

March 2009

Training program

Program: Lean Manufacturing integration using advanced Manufacturing intelligence system (information technology)

Objectives:

Facilitate, simplify and improve operations management by integrating a manufacturing intelligence system in manufacturing processes, increase flexibility and the necessary communication in global competitive context. Implement a standardized manufacturing system. Eliminate delays, slow administration, improve communication using paperless system. Implement a durable lean manufacturing and continuous improvement culture.

This program train employees to use new technologies and obtain a higher level of performance and quality necessary to perform in a very competitive global context continuously changing. The training uses software tools to ensure full integration and continuity in time. The result is a standardized manufacturing system where products are always manufactured with 100% quality in the planned time and with the method prescribed regardless of the operators and users.

The immediate result is an overall productivity increase. An increase in quality and general effectiveness will be immediately observed. The system eliminates the delays and the wastes of time due to the lack of preparation. The operators will gain in autonomy and the key people will work on activities with greater value added.

Didactic material: Computers, software PLM (Product Lifecycle Management), Modelers, MES (Manufacturing Execution System) for discrete manufacturing, operator workstations and quality control using microscope.

Important: Software and a number of computers can be included at no cost upon eligibility. Validate your eligibility with Prodesol.

Integration with your systems ERP or MRP is possible.

The duration of the training varies according to the number of participants, the manufacturing environment, the complexity of the products and the quantity of the multiple manufactured products.

There are six current training courses utilizing the full suite of software tools from Prodesol. The best combination of courses for any operation should be decided upon in consultation with Prodesol. Let us customize the courses for your needs.

Detailed training description below

Course 1: Product lifecycle management

Objective(s):

Description: Complete product management, NPI, projects, processes, BOM, CAD, revisions, engineering changes, CAPA, document management, parts, packages, contacts, and quality.

Objectives: Standardize products management. Understand the importance of product`s multiple details. Manage complex products, Simplify NPI (New product introduction), Improve collaborative work with collaborators and other working groups. Increase the employees and enterprise technological capability. Eliminate errors and frequent delays with global integration.

Users: Engineering department, product development, operation manager, project manager, product manager, purchaser, methods (work instruction technician), NPI (New Product Introduction) technician.

Tools: (PLM) SmarteManager software

Duration: 3 – 5 days

Methodology: Theoretical and practical training

Concepts introduction:

- Design
- Validation
- Optimization
- Documentation

- manufacturers, others
- Parts
 - Part type, Parts Standardization
 - Comp Type
 - Parts names standardization
 - Packages (electronic assembly)
 - Parts creation
 - Manufacturers
 - Priority
 - Documents
 - Compliances

Manufacturing process management

Functions and basic concepts definition:

- Projects
- Products
- Processes
- eBOM (engineering BOM)
- Documents management
- Revisions
- Engineering changes
- CAPA (Corrective and preventive action)
- Agenda, project and task management
And time tracking
- Collaborators
 - employees, suppliers
- Assembly
 - General
 - Electronic (PCB)
- Parts Creation
- BOM Import, management
- CAD (PCB) Import, management
- BOM management
- Visual support management
 - Pictures
 - Videos

- Quality
- Communication

Functions evaluation and analysis adapted to the enterprise. What functions are used or must be used in the enterprise?

Practical work: Participants create examples of every function with real enterprise products and projects.

Course 2: Manufacturing process definition and modeler

Description: Complete product assembly and manufacturing process definition, product configuration. Course is broken down into two parts.

Objectives: Standardize products management. Understand the importance of product's manufacturing detailed definition. Manage complex products in a shorter time, Simplify NPI (New product introduction), Integrate analysis methods. Integrate value added concepts in every product. Improve collaborative work with collaborators and other working groups and facilitate continuous improvement. Increase the employees and enterprise technological capability. Eliminate errors and frequent delays with global integration.

Users: Engineering department, product development, operation manager, project manager, product manager, purchaser, methods (work instruction technician), NPI (New Product Introduction) technician, quality technicians, quote technician.

Tools: (PLM) SmarteManager software

Modeler SmarteModeler-GA software

Methodology: Theoretical and practical training

Duration: 4 – 6 days for both parts 1 & 2

Part 1: Manufacturing process definition and modeler

- Operation (phase)
- Tasks
- Steps
- Department and workstations
- Assembly time
- Cycle time calculation
- eBOM,
- mBOM
- Tools
- Safety
- Parts referencing
- Process Modeler
- Value added concept
- Process changes (cut, copy, paste, level)
- Work instructions creation
- Picture integration
- Video integration
- Documents and drawings integration
- Machine program integration (option)
- Work instructions changes
- Introduction to routing
- Introduction to cost analysis
- Introduction to quotes

- Template creation and use
- Quality control
- Communication
- Operators training

Part 2: Manufacturing process analysis and optimization

Objectives: Use statistical analysis in parts and labor cost. Analyze value added concepts in manufacturing process. Optimize batch size and setup. Optimize routing. Make quotes with a higher level of reliability. Optimize manufacturing cost.

Description: Routing, parts and labor cost optimization, statistical analysis, automatic work instructions creation, line balancing.

- Routing definition with predecessors
- Time statistical analysis
- Cost statistical analysis
- Cycle time
- Setup time
- Batch size analysis
- Line balancing
- Work instructions automatic creation
- Advance quoting
 - Cost analysis, quantity, batch size, labor, parts.
- Kaisen (Continuous improvement)
- Poke Yoke
- Operators empowerment

Course 3: Shop Floor

Objective(s): Ease operator tasks. Become familiar with software. Improve communication in work instructions. Reduce waiting time by making information always available. Increase operator`s autonomy and involvement. Free supervisors time to work on more valuable tasks. Implement a proactive culture. Standardize and simplify products assembly. Improve collaborative work with collaborators and other working groups and facilitate continuous improvement. Increase the employees and enterprise technological capability. Eliminate errors and frequent delays with better communication. Improve products quality.

Description: Using work instructions by operators, engineering change request, corrective and preventive action request (CAPA), task manager, time tracking, communication

Users: operators, supervisors, inspectors, maintenance, parts preparation, kitting

Tools: SmarteStation, Operator software

SmarteECM, Engineering change request software

SmarteCAPA, Corrective and preventive action request software

SmarteAgenda, Task manager and time tracking software

Methodology: Theoretical and practical training

Duration: 2 – 4 days

Products assembly, workstation

- Work Instructions
- Products, process and work instruction
- Quantity to build
- Setup
- Parts verification
- Tools verification
- Safety
- Cycle time
- Steps
 - Action
 - Description
 - General information
 - Duration
 - Parts
 - Parts picture
 - Documents and drawings
 - Videos

- Quantity built
 - New employee training
 - New product training
 - New process training
- ### Engineering change request
- Create engineering change request
 - Follow up

CAPA Corrective and preventive action

- Create preventive action request
- Create corrective action request
- Follow-up

Task management and time tracking

- Creation tasks
- Follow up

Course 6: PCB process definition

For electronic assembly manufacturing

Objectives: Standardize products management. Understand the importance of product's manufacturing detailed definition. Manage complex products in a shorter time, Simplify NPI (New product introduction), Integrate analysis methods. Integrate value added concepts in every product. Improve collaborative work with collaborators and other working groups and facilitate continuous improvement. Increase the employees and enterprise technological capability. Eliminate errors and frequent delays with global integration

Description: Create pcb information and work instructions for assembly

Users: Engineering department, product development, operation manager, product manager, methods (work instruction technician), NPI (New Product Introduction) technician, quality technicians

Tools: SmarteManager software, PLM, Product lifecycle manager
SmarteModeler-EA software, PCB process modeler
SmarteStation software, Operator workstation
SmarteQC-EA software for Quality Control
SmarteViewer-EA software, PCB Viewer

Methodology: Theoretical and practical training

Duration: 4 - 5 days

Part 1: PCB manufacturing process

Using parts packages
Process creation
Parts placement on PCB (top-bottom)
Work instructions creation
Cycle time analysis
Line balancing
Releases management

Part 2: Shop Floor

Using product SmarteViewer-EA
Parts search

Using Assembly Workstation Product assembly workstation

- Work Instructions
 - Products, process and work instruction
 - Quantity to build
 - Setup
 - Parts Verification
 - Tools Verification
- Steps
 - Action
 - Description
 - General Information
 - Duration
 - Parts
 - Parts Picture
 - Quantity completed
 - New employee training
 - New product training
 - New process training

Part 3: Quality Control (Course 6)

Generic information for quality control (SmarteManager)

- Defaults Category
- Defaults Types
- Status
- Severity
- Priority
- Resolution
- Standards (IPC, others)
- Work Order Creation
- Defect tracking per unit (PCB)
 - Serial number (manual, Rfid, barcode)
 - Defective parts selection
 - Information on defect
 - Using usb microscope
 - Defect image capture
- Repair
 - Defective unit selection (serial number)
 - Repaired defect image capture
- Statistical Analysis
 - Report
 - Pareto Parts
 - Pareto defect categories
 - Pareto defect types
 - Yield
 - Units (PCB)
 - Parts (part number)
 - Parts Designators
- Work order management, closing

Course 4: Team (collaborative) work and communication

Duration: 1 day

Objectives: General training revision. Evaluate value added concepts (lean manufacturing) and continuous improvement concepts in the enterprise

Description: training, general review, integrating team (collaborative) work using software tools. Communication and links PLM – MES – ERP (MRP)

Integrating concepts:

- Design
- Validation
- Optimization
- Documentation

Manufacturing process management

Introduction to MES

- Process real time traceability
- Parts traceability

Training Evaluation Discussion

Course 5: **ERP and MRP Optimization**

Objectives: Improve the understanding of operation management.

Description: Increase existing manufacturing system functionalities such as report, data collection, flexibility, and optimization.

Users: IT department

Tools: varies with system

Duration: Varies with system

Course 7: **SMT machine operation and programming**

Objectives: Train operators to operate SMT placement machines.

Description: Course provides a foundation for operating and programming a SMT machine. The course covers basic machine functions, safety, operation, basic programming and general maintenance.

Users: new operators

Tools: Machine programming system and machine controls

Methodology: Theoretical and practical training

Duration: 2-3 days

Course 8: **Wave soldering machine operation and programming**

Objectives: Train operators to operate wave soldering machines.

Description: Course provides a foundation for operating and programming a wave soldering machine. The course covers basic machine functions, safety, operation, basic programming and general maintenance.

Users: new operators

Tools: Machine programming system and machine controls

Methodology: Theoretical and practical training

Duration: 1 day

Course 9: AOI (Automated Optical Inspection) machine operation and programming

Objectives: Train operators to operate AOI machines.

Description: Course provides a foundation for operating and programming a AOI machine. The course covers basic machine functions, safety, operation, basic programming and general maintenance.

Users: new operators

Tools: Machine programming system and machine controls

Methodology: Theoretical and practical training

Duration: 1 day

Course 10: Real time operation management

Objectives: Reduce response time. Improve productivity by solving problems right away resulting in eliminating repairs and integrate total quality concepts. Improve manufacturing process using reliable measurement. Integrate process and parts traceability necessary to manufacture higher technology products such as medical, military, aeronautics, aerospace and transportation.

Description: How to use software and sensors to collect real time production data. Data utilization and analysis. Data storage management.

Users: Production engineers, production managers, engineering managers, plant managers, software programmers, information technology department.

Tools: SmarteMES software

Excel

Methodology: Theoretical and practical training, programming

Duration: 8-12 days

Data collection selection

Data collection location (where)

Data collection cycle

Data storage

Data utilization

Data statistical analysis

Data analysis result presentation

Reactive action

Preventive action

Pro-active actions

Course 10: Advance Excel, data analysis

Objectives: Use Excel for advance data

Description: Use Excel

Users: Production engineers, production managers, engineering managers, plant managers, Technicians

Tools: Excel

Methodology: Theoretical and practical training, programming

Duration: 8-12 days

Lists

- Sorting lists
- Filtering lists
- Extracting subtotals
- The definition of a list

Pivot tables

- Creating pivot tables
- Swapping rows, columns and pages
- Grouping fields
- Drill-down

Styles (*)

- Creating formatting styles
- Using the style drop-down box
- The NORMAL style

Charts

- Selecting data
- Formatting your chart

IF and LOOKUP functions

- The conditional (IF) function
- Nested IFs are evil
- Lookup tables
- The mysterious fourth lookup argument

Advanced charts

- Combination charts
- Picture charts
- Custom chart types
- Regression and trendlines