PF7216 Lean In: Accelerate Lean Manufacturing with FDS

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Product Manager: Autodesk Manufacturing Engineering
Lean Manufacturing

Waste

Inventory

Value

Waiting

Defects

Value

Production

System

5S

Pull

Parts

Waiting

Different

Wasteful

Reducing

Standardized

Raw

Kitchen

Operators

Automation

System

Kanban

Managed

Maintenance

Multi-Part

Simplified

SMED

Efficiency

Reduced

Overprocessing

Many

Adding

Excess

Preventative

Machine

Inventories

Manufacturing

Eliminating

Customer

Inventory

Work

First

Fixtures

invoice

Waste

Waste

Waste

Waste

Waste

Waste

Waste

Waste
Class summary

Factory Design Suite provides tools to optimize the manufacturing process, evaluate and improve inventory storage and improve transportation schemes in the factory.

These capabilities align well with many Lean Manufacturing goals.

This class will highlight how FDS can impact your lean manufacturing initiatives.
Key learning objectives

At the end of this class, you will be able to:

- Identify Top 3 lean manufacturing impacts
- Apply Factory Design Suite to lean manufacturing
- Build on your AutoCAD software strengths
Lean Manufacturing
Introduction
Outline

- Seven Wastes
- FDS impact on Wastes
- Examples/ Demos from FDS 2015 R2
Focus on Waste Reduction

- Waiting
- Excess Motion and Movement
- Excess Transportation
- Over Processing
- Errors and Defects
- Overproduction
- Excess Inventory
Waste/Muda ‘Responsibility’

- Waiting
- Excess Motion and Movement
- Excess Transportation
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Waste/Muda ‘Responsibility’

- Waiting
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- Excess Inventory

Demand and Capacity Alignment
Waste/Muda ‘Responsibility

Planning and Layout

Waiting

Error and Movement

Excess Transportation

Over Processing

Errors and Defects

Excess Inventory

Overproduction
OBJECTIVES OF A LEAN JOB SHOP LAYOUT

- Improve velocity and flow of parts thru the shop
- Reduce Work in Process inventory
- Minimize changeover time
- Reduce travel distance of parts thru the shop
- Smoother scheduling thru less chaotic routings
- Reduced need for material handling equipment
IMPACT OF FACILITY LAYOUT

- In a poorly-designed facility layout
  - Average Travel Distance per order ↑
  - Transportation Waste ↑
  - WIP Waste ↑
  - Waiting Waste ↑
  - Flow Time ↑, Throughput ↓ and Cost ↑
Lean Thinking and Factory Design Suite
Waste/Muda

Planning and Layout

Waiting
Excess Motion and Movement
Excess Transportation

Over Processing
Errors and Defects

Overproduction
Excess Inventory
Gathering and Organizing Information for Lean-based Improvements

Demand Forecast  Processing Steps Needed  Time and Motion Study Data  Current Facilities

Existing Knowledge

Value Stream Evaluation  Current Routing

As-Is Analysis

Process Analysis  Layout and Transportation Proposal  Facilities Review

Plan and Proposal
Gathering and Organizing Information for Lean-based Improvements

Existing Knowledge

- Demand Forecast
- Processing Steps Needed
- Time and Motion Study Data
- Current Facilities

As-Is Analysis

- Value Stream Evaluation
- Current Routing

Plan and Proposal

- Process Analysis
- Layout and Transportation Proposal
- Facilities Review
Starting a New Manufacturing Line Building to Plan

Current Process
- Excel, Visio, PPT or similar tools
- Limited graphics capability
- Difficult to link plan and documentation
The role of Process Analysis 360 in Lean MFG

- Capture known or predicted operations and timing
  - Existing or Similar processes
  - NC Machining Calculation
  - Other Simulations
Understanding Existing Facilities
Re-Using and Standardizing Equipment

Create Point Cloud Asset In ReCap
Gathering and Organizing Information for Lean-based Improvements

- Demand Forecast
- Processing Steps Needed
- Time and Motion Study Data
- Current Facilities

Existing Knowledge

Value Stream Evaluation
Current Routing

As-Is Analysis

Process Analysis
Layout and Transportation Proposal
Facilities Review

Plan and Proposal
Starting a New Manufacturing Line Building to Plan

Current Process
- Excel, Visio, PPT or similar tools
- Limited graphics capability
- Difficult to link plan and documentation
Convert Process Data to Process Analysis
Moving from Concept to Layout Modeling
Understand and Improve Transport

![Diagram showing material flow before and after changes]
Alternative Methods for As-Is Factory Flow
Gathering and Organizing Information for Lean-based Improvements

- Demand Forecast
- Processing Steps Needed
- Time and Motion Study Data
- Current Facilities

Existing Knowledge

- Value Stream Evaluation
- Current Routing

As-Is Analysis

- Process Analysis
- Layout and Transportation Proposal
- Facilities Review

Plan and Proposal
Identify Bottlenecks or Inefficiency

- Highest Utilization
- Downstream Buffers Empty
- Upstream Buffers Full
- Upstream Processors Blocked
- Lowest Blocked Time
Process Analysis 360
Adjust Model to Reduce Bottle Necks
Autodesk Digital Factory Solutions

- Production
- Installation & Commissioning
- Clash & Clearance Analysis
- Ventilation / Emission / Energy Efficiency
- CFD Simulation
- Work Cell Design
- Tool & Fixture Design
- Process Simulation
- Factory Layout
- 3D Design Review
- Shared Data Model
Managing and Planning the Factory with Factory Design Suite

Building

Structural

Piping

Media

Equipment

Transport

Products

Assets
Business Value of Leaning Out the Digital Factory

Profitability
- Less time needed in planning
- Reduction in processing time
- Shorter installation and commissioning time

Standardization
- Consistent use of manufacturing resources
- Standardization of planning procedures
- Re-use of models from planning and development in series production

Communication
- Improvement of exchange between involved departments

Knowledge Management
- Make planning knowledge independent of responsible person
## Factory Design Courses at AU 2014

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Class Title</th>
<th>Day</th>
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<tr>
<td>PF4969</td>
<td>Factory Design Suite: The Power is in the Workflow</td>
<td>Tue</td>
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<td>PF7218-L</td>
<td>Everything's an Asset: Everything You Wanted to Know about Factory Assets</td>
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<td>PF6858</td>
<td>Get to the Point! Cloud?</td>
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<td>PF7266</td>
<td>Process Analysis 360 for Estimating Project Costs</td>
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<td>Don't Let the Word &quot;Factory&quot; Get in the Way: The Broader Uses of Factory Design Suite</td>
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<td>Manufacture Products Efficiently</td>
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<td>What Factory Design Suite Means to Me</td>
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