IPRO306

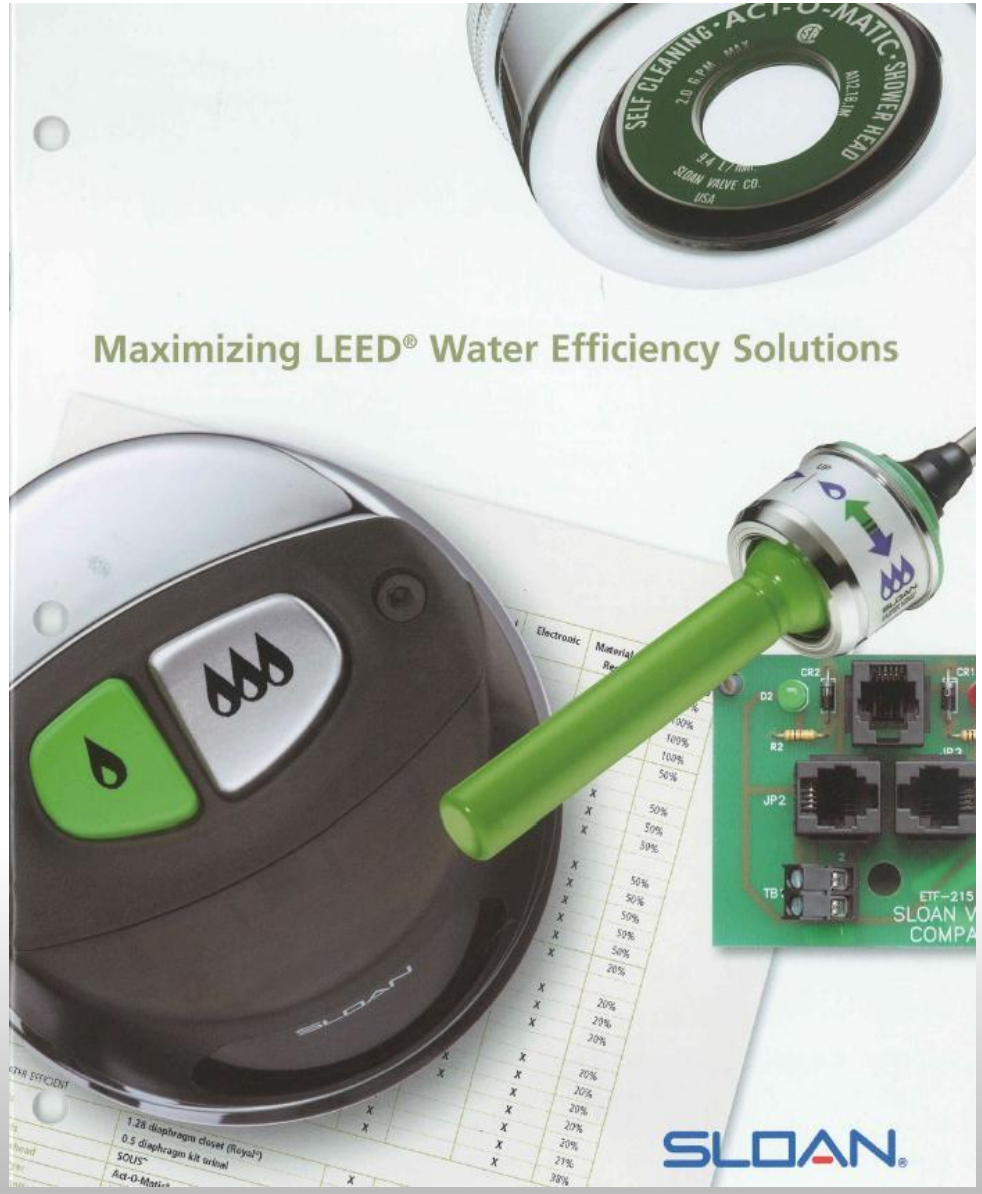
Improving Global Supply Chain Management

Spring, 2010

Introduction

Sloan Valve

- World’s leading manufacture of water-efficient solutions
- Headquarter: Franklin Park, Illinois
- Founded in 1906
- Facilities in Michigan, Massachusetts, Pennsylvania, California, Arkansas, Mexico, and China



IPRO 306 Project Structure

At Franklin Park, Illinois

- **Predictive Preventative Maintenance (PPM)**
  - **Franklin Park Equipment & Facility Maintenance**

- **Warehouse Management System (WMS)**
  - **Central Distribution Center (CDC) Warehouse**

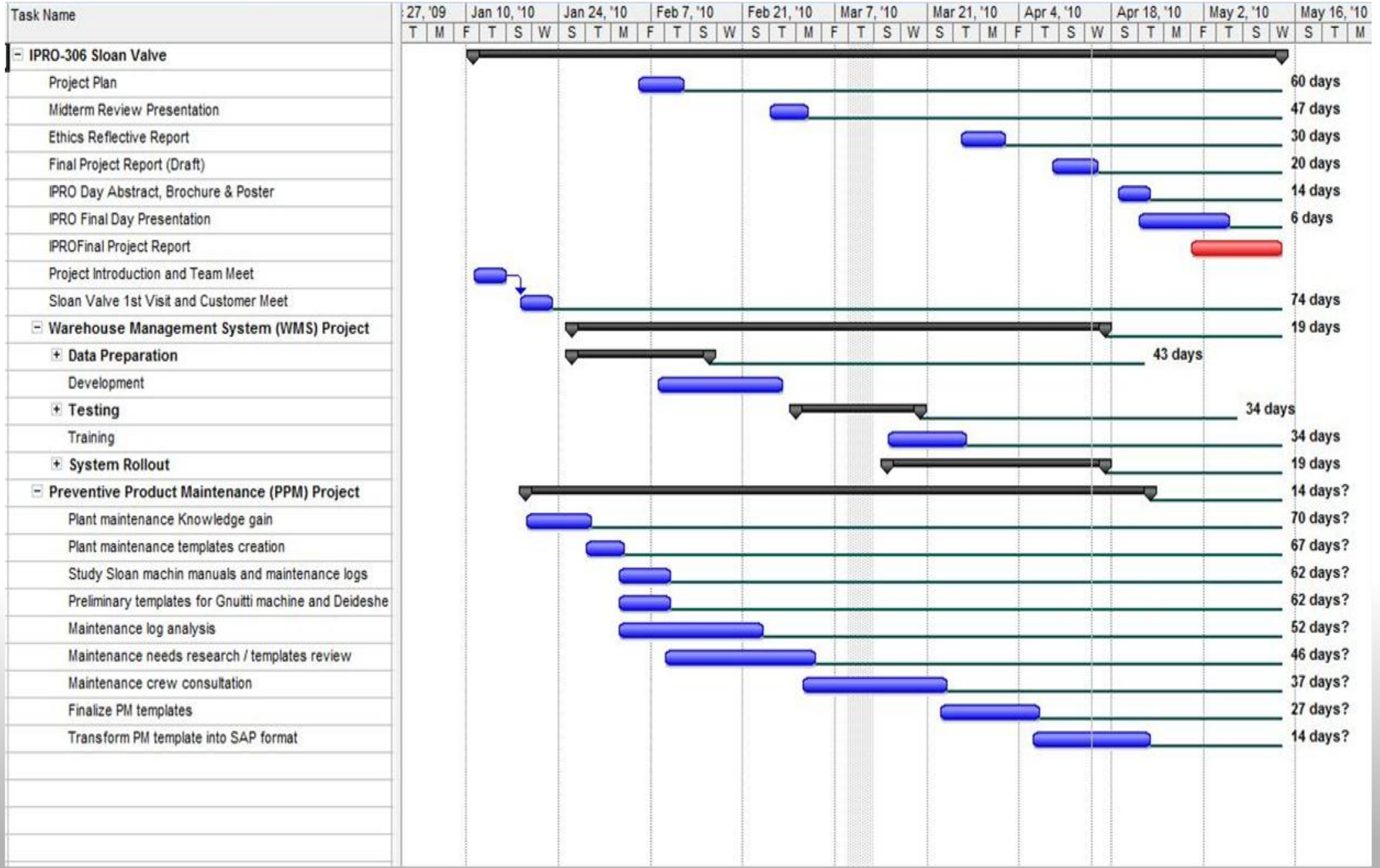
IPRO 306 Objectives

- Predictive Plant Maintenance (PPM)
  - Proactive Maintenance
  - Reduce equipment downtime
  - Part of Sloan Lean implementation

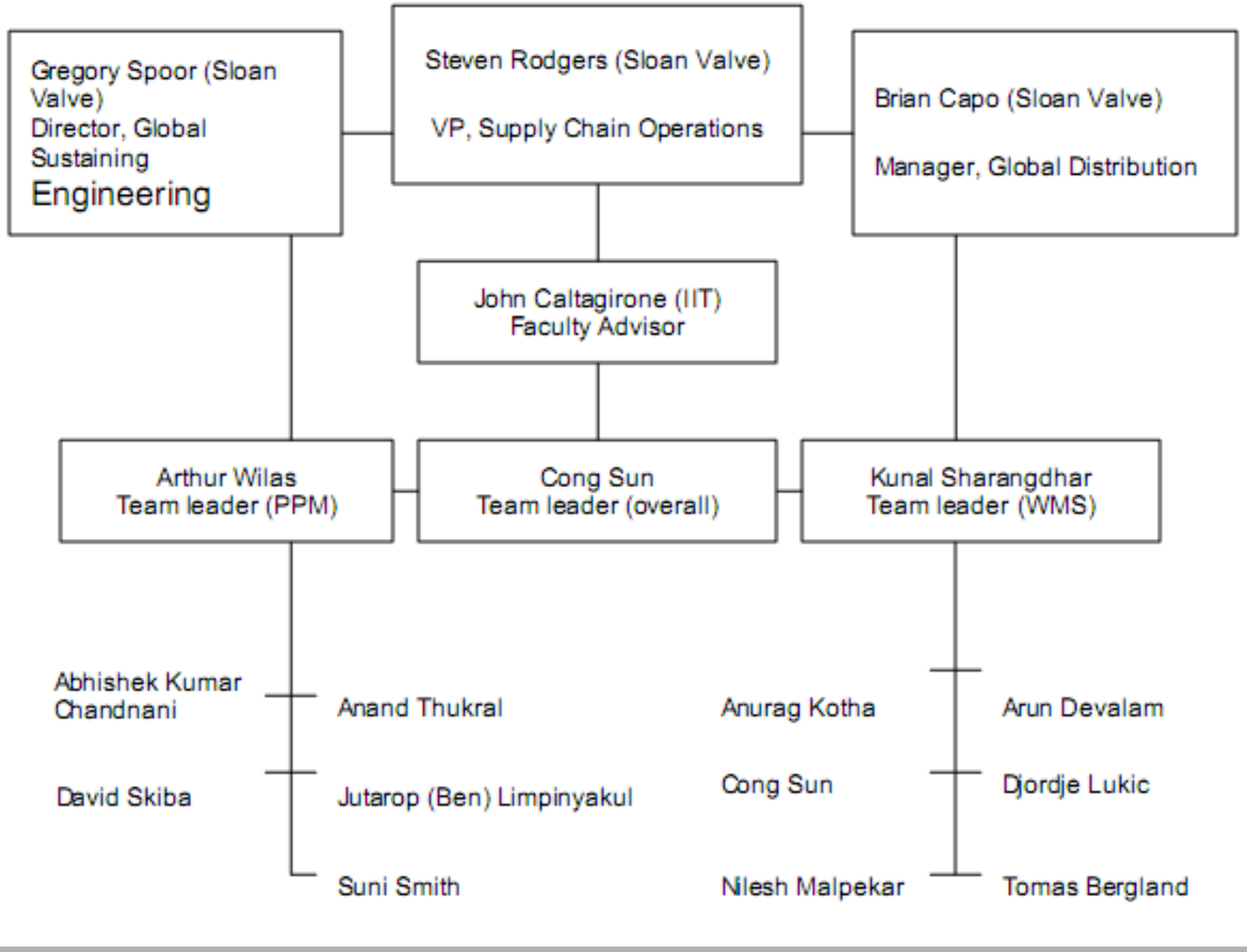
IPRO 306 Objectives…

- Warehouse Management System (WMS)
  - Distribute products on-time and accurately
  - Optimize Inventory levels, turns, and accuracy

IPRO 306 Project Plan

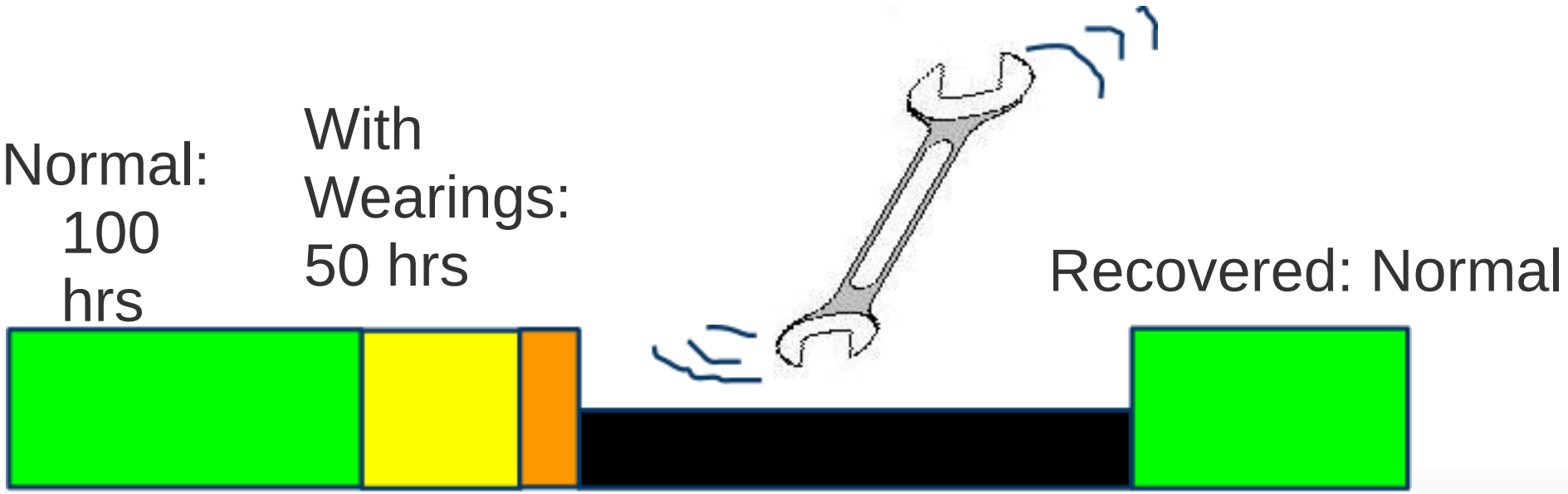


Overall Team Structure



Project 1: PPM - Rationale

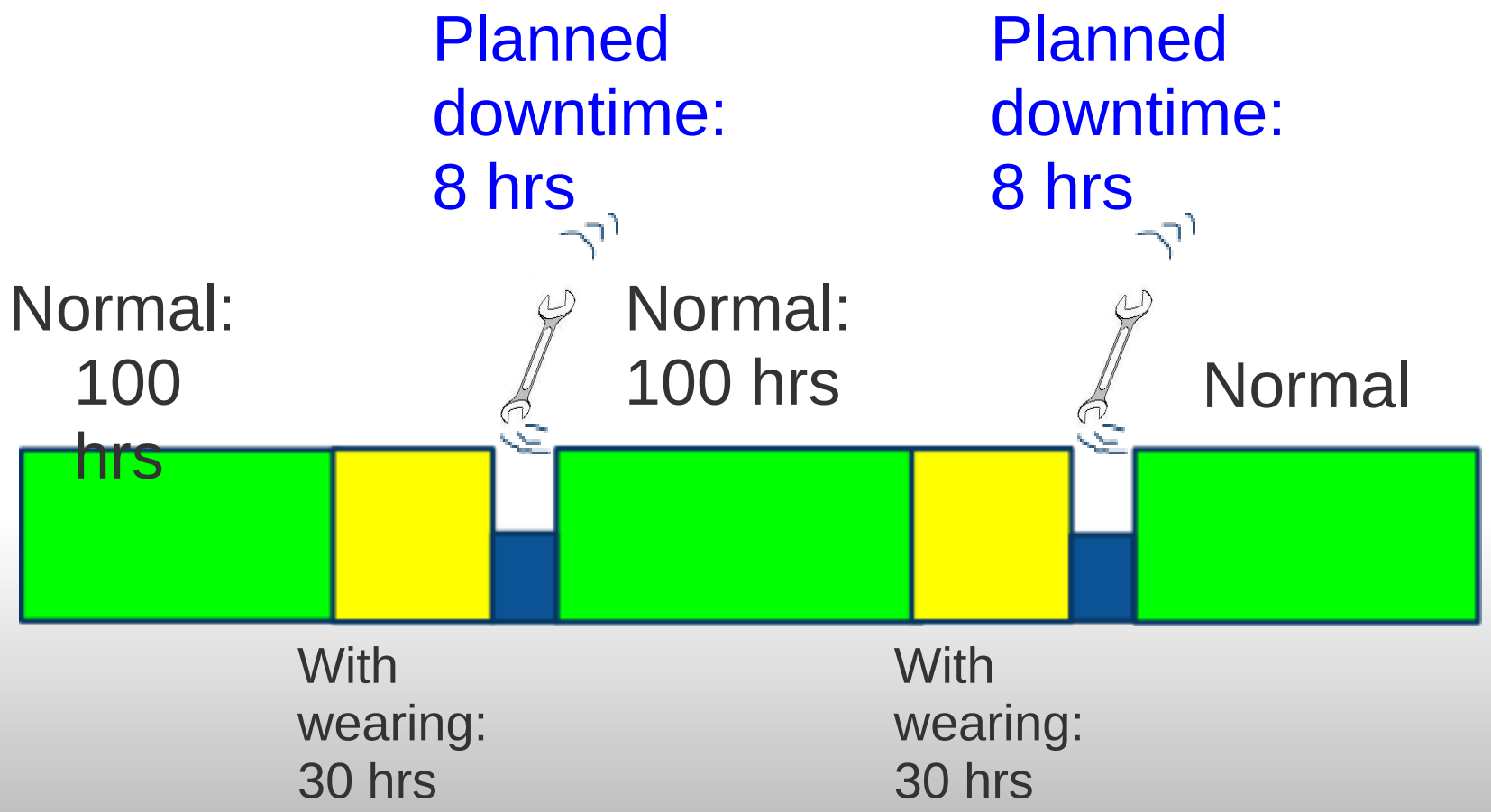
Typical running cycle of a machine
- under reactive maintenance



Unexpected Machine Down time - 150 hrs !!

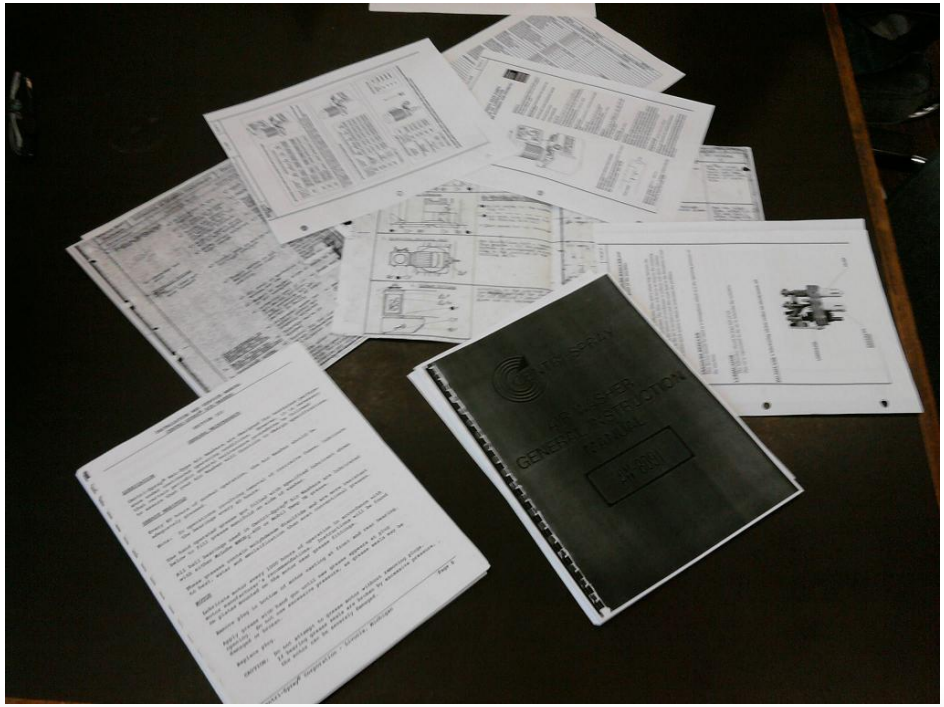
Project 1: PPM - Rationale

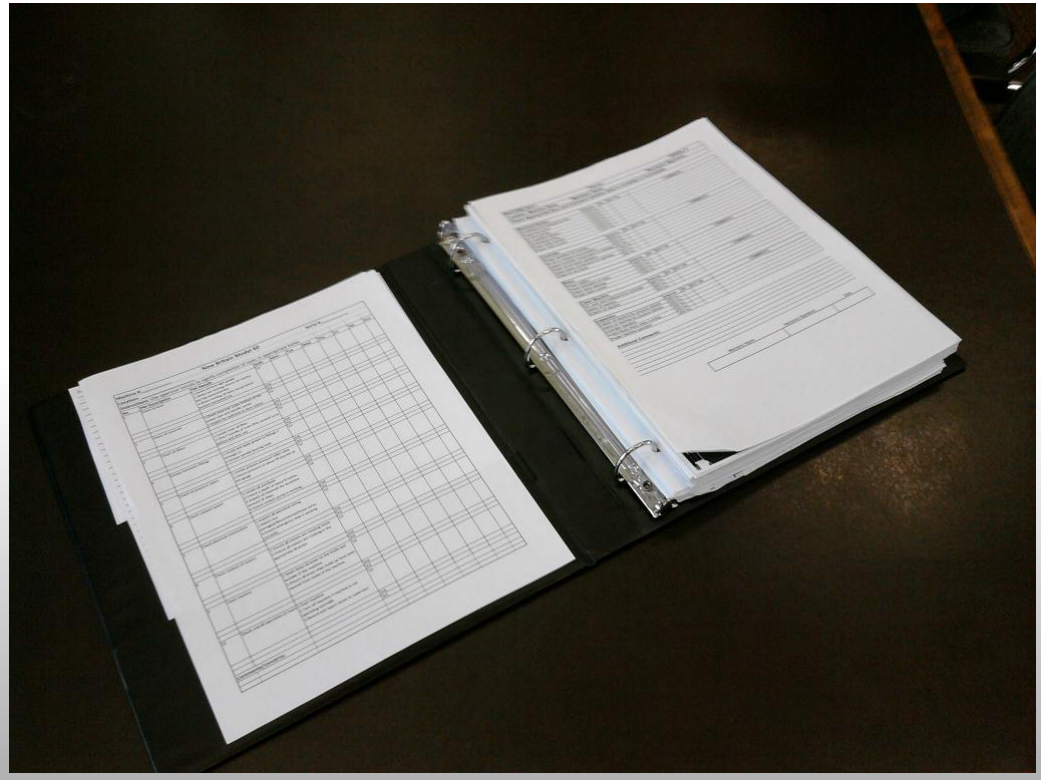
Typical running cycle of a machine - under Preventative / Predictive Maintenance



Project 1: PPM - Tasks

PM sheets:

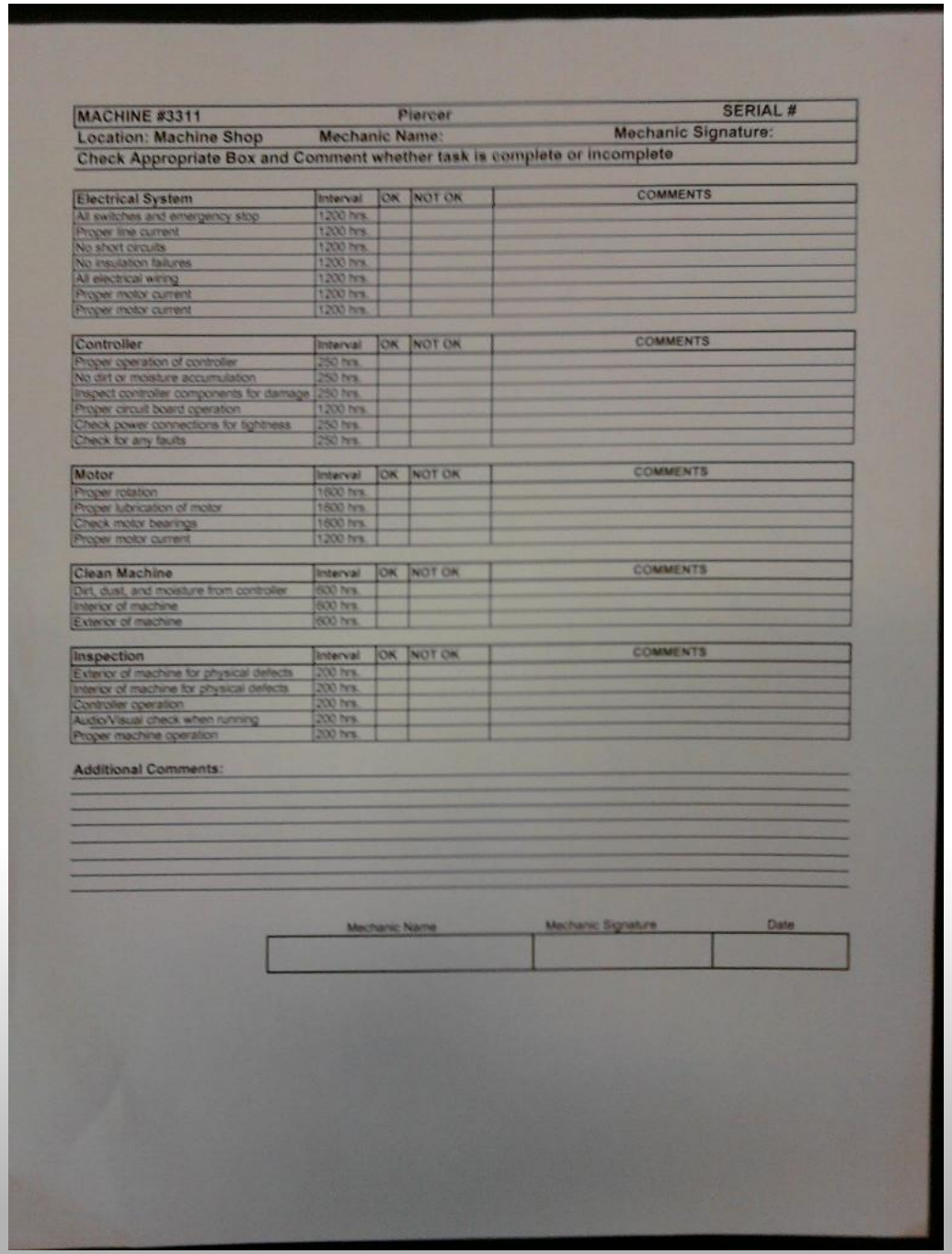




Project 1: PPM - Tasks

What we have done...

- created PM sheets for machines
- created daily PM sheets for operators
- daily procedure sheets with pictures



MACHINE #3311 Piercer SERIAL #

Location: Machine Shop Mechanic Name: Mechanic Signature:

Check Appropriate Box and Comment whether task is complete or incomplete

Electrical System	Interval	OK	NOT OK	COMMENTS
All switches and emergency stop	1200 hrs.			
Proper line current	1200 hrs.			
No short circuits	1200 hrs.			
No insulation failures	1200 hrs.			
All electrical wiring	1200 hrs.			
Proper motor current	1200 hrs.			
Proper motor current	1200 hrs.			

Controller	Interval	OK	NOT OK	COMMENTS
Proper operation of controller	250 hrs.			
No dirt or moisture accumulation	250 hrs.			
Inspect controller components for damage	250 hrs.			
Proper circuit board operation	1200 hrs.			
Check power connections for tightness	250 hrs.			
Check for any faults	250 hrs.			

Motor	Interval	OK	NOT OK	COMMENTS
Proper rotation	1600 hrs.			
Proper lubrication of motor	1600 hrs.			
Check motor bearings	1600 hrs.			
Proper motor current	1200 hrs.			

Clean Machine	Interval	OK	NOT OK	COMMENTS
Dirt, dust, and moisture from controller	600 hrs.			
Interior of machine	600 hrs.			
Exterior of machine	600 hrs.			

Inspection	Interval	OK	NOT OK	COMMENTS
Exterior of machine for physical defects	200 hrs.			
Interior of machine for physical defects	200 hrs.			
Controller operation	200 hrs.			
Audio/Visual check when running	200 hrs.			
Proper machine operation	200 hrs.			

Additional Comments:

Mechanic Name	Mechanic Signature	Date

Project 1: PPM - Tasks

Preventative Maintenance Schedule for New Britain 656 and 657

Daily Schedule

The daily maintenance is to be performed by the machine operator.

1. Oil Level

No.	PM Description	PM Details
1	Check oil level	1.Locate oil level sight gauge 2.When not running, ensure oil reaches the top horizontal line 3.When running, oil does not go below bottom horizontal line

Project 1: PPM - Encountered Difficulties

- Old machines with limited amount of information
  E.g. some machines made in 1930s-1940s,
  with no operator manuals available now

- Manuals written in different languages

Project 1: PPM - Results

← Before

After →

Project 1: PPM - Return on Investment

- **Investment:**
  - fund for sponsoring the IPRO project
  - effort for training & supervising the IPRO team
  - effort for training the maintenance crew, etc.

- **Return:**
  - saved machine maintenance costs (up to $1,200,000 per year)
  - improved overall equipment effectiveness
  - better predictability in maintenance crew's work

Project 2: WMS - Project Goals

WMS = Warehouse Management System

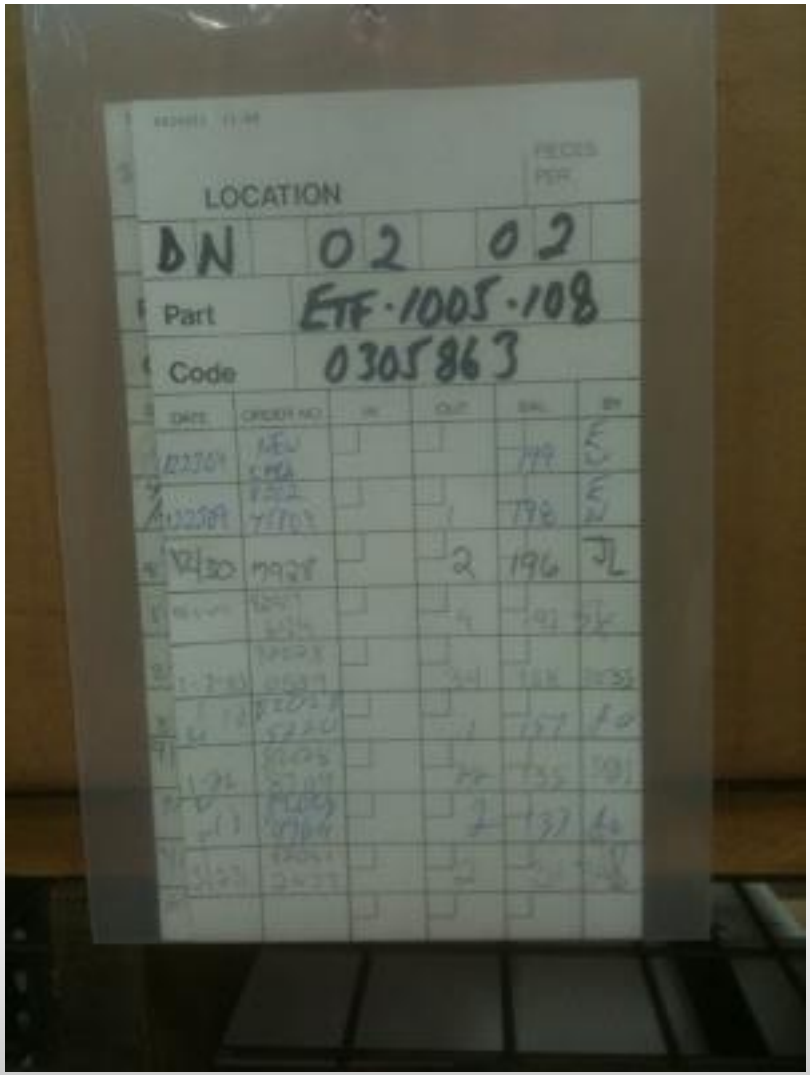
Goals: **SAP WMS Implementation**

- Put-away process
- Pick process
- Cycle counting

Project 2: WMS - Current Issues

Current Issues:

- Lack of formal procedures
- Items not easily located
- Manual bin card updates
- Sub-optimal inventory storage



Project 2: WMS - Implementation

- Formalized procedures
- Cut-over data
- SAP WMS testing
- Training material
- Beta run
- SAP WMS deployment

Project 2: WMS - Formalized Procedures

- Put-away, pick, and cycle counting
- Warehouse storage control reorganization
  - Fixed bin, pallet, bulk area
  - Physical inspection -> CAD layout -> discussion -> finalize
  - Warehouse signs
  - Bar-coding
  - Use of RF gun

Project 2: WMS - Collecting Cut-over Data

- Item locations
- Rack dimensions (W x H x L)
- Storage types
- Item attributes

Project 2: WMS - Test Environment

- Prepared excel files
- Handed over data to IT for WMS population
- Security testing
- Functional testing
- Feedbacks
- RF gun testing

Project 2: WMS - Training Material

- Prepared training material on the basis of work instructions
- Updated as required
- Tested within team members for improvement
- Incorporated feedback

Project 2: WMS - Beta Run & Deploy

- Allowed actual users to test
  - Formal procedures
  - System information
  - RF guns

  (in pseudo-live environment)

- Deployment
  - Collected feedback from beta-run
  - Incorporated changes as per the change control board

Project 2: WMS - Encountered Difficulties

- SAP functional testing process was longer than expected, making on-site working time insufficient
- IT difficulties: connection to SAP system could not be established from out of Sloan

Project 2: WMS - Return on Investment

- **Investment:**
  - fund & effort for sponsoring the IPRO project
  - fund for purchasing RF guns and other new facilities for the warehouse rearrangement
- **Return:**
  - increase in inventory accuracy in Sloan's Central Distribution Center: from 85% (current) to 99% (expected)
  - reduction in the number of returns resulted from picking errors: between 11% and 25%
  - reduction in material handling labor: between 10% and 25%

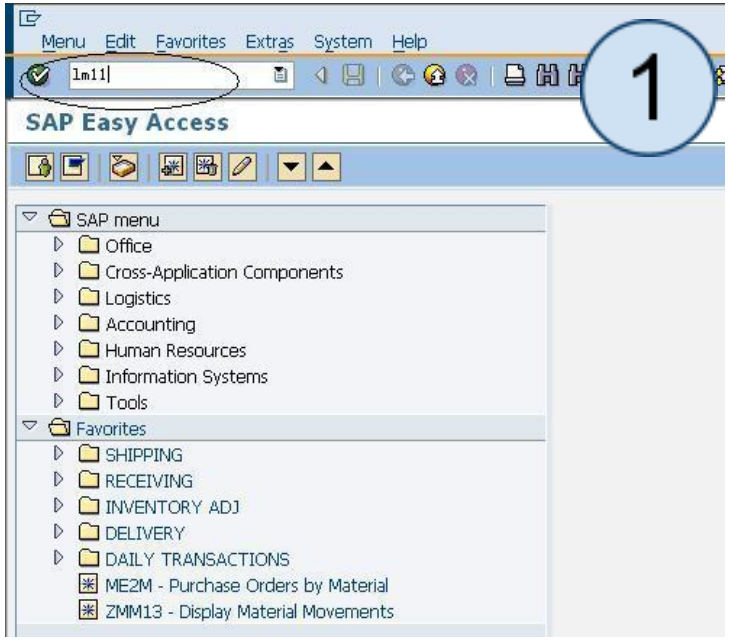
Gained Experience - Workplace Ethics

- Open communication
  - with the customer
  - within the team
- Exceeding customer's expectations
- Observing the regulations (e.g. Non-Disclosure Agreement)

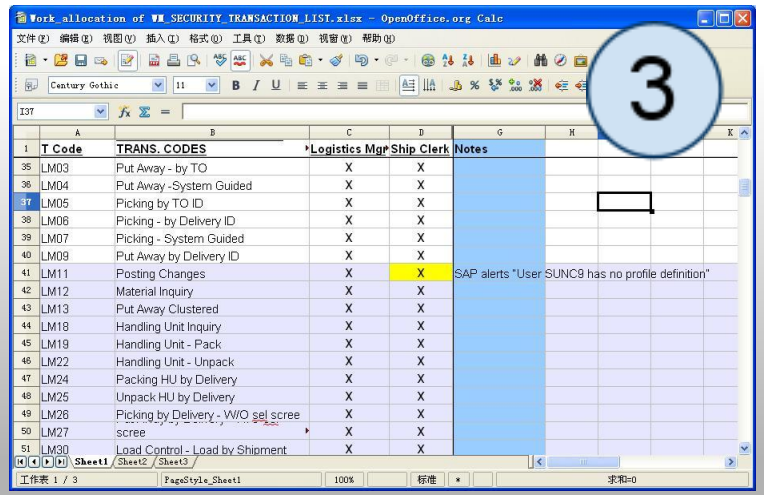
Gained Experience - Innovation

Automated testing solution

General process:

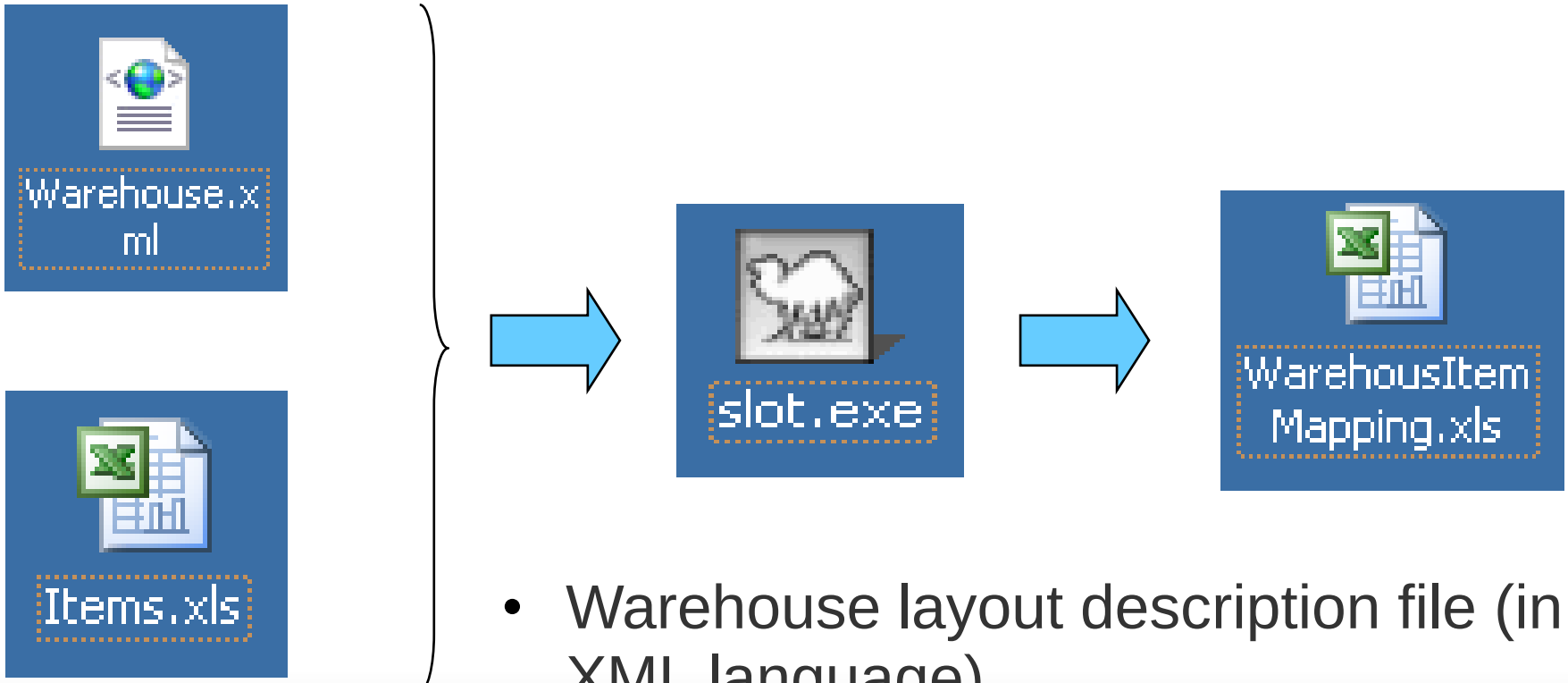


- Budgeted effort (manual process):
  24 person-hours
- Actual effort (automated process, with computer program):
  3 person-hours



Gained Experience - Innovation

Automated item slotting:



- Warehouse layout description file (in XML language)
  - XML= eXtensible Markup Language
- List of inventories and their properties

Acknowledgments

- Mr. Steven Rodgers, Vice President at Sloan Valve Company, sponsor of IPRO306
- Mr. Brian Capo - Global Distribution Manager, Mr. Gregory Spoor - Director of Global Sustaining Engineering, and Dean Poulsen - Project Engineer
- All the other stakeholders at Sloan who helped with the projects
- Mr. John Caltagirone, Faculty Advisor
- IPRO Office
- All guests today!

Thank You!

Questions & Suggestions?