Bringing Manufacturing Back
MA 3367

Pete Lord
Product Line Manager
Course Description

Onshoring is the new offshoring. Companies are bringing their manufacturing operations back home to improve their quality, flexibility, and margins. Learn more about what is driving this trend and how manufacturing solutions from Autodesk help make this possible.
Course Objectives

1. Understanding the recent trend toward on-shoring
2. Are your manufacturing operations ready for On-shoring?
3. Better analyze manufacturing options
Manufacturing Returns Home!
All Kinds of Companies
What’s Going On?

Source: The Economic Argument for “Re-shoring” Manufacturing Jobs Back to the U.S.
By Dean Franck, Harry C. Moser, Marius Ronge
January 14, 2012
Top Five Drivers for Re-Shoring

1. Time to Market (73.7%)
2. Cost Reductions (63.9%)
3. Product Quality (62.2%)
4. More Control (56.8%)
5. Hidden Supply Chain Mgmt Costs (51.4%)

Source: US Reshoring: A Turning Point
MIT Forum, David Simchi-Levi
### Figuring Out Where to Produce

#### Figure 2: STERIS: Insourcing Site Decision Matrix (Example)

<table>
<thead>
<tr>
<th>NA Facilities</th>
<th>Existing or Potential Space</th>
<th>Existing Machinery</th>
<th>Accommodate Final Assembly</th>
<th>Increase Site Complexity</th>
<th>Proven Management Team</th>
<th>Cost Effective Skilled Labor</th>
<th>Disruption to Existing Operations</th>
<th>Preserves Capacity for Growth</th>
<th>Minimizes Business Risk</th>
<th>Significant Capital Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plant B</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plant C</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plant D</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plant E</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**KEY:**
- Yes
- Possible
- No

Source: Dave Johnson / STERIS Corp.
Build a Strategy Around High-Level Goals

- Be customer-driven
- Improve quality
- Ensure minimal disruption
- Require no new brick-and-mortar investment
- Fit in with existing
- Leverage existing management teams
- Have sufficient access to a readily available and cost-effective labor market
- Build on the foundation of lean principles

Source: OpEx Review
Today’s design process

Most production system or machine-line layout is done in AutoCAD
Growing Factory Complexity - Example
Manufacturing Capabilities

- Production Modeling
- Detailed Layout Simulation
- Prod Tracking
- Flow Planning
- Simulation
- Ergonomics
- Build-out
- Conceptual Layout
- Process Modeling
- CAM
- Assembly Instructions
- Production Monitoring
- Maintenance
- BIM
- Facilities Mgmt
- PLM
- PDM
- Design for Mfg
Solving Production Planning Issues
Top Software Capabilities Enabling Process Improvement

Getting Top Performer Results – Process and Technology Improvements

- **Central repository** of process plans and synced eBOM & mBOM data
- **Factory simulation** used to sequence and balance production lines

- **Laser scans** accurately capture as-is state of the facility
- **3D walkthroughs of designs combined w/ as-is** used for project reviews

- **Seamless exchange of BIM data** between facilities & manufacturing
- **Combined model provides accurate installation documentation** for MEP

- **Accurate work sequence** validated & collisions checked by simulating the entire installation procedure

---

**Process Planning**
Design of the mfg & assy processes for the product.

**Production Layout**
Layout to execute mfg & assy processes.

**Facility**
Facility design to enable the operation of the factory.

**Installation**
Scheduling & implementing layout & facility designs.

---

**Operations**
Planning, managing, & executing the operation of the factory.

- **Accurate maintenance instructions and schedule** formally managed and followed
- **Key manufacturing metrics are tracked, managed, and visible to key stakeholders companywide**
Autodesk Technology Supports Re-Shoring Efforts
“Autodesk Factory Design Suite solves the capacity issues of existing CAD applications and enables much smoother handling of large data sets. In addition, its intuitive functionality makes it easier to use the software and 3D data in a wider range of areas.”

—Toshiyuki Ishii
Conventional Technology/Weld Assembly
Production Technology
Mitsubishi Motors, Japan
Streamlined Workflow for Layout Design
Streamline Understanding of Existing Facilities

“With the Autodesk Factory Design Suite, we generated 3D laser point cloud scan of the indoor and outdoor area. Now, there is no longer a need for manual measurements, which saves a huge amount of time and reduces the possibility of making any mistakes.”

—Jörg Duus  
Head of Design Engineering  
Feige Filling GmbH
Understand As-Is Building Conditions
Avoid Unexpected Delays in Starting Equipment clash and space constraint detection

“The Factory Design Suite makes it possible to analyze digital factory models, so that clashes and space constraints can be identified before going into production. As a result, additional costs that might have been incurred are completely avoided.”

—Jörg Duus
Head of Design Engineering
Feige Filling GmbH
Determine Potential Interferences Early in the Design Cycle
Meet compressed project cycles

“Factory Design Suite is much less cumbersome than competitive programs. That, and the ability to do multiple layouts quickly to reduce design cycles, will easily cover our investment quickly.”

—Michael Haendiges
Director of Engineering
Marker Systems Inc.
USA
Easily Evaluate Factory Layout Variants
Re-Use and Present Data for All

“Architects, engineers, and equipment manufacturers can provide designs in whatever formats they use, and we can connect the whole project team to a common project model for project coordination. Having an accurate, coordinated model helps improve collaboration and reduce installation and commissioning time in the field.”

—Brian Strothcamp  
Senior Designer  
Barry-Wehmiller Design Group, USA
Make Information Available Where Needed
Extending the Value of the Digital Prototype for Manufacturing
Tenets of Digital Prototyping for Manufacturing

- Aggregate and reuse data throughout the lifecycle
- Present actionable views of data to inform decisions
- Support daily activities for all stakeholders

The right data, at the right time, with the right person
Class Focus

Product Design

Planning & Facilities

Production

Simple conceptual layout

Model process behaviors
Thank You!
Questions?