Use AutoCAD | Inventor with ProModel Simulation to Optimize Factory Layouts

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Andy Schild is a sales director with ProModel and has been with the company for 12+ years working with manufacturing and logistics clients to help leverage ProModel’s simulation engine to help improve efficiency in manufacturing and in supply chains. Currently, Andy is the ProModel point of contact for the sales and marketing relationship with Autodesk.

Prior to ProModel, Andy worked in sales roles in the industrial automation space and graduated with a BS in industrial and systems engineering from Rochester Institute of Technology (RIT).
About the speaker

Aaron Nelson – ProModel Product Manager

Aaron Nelson has been the product manager of ProModel Corporation's two flagship product families, the ProModel/MedModel Optimization Suites and Process Simulator, since 2018. As part of this role, he and his team work closely with Autodesk’s AutoCAD, Inventor, and Factory Design Utilities technology teams developing the integrations between the ProModel and Autodesk toolsets.

Aaron is also one of our instructors teaching our ProModel and Process Simulator training classes both in-person and on-line. Previously he was the customer technical support manager and started with ProModel in 2007 as a customer technical support engineer.

Prior to joining ProModel, Aaron graduated with a BS in management from the University of Phoenix in 2007.
Class Learning Objectives

• Explain the value of using ProModel simulation for process optimization

• Describe when to use manufacturing simulation

• Create a simulation model with Factory Design Utilities that opens directly in AutoCAD/Inventor to start a factory layout

• Identify how to create a simulation model from an existing layout
Virtual Booth and Additional ProModel Learning Resources
All Links Available in Class Presentation and Handout Downloads

- Class Live Q&A Fri Nov 20 12:30-1:30 PM EST (17:30 UTC)
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  - [https://www.autodesk.com/autodesk-university/conference/expo/ProModel-Corporation](https://www.autodesk.com/autodesk-university/conference/expo/ProModel-Corporation)
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- **Purchase Your Process Simulator Autodesk Edition Subscription Here**
Agenda

• ProModel Company Introduction
• Simulation Introduction
• Demonstrations
  o Process Simulator
  o ProModel Optimization Suite
• Autodesk Integration
• Sample Model Builds
What Does ProModel Do?

• ProModel provides simulation-based decision support technology and services that allow organizations to PREDICT factory performance in a low-risk environment

• For over 30 years, ProModel has delivered solutions enabling our clients to:
  o Maximize Factory Efficiency
  o Minimize Production Lead-times
  o Right-Size WIP
  o Increase Labor Productivity
  o Identify System Bottlenecks

Understand the Impact of Critical Business Decisions… *Prior to Implementation*
Our Methodology

**Visualize** the Process

- Business Rules
- Facility Constraints
- Resource Constraints
- Demand
- Process Flows

**Analyze** the Results

- Throughput
- Resource Utilization
- Operational Efficiency
- Inventory Levels
- Energy Consumption

**Optimize** Scenarios & KPI Comparisons

- Equipment Changes
- Schedule Changes
- Labor Quantities
- Batch Sizes
- Buffer / Storage Sizes
- Downtime Changes
Simulation Helps Understand Impact of...

Variability

Complexity

Constraint

Uncertainty
When To Simulate?

Modeling and Simulation Usage

- **Interdependencies**
  - MRP, LP/IP, Math Models
  - Discrete Event Simulation
    - ProModel Simulation
  - Increasing Complexity

- **Variability (Randomness)**
  - Spreadsheets
  - Monte Carlo
  - Cycle Times, Process Times, Scrap Rates, Equipment Downtime
Where Does Simulation Help?

• New Factory Design
  o Validate Layout and Operational Assumptions
  o Validate Quantities of Equipment
  o Determine Correct Labor Allocations
  o Determine In-plant Logistics, and Material Handling Needs
Where Does Simulation Help?

• Existing Factory Improvement
  o Identify Process Waste
  o Line Balancing
  o Target & Test Improvements
  o Validate and Quantify Impact of Process Changes
ProModel-Autodesk Partnership

• Process Simulation Partner of Autodesk

• Integration between Autodesk & ProModel Simulation Tools

• Create Seamless Integration Between Factory Design and Factory Simulation, i.e. Digital Twin
ProModel Autodesk Edition Offerings

- **Process Simulator Autodesk Edition** – Microsoft® Visio plug-in to automatically create and run simulation models directly inside Visio, utilizing the ProModel simulation engine, to optimize processes:
  - Utilizes Factory Assets
  - Syncs to AutoCAD and Inventor

- **ProModel Autodesk Edition** – Full-featured simulation software with Autodesk add-in. Detailed spatially accurate visual representation of a facility:
  - Simulation ribbon inside of AutoCAD
  - Create simulation from existing AutoCAD drawing
Autodesk Edition Integration

Process Simulator & ProModel

2D

3D

AUTODESK® AUTOCAD® 2020

AUTODESK® INVENTOR®
ProModel Autodesk Edition Integration
Demonstration
Process Simulator
Autodesk Edition
Process Simulator
Autodesk Edition
Sample Model Build
See class handout for more details
## The ProModel Model Building Process

<table>
<thead>
<tr>
<th>Steps LEAP(RPN)</th>
<th>Definition</th>
<th>Mfg. Example</th>
<th>Bank Example</th>
<th>Hospital Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Locations</td>
<td>Physical place where work is done on or for the entity</td>
<td>Work Station</td>
<td>Teller Station</td>
<td>Exam Room</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drive-Thru Window</td>
<td></td>
<td>Operating Room</td>
</tr>
<tr>
<td>2 Entities</td>
<td>Material or part being worked on or person being served</td>
<td>Material or Part(s)</td>
<td>Customer</td>
<td>Patient</td>
</tr>
<tr>
<td>3 Arrivals</td>
<td>The distribution patterns and entry points of entities arriving at the system</td>
<td>How many and when material or parts arrive at receiving</td>
<td>How many and when customers arrive at the drive-thru</td>
<td>How many and when patients arrive at the emergency room</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How many and when material or parts arrive at the first work station</td>
<td>How many and when customers arrive at the drive-thru</td>
<td>How many and when patients arrive at the front door</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How many and when customers arrive at the front door</td>
<td>How many and when patients arrive at the front door</td>
<td>How many and when patients arrive at labor and delivery</td>
</tr>
<tr>
<td>4 Processing</td>
<td>Logic to define the process and routes the entities could go through: 1. Where do they come from and where to they go 2. When do they go to the next location 3. What happens at each location</td>
<td>Movement of material or parts through the manufacturing process</td>
<td>Flow of the customer at the bank</td>
<td>Flow of the patient through the hospital</td>
</tr>
<tr>
<td>5 Resources (Optional)</td>
<td>Resources perform the work or service on entities if the location itself does not</td>
<td>Equipment, AGV’s Workers</td>
<td>Employees, ATM Machine</td>
<td>Doctors, Nurses, Equipment</td>
</tr>
<tr>
<td>6 Path Networks (Optional)</td>
<td>The path(s) on which resources can travel – If resources do not need to move you do not need a path network</td>
<td>Where workers can walk AGV Path</td>
<td>Where employees can walk</td>
<td>Where staff can walk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Where equipment can go</td>
<td></td>
<td>Where equipment can go</td>
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ProModel Optimization Suite
Autodesk Edition
Sample Model Build
See class handout for more details
Class Learning Objectives

• Explain the value of using ProModel simulation for process optimization
  o Design more efficient and effective factories the first time—saves time and $$

• Describe when to use manufacturing simulation
  o When complexity is high due to many interdependencies and high variability

• Create a simulation model with Factory Design Utilities that opens directly in AutoCAD/Inventor to start a factory layout
  o Use Process Simulator Autodesk Edition

• Identify how to create a simulation model from an existing layout
  o Use ProModel Optimization Suite Autodesk Edition
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• For questions or inquiries, please reach out to:
  o Technical Questions:
    ▪ Aaron Nelson: anelson@promodel.com
  o Licensing or Inquiries:
    ▪ Andy Schild: aschild@promodel.com