edu</a>
Alan Pang	Architecture	<a href="mailto:Apang1@iit.edu">Apang1@iit.edu</a>
Chetan Rawal	Masters of Information Technology and Management	<a href="mailto:crawal@iit.edu">crawal@iit.edu</a>
David Skiba	Mechanical Engineering	<a href="mailto:dskiba@iit.edu">dskiba@iit.edu</a>
Michael Spytek	Mechanical Engineering	<a href="mailto:mspytek@iit.edu">mspytek@iit.edu</a>
Michael Walters	Electrical Engineering	<a href="mailto:Mrwalters88@gmail.com">Mrwalters88@gmail.com</a>
Samuel Yonezawa	Computer Science	<a href="mailto:syonezaw@iit.edu">syonezaw@iit.edu</a>

## VII. Appendix B

### Team Skills and Expectations

Team Member	Sub-Project	Strengths	Weaknesses	Expectations
Burim Bakalli	Lean	Databases, critical thinking, process elimination, information technology related topics	Inventory management, process, and procedures	Better understanding of how lean works, as well as the best way to implement it in the business world
Martin Biller	Lean	Logical thought, arduous, ambitious, team skilled	Need a coffee to start	Improve logical skill, improve teammates, get in touch with the industry
Paramin Chavalit	SKU	Problem solving on independent tasks, task completion, best of my ability	Procrastination on projects with too large of scope, technical programming	Familiarization with SAP, performing tasks to the expectations of Sloan
Andrew DiCosola	SKU	Problem solving, computers, networking and new technologies	Time management, public speaking	Working in teams, exposure to real world companies and projects, exposures to new technologies.
Joohyung Eom	SKU	Making and organizing presentation files	Conversation skills	To have an experience working with a real company. Also, to discuss with teammates how to improve the condition which we want to make better
Stephen Falk	Green	Technical writing, problem solving	Little knowledge about manufacturing	Learn about manufacturing in a global business
Ashika Sita Jayanthi	Lean	Team work	Leadership skills	Develop leadership skills and an insight into corporate structure
Monika Krauszowska	SKU	Hard working	Public speaking	Learn more about what Sloan offers to the public
Alan Pang	SKU	Organizational skills, time management, visual AIO fabrication	Communication, working with others, basketball	A finished product employed by Sloan Valve
Chetan Rawal	SKU	Strong educational background, knowledge of SAP, Team player	Lack of professional experience, programming	More exposure to SAP, learn team management and building skills,

				improve problem solving skills
David Skiba	Lean	Works well with others, communication	Time management, organization	Improve team working skills, gain some real world experience
Michael Spytek	Lean	Works well with others, work experience	Time management	To learn more about how large companies work
Michael Walters	Green	Communicates well with others	Staying organized for long term success	How other companies implement new strategies
Samuel Yonezawa	Green	Computer stuff	Not very good at planning specifics. More "big picture" than details.	A better understanding of the corporate way of doing things

# VIII. Appendix C

## IPRO 306 “Organizational” Chart

