Walk-in Slide: AU 2014 Social Media Feed

1. Click on the link below, this will open your web browser

http://aucache.autodesk.com/social/visualization.html

2. Use “Extended Display” to project the website on screen if you plan to work on your computer. Use “Duplicate” to display same image on screen and computer.

Process Analysis 360 for Estimating Project Costs

Ryan McMahon, Sr. Product Manager, Autodesk
Anna D'Alessio, PhD. Candidate, Berkeley

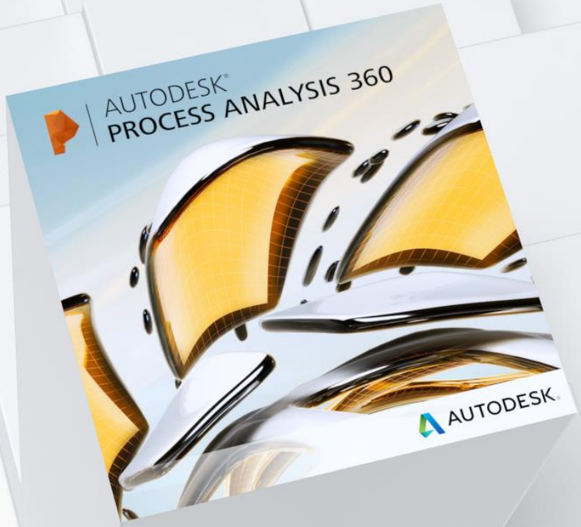
Class summary

Estimating and understanding costs is paramount to the success of any project. This course will show how to use Process Analysis 360 software to model your manufacturing processes, test various options, and generate associated costs for capital equipment, energy, labor, consumables, and waste.

Key learning objectives

- Learn how to build a model of manufacturing processes using Process Analysis 360 software
- Learn how to create, study, and validate multiple process options to better ensure effective decisions
- Learn how to export simulation data and create cost model using a spreadsheet
- Make better decisions about manufacturing projects

What is Process Analysis 360



Simple process modelling tool for general mfg users

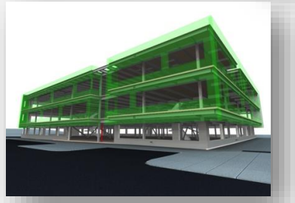
Simulation and optimize processes early in the project

Decision support tool for manufacturing changes

Autodesk Digital Factory Solutions

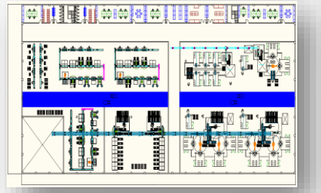
Installation & commissioning

Process simulation

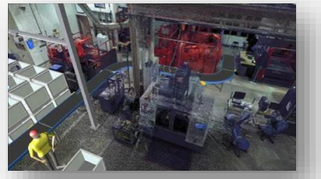


BIM – Building Information Modeling

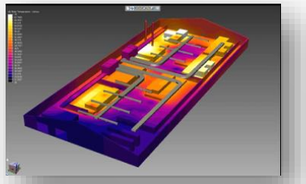
Factory layout



Clash & clearance analysis

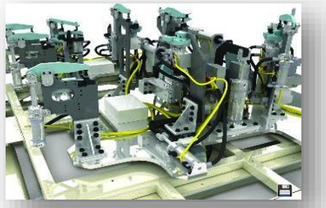


Multi-CAD / Point cloud review



Ventilation / Emission / Energy efficiency CFD simulation

Work cell design



Tool & fixture design

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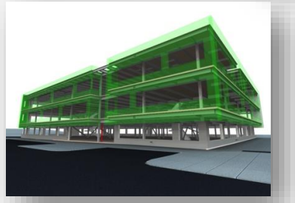
Autodesk Digital Factory Solutions

Installation & commissioning

Process simulation



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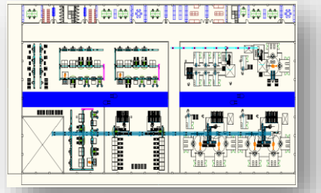

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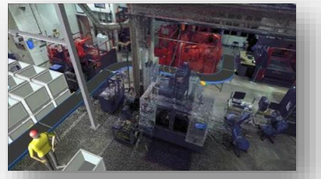

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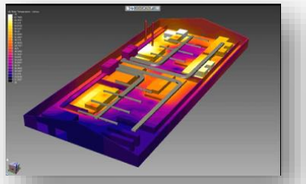

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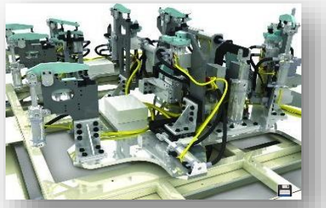

Tool & fixture design

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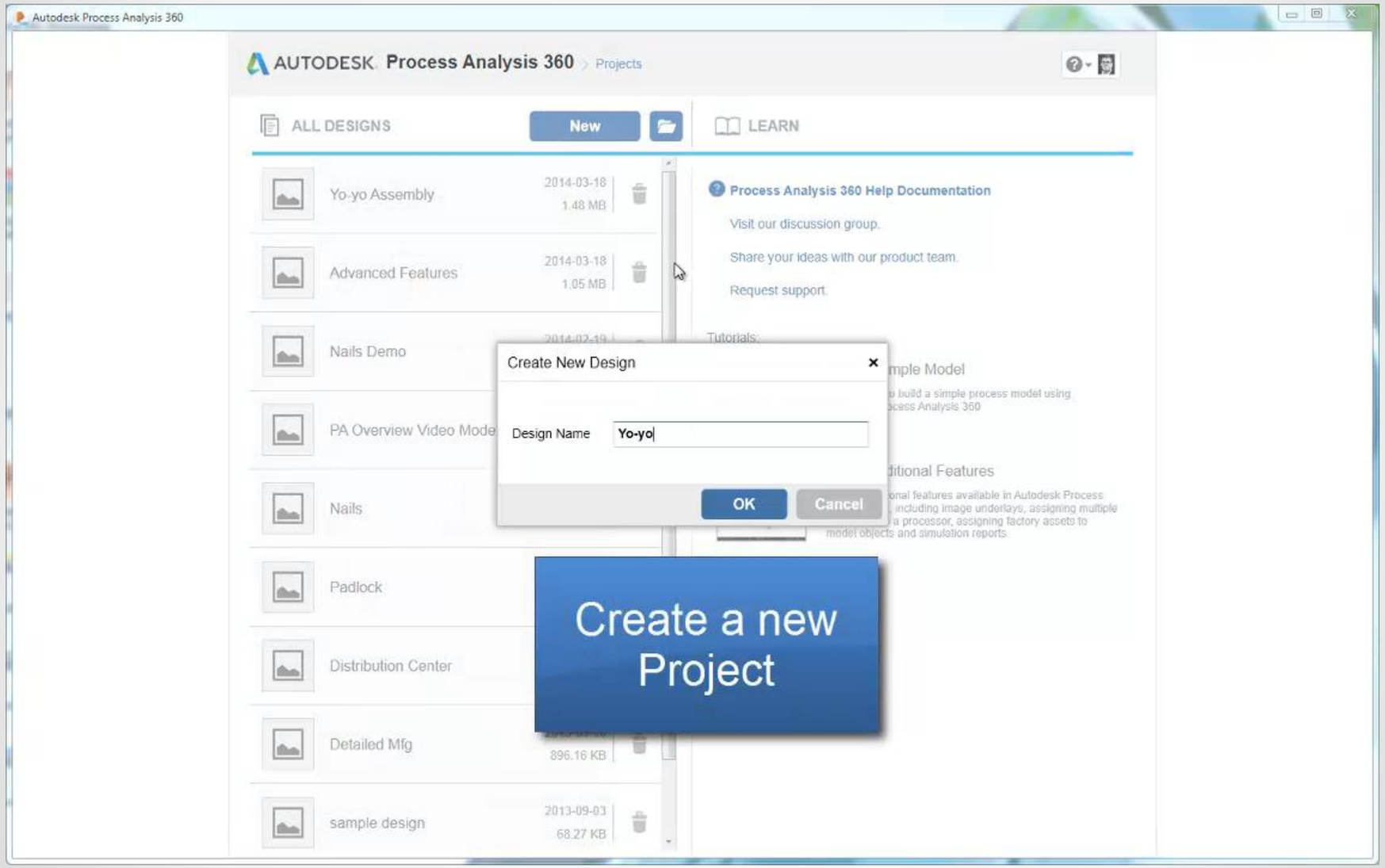
Challenges Addressed

- Quickly model manufacturing processes
- Study manufacturing alternatives to optimize performance
- Identify bottlenecks, simulate unplanned downtime

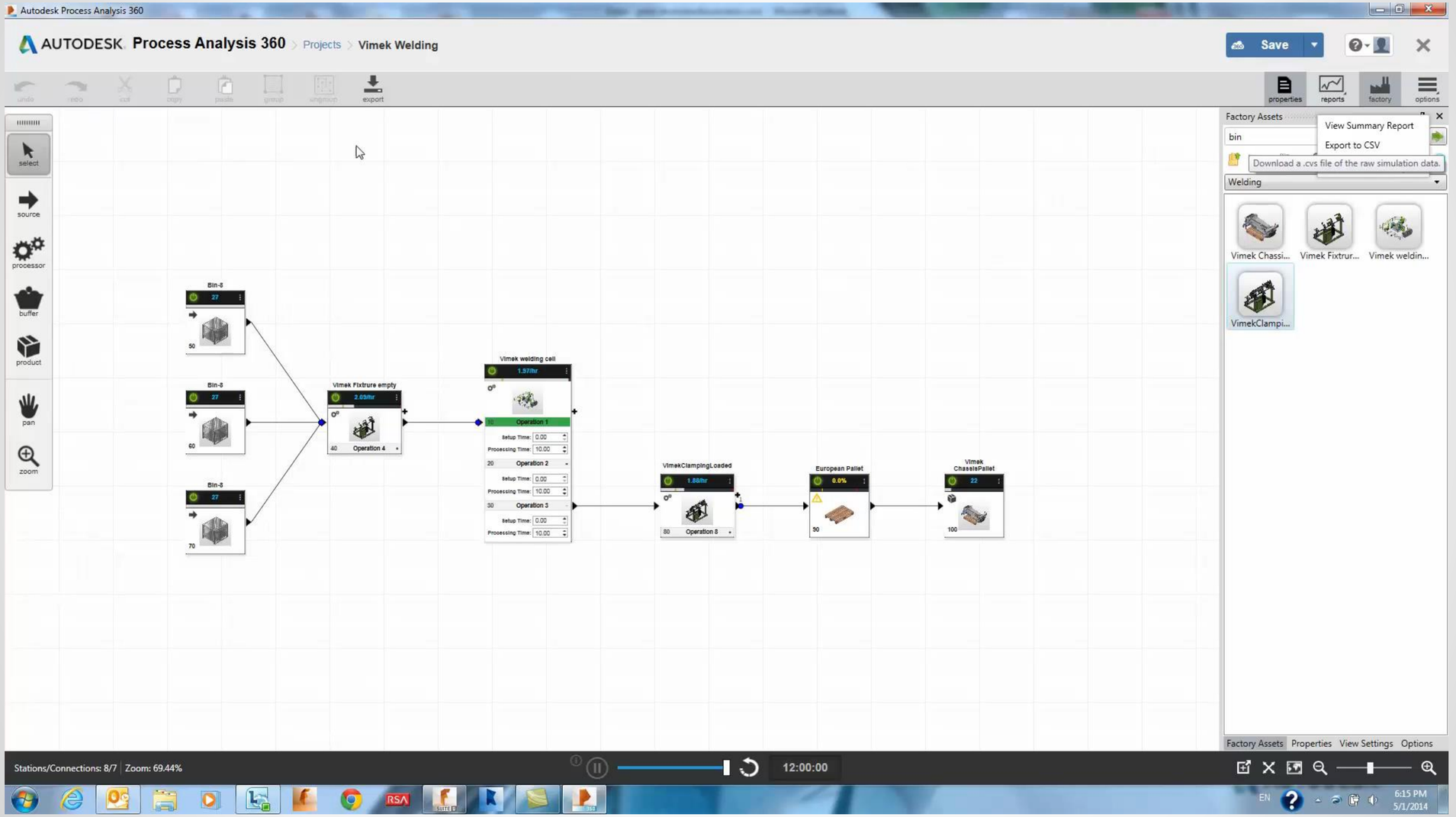
Manufacturing Decisions

- manufacturing methods
- equipment decisions
- capacity analysis
- WIP and inventory reduction
- line balancing

Quickly Create Process Models



Improves Workflow from Planning to Layout



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Estimating Project Costs

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Demonstration

Key Actions

- Simulate a simple model
  - View summary and CSV summary reports
  - Paste CSV summary data into Costing template
- Simulate a alternate model
  - View CSV report
  - Compare how costing is different

AUTODESK Process Analysis 360 › Projects

ALL DESIGNS | New | LEARN

Yo yo Line 3X	2014-11-20	1.72 MB
Yo yo line	2014-11-20	1.66 MB
Welding	2014-10-13	49.23 KB
Advanced Features	2014-09-10	1.15 MB
Yo-yo Assembly	2014-07-10	1.48 MB
Machine Shop	2014-07-07	512.99 KB
Keurig	2014-07-01	684.56 KB
Copy of Yo-yo	2014-06-25	3.06 MB
Hospital	2014-06-23	94.16 KB
Advanced Features copy	2014-06-09	1.05 MB

Process Analysis 360 Help Documentation

Visit our discussion group.

Share your ideas with our product team.

Request support.

Tutorials:

Getting Started with Process Analysis 360

Create a simple process model for building a yo-yo

Building More Complex Models

How to use advanced features to build more complex models with Process Analysis 360

Process Analysis 360 to FDS Workflow

How to create a simple Process Analysis 360 model, export it as a DWG and import it into FDS

Access to FDS workflow features in Process Analysis 360

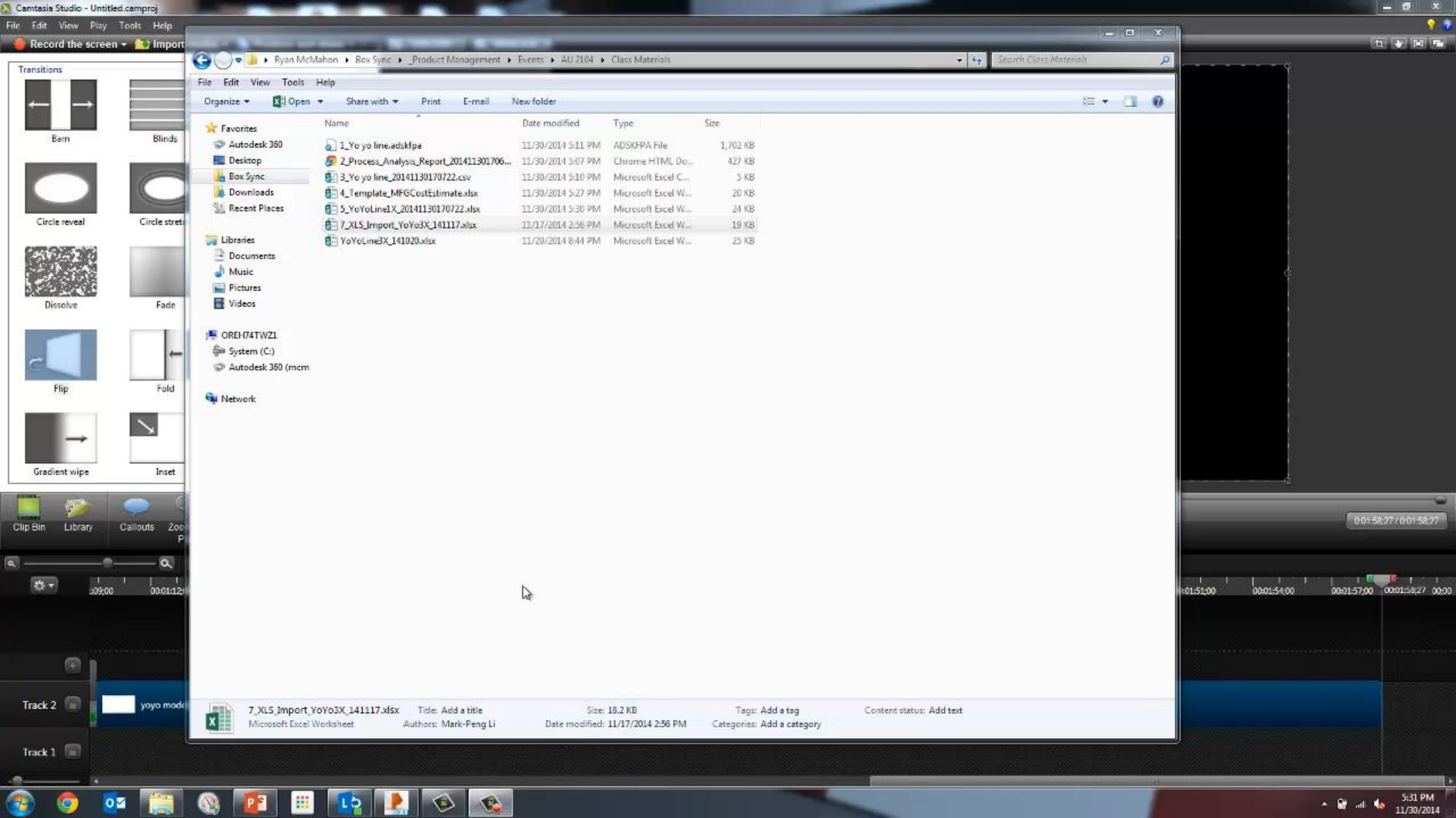
How to verify that you have access to the FDS workflow features in Process Analysis 360

Create a process model from an imported excel file generated from a routing table

How to import a process model from an excel file in Process Analysis 360

Estimating manufacturing costs using Process Analysis 360 CSV summary report feature

How to estimate costs from a CSV summary report in Process Analysis 360


Camtasia Studio - Untitled.camproj
File Edit View Play Tools Help
Record the screen
Import
Transitions
Barn
Blinds
Circle reveal
Dissolve
Fade
Flip
Fold
Gradient wipe
Inset
Clip Bin
Library
Callouts
Track 2
Track 1
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1_Yo yo line.adskfpa 11/30/2014 5:11 PM ADSKFPA File 1,702 KB
2_Process_Analysis_Report_20141130170... 11/30/2014 5:07 PM Chrome HTML Do... 427 KB
3_Yo yo line_20141130170722.csv 11/30/2014 5:10 PM Microsoft Excel C... 5 KB
4_Template_MFGCostEstimate.xlsx 11/30/2014 5:27 PM Microsoft Excel W... 20 KB
5_YoYoLine1X_20141130170722.xlsx 11/30/2014 5:30 PM Microsoft Excel W... 24 KB
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YoYoLine3X_141020.xlsx 11/20/2014 8:44 PM Microsoft Excel W... 25 KB
7_XLS_Import_YoYo3X_141117.xlsx
Microsoft Excel Worksheet
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Authors: Mark-Peng Li
Size: 18.2 KB
Date modified: 11/17/2014 2:56 PM
Tags: Add a tag
Categories: Add a category
Content status: Add text
5:31 PM
11/30/2014

Links to Content

- 1_Yo yo line.adskfpa
- 2_Process_Analysis_Report_20141130170653.html
- 3_Yo yo line_20141130170722.csv
- 4_Template_MFGCostEstimate.xlsx
- 5_YoYoLine1X_20141130170722.xlsx

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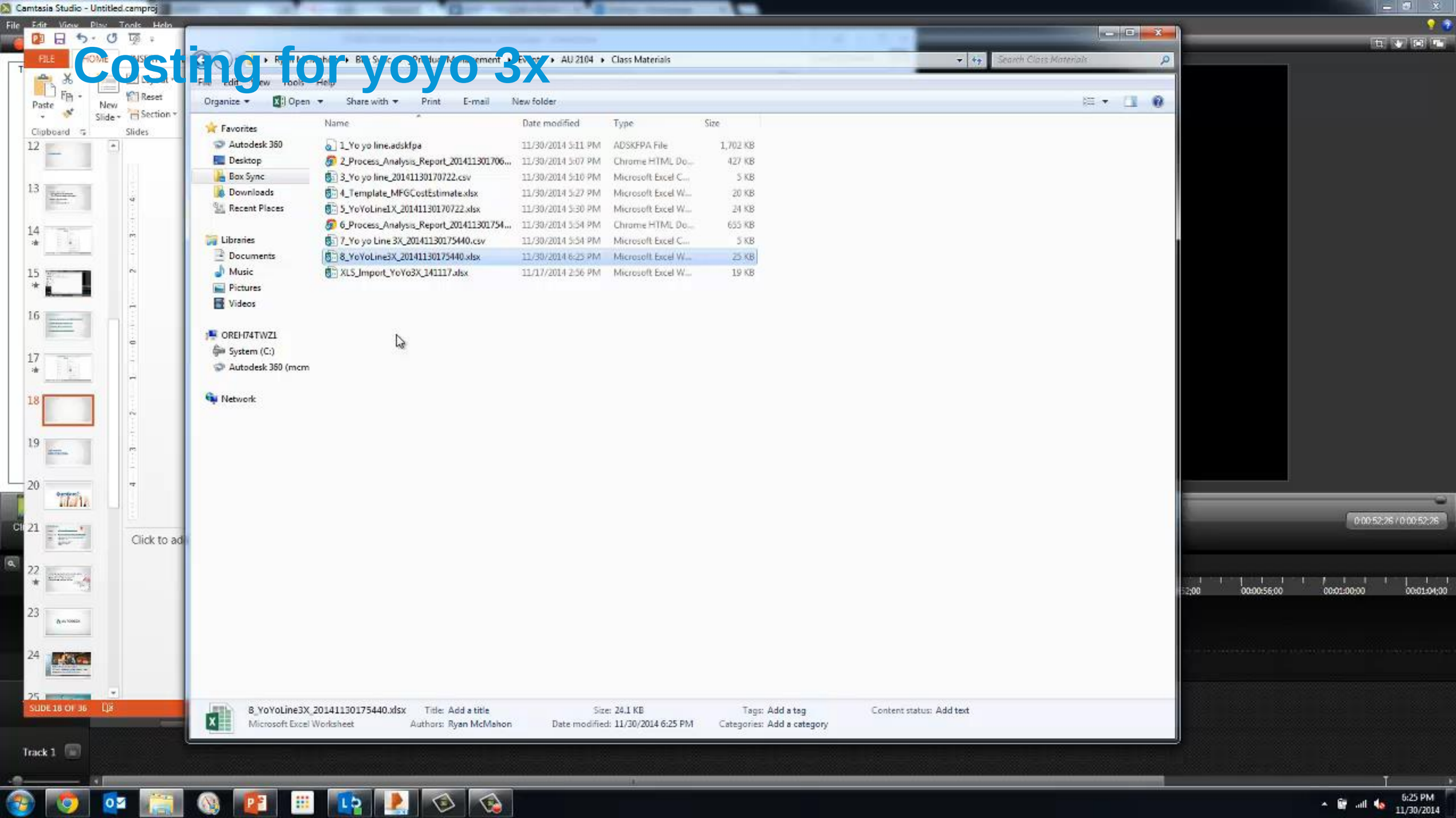
Costing for yoyo 3x



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- 8_Yo yo Line 3X_20141130175440.csv
- 9_YoYoLine3X_20141130175440.xlsx

Anna D’Alessio

Graduate Student Researcher

University of California, Berkeley

LMAS

Integrating Sustainability into Process Analysis 360

Anna D'Alessio

University of California, Berkeley

Autodesk University

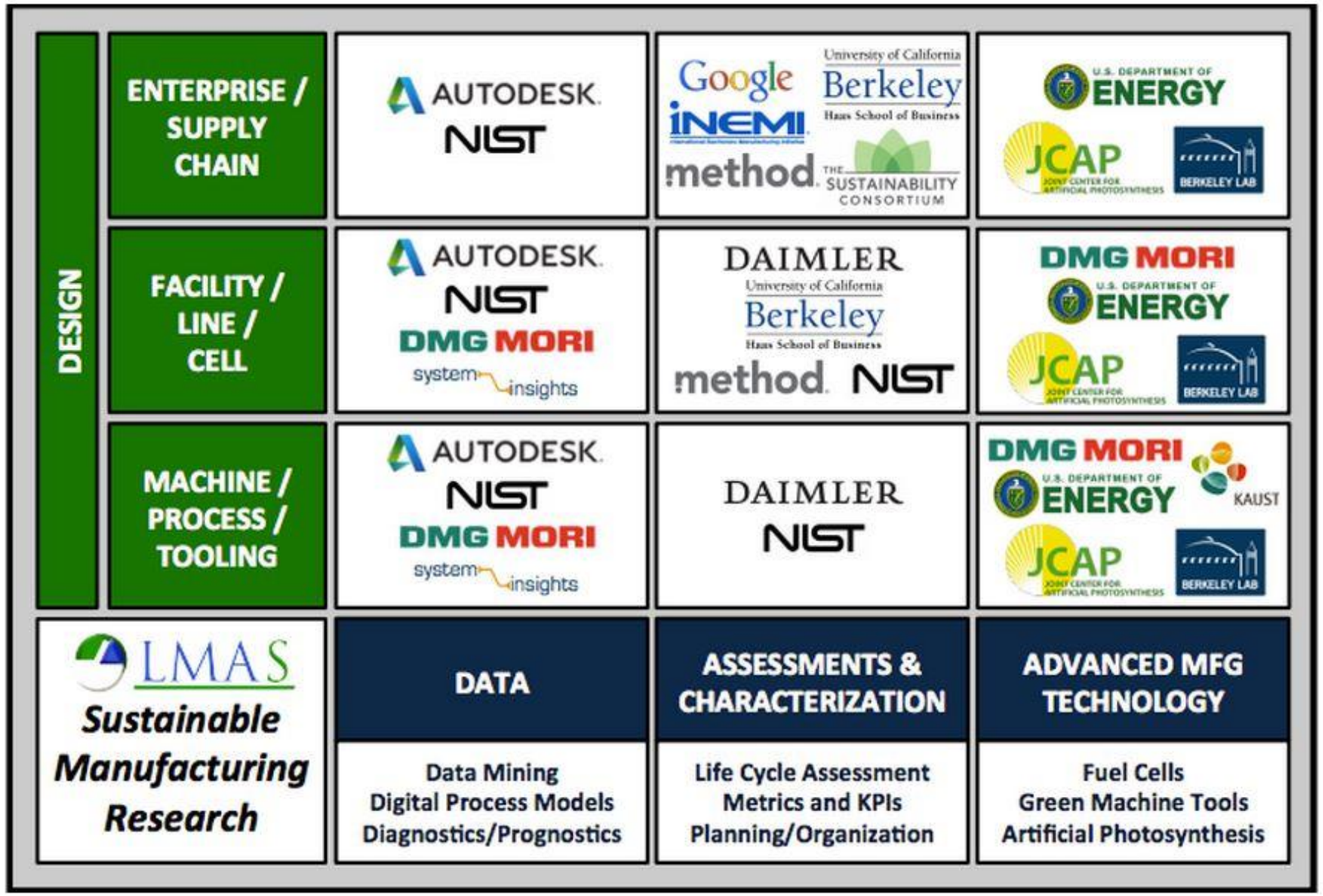
12/02/2014

SUSTAINABLE MANUFACTURING PARTNERSHIP

Berkeley UNIVERSITY OF CALIFORNIA

Overview of LMAS

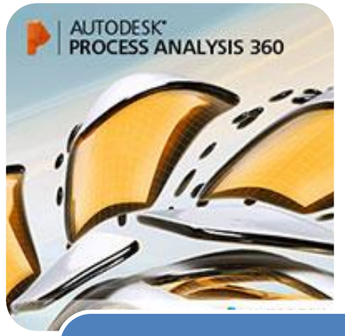
"The goal of research in the LMAS is to create sustainable technologies and tools that innovate manufacturing products, processes, and systems."



Outline

- Introduction
- Users and Key Performance Indicators (KPIs)
- Case Study
  - Machining
  - Welding and Cutting
- Conclusion

Summary of Workflow



Generate Process Chain

- Model specific process chain
- Run for x hours

Export Summary CSV File

- After PA 360 has ran, generate the report

Import Summary File to Process model

- Import time and utilization data into process models

Implement and Validate

- Implement process chain from models and validate success

Make necessary changes

Introduction

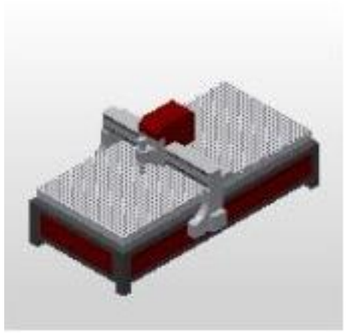
Energy Consumption
Water Consumption
Resource Consumption

Energy Cost
Water Cost
Resource Cost
Labor Cost

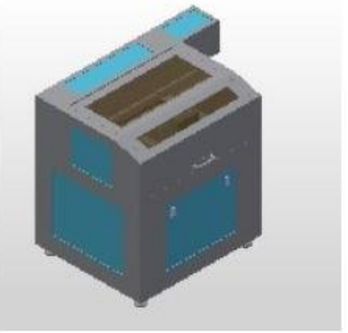
Milling

Manual Gas Metal Arc Welding (GMAW)

Robotic GMAW

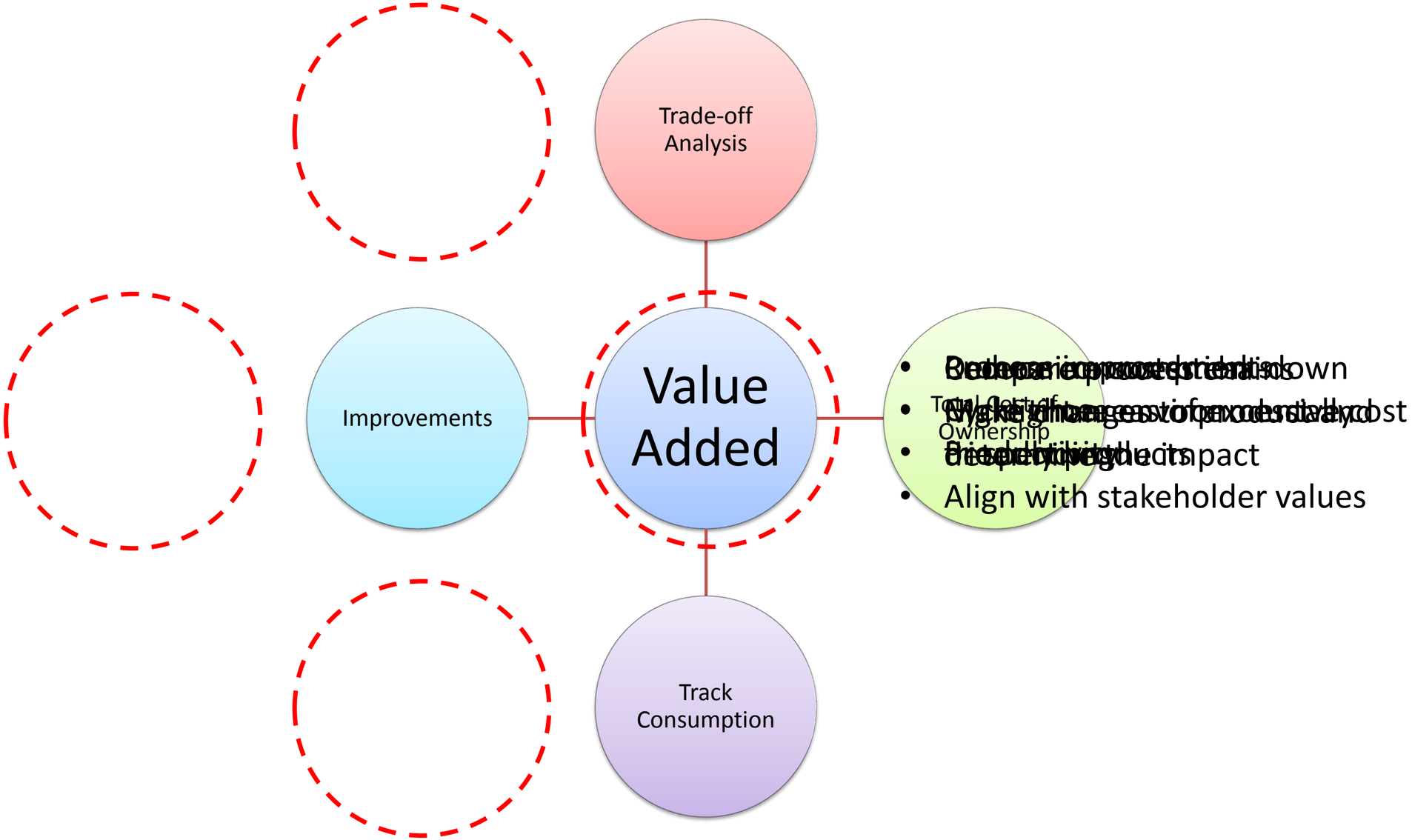


Plasma Arc Cutting



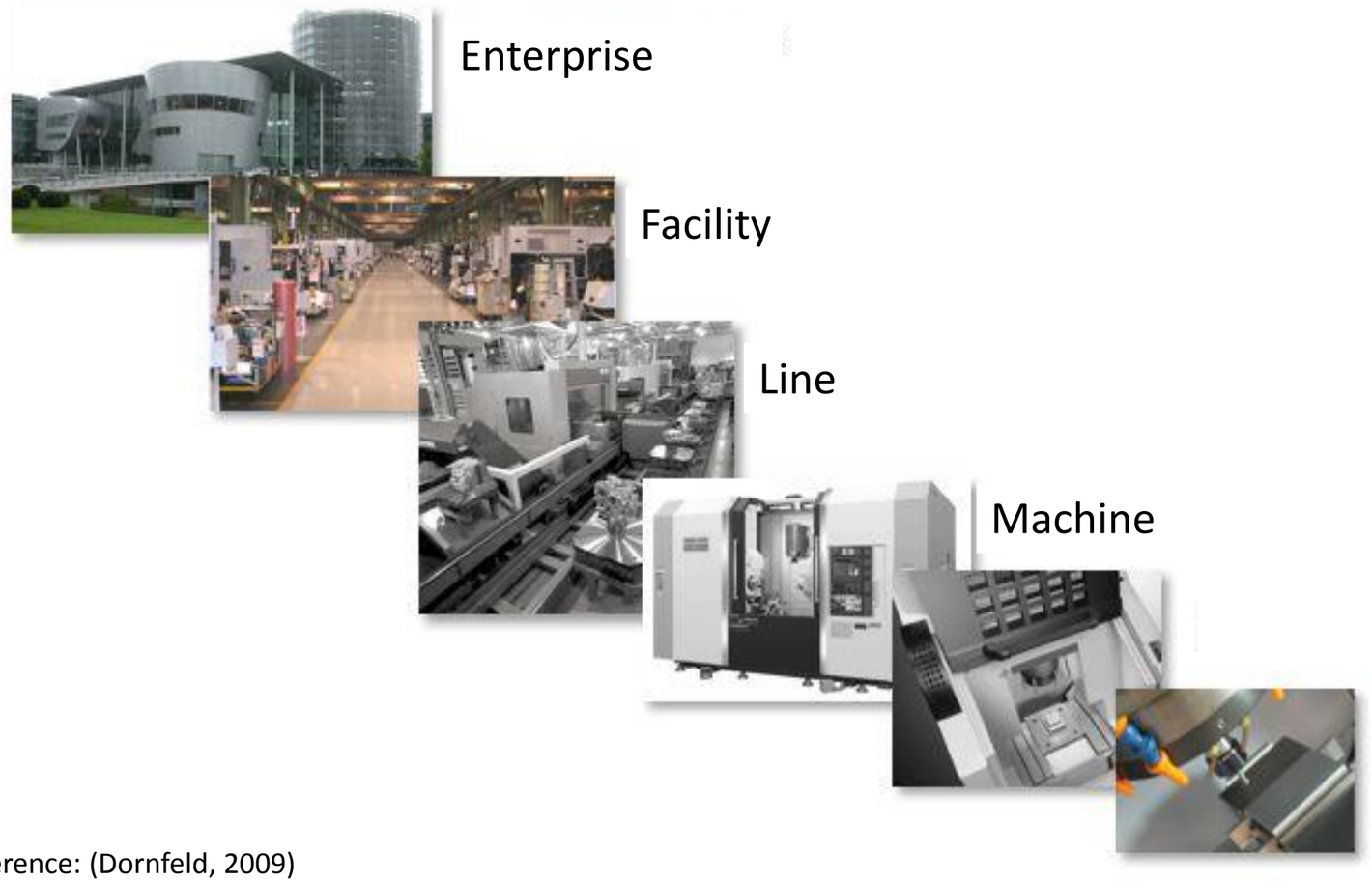
Laser Cutting

Added Value


Trade-off Analysis
Improvements
Value Added
Track Consumption
Align with stakeholder values

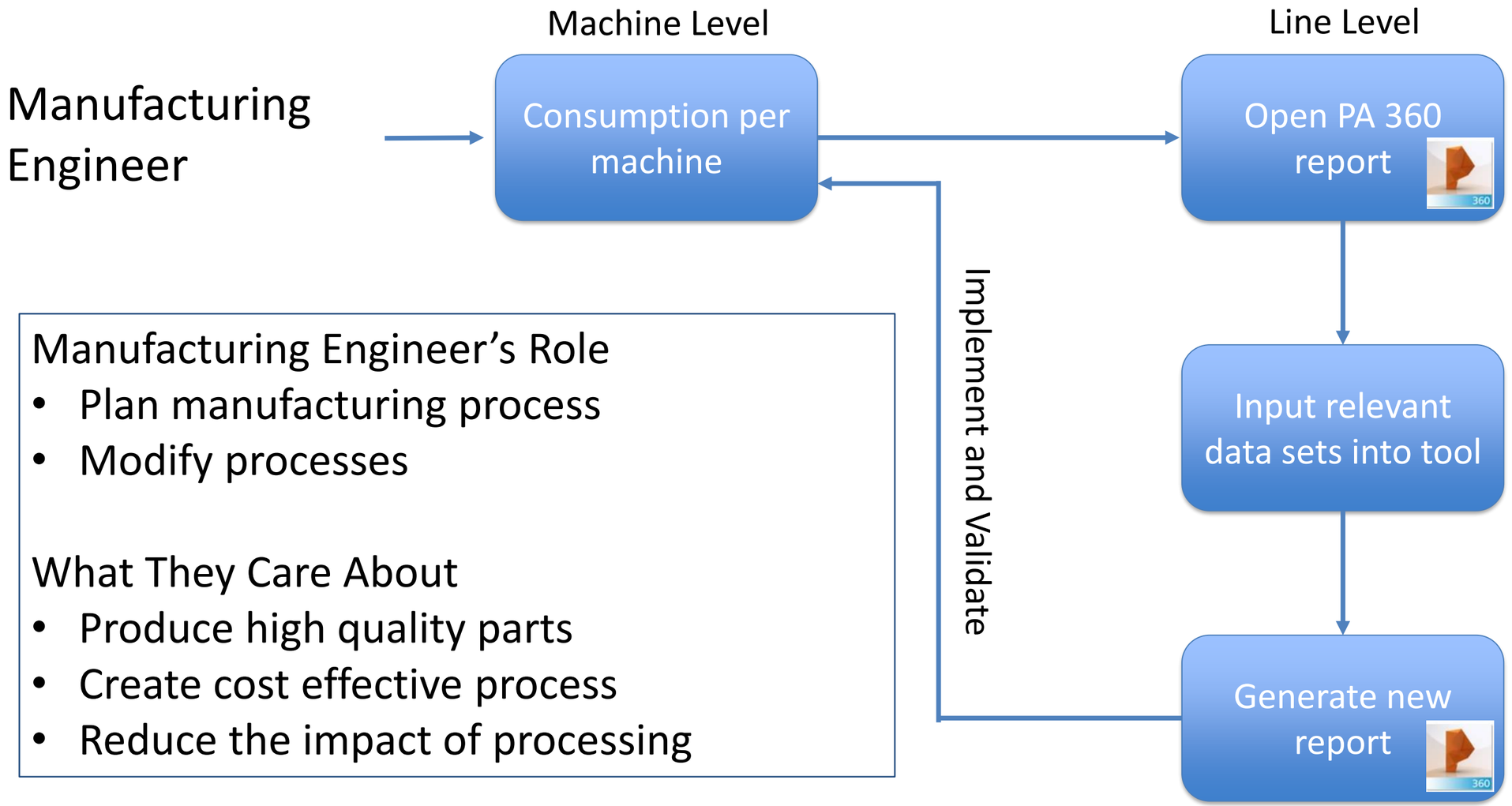
User Levels

Google Earth View



Reference: (Dornfeld, 2009)

User Work Flow



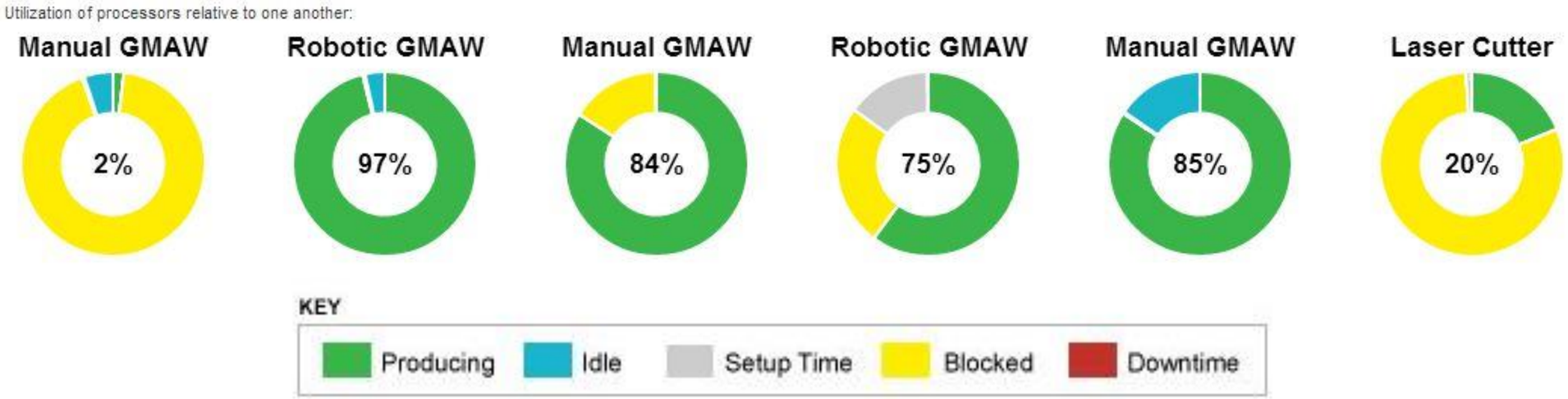
Manufacturing Engineer's Role
- Plan manufacturing process
- Modify processes

What They Care About
- Produce high quality parts
- Create cost effective process
- Reduce the impact of processing

Process Analysis 360

Planning manufacturing operations

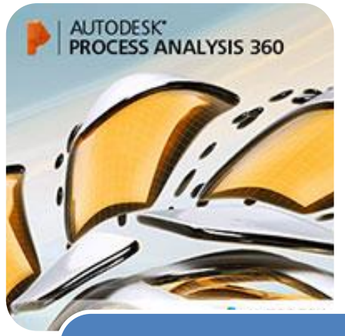
- Time
  - Setup, processing, idle, blocked
- Average production time per operation
- Utilization



Sustainability KPIs at Different Levels

	Objective	Resource Consumption	Manufacturing Space
Enterprise Level	Overall Factory Expenses or Environmental Impact	kWh / Month L / Month $ / Month	
Facility Level	Process Chain or Resource Optimization	kWh / Assembly L / Assembly $ / Assembly	 
Line Level	Throughput Time Improvement or Line Utilization	kWh / Part L / Part $ / Part	
Machine Level	Cycle Time Improvement	kWh / Machine L / Machine $ / Machine	

Summary of Workflow



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Make necessary changes

Milling Process

Inputs

- Electricity
- Water
- Consumables
  - Cutting Fluid
- Labor

Outputs

- Consumption
  - Electricity
  - Water
- Costs
  - Electricity
  - Water
  - Consumables
  - Labor

Image Source: (Binkertag.ch)

Data Sets for Milling

Website (API available)

- Energy Consumption
- Water Consumption
- Cutting Fluid Consumption
- Energy Cost
- Water Cost
- Labor Cost
- Cutting Fluid Cost

Calculations

Milling

$$MRR = S * x * Depth$$

$$E = \left(\frac{a}{MRR} + b\right) * V$$

$$\$ = E * EIA_{data}$$

$$CF = \frac{L}{part} * part$$

$$\$ = CF * \frac{\$}{L}$$

$$L_{Water} = \%W * CF$$

$$\$ = \frac{\$}{L} * L_{Water}$$

$$\$_{Labor} = hr * \frac{\$}{hr}$$

GMAW

$$P = V * I$$

$$E = (P + P_{robot}) * t$$

$$\$ = E * EIA_{data}$$

$$SG = \frac{L}{t} * t$$

$$\$ = SG * \frac{\$}{L}$$

$$Wire = \frac{kg}{V} * V$$

$$\$ = kg * \frac{\$}{kg}$$

$$\$_{Labor} = hr * \frac{\$}{hr}$$

Cutting

$$P = V * I$$

$$E = P * t$$

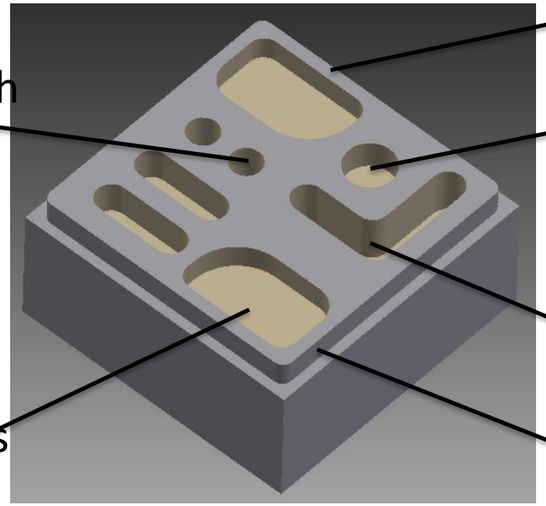
$$\$ = E * EIA_{data}$$

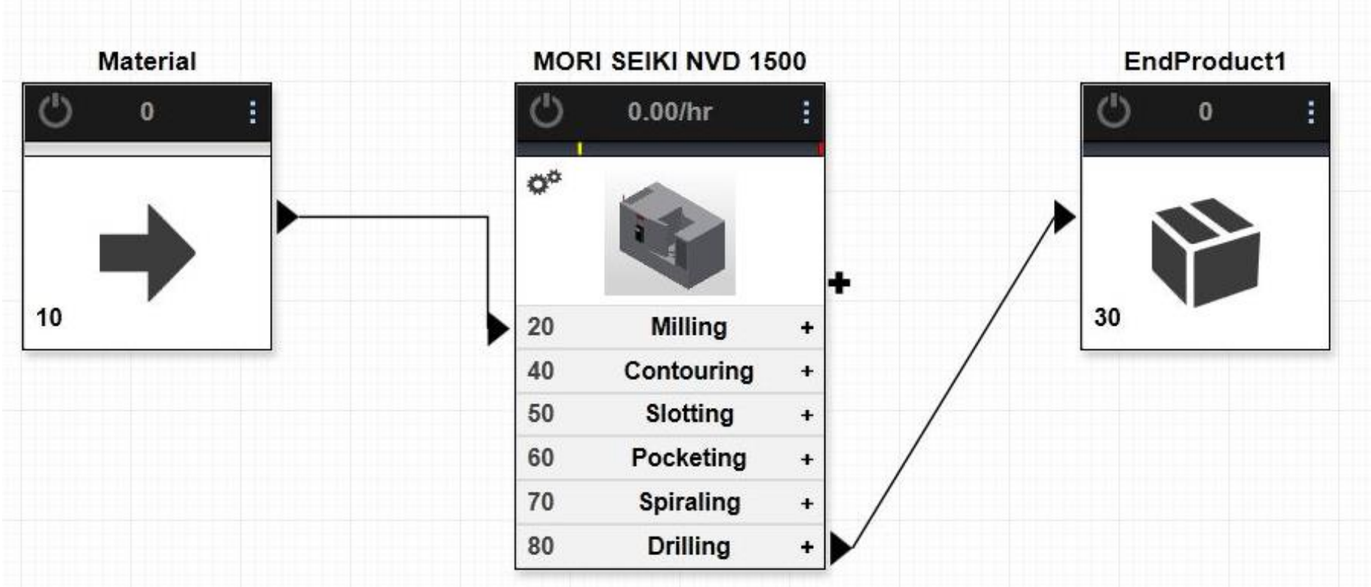
$$SG = \frac{L}{t} * t$$

$$\$ = SG * \frac{\$}{L}$$

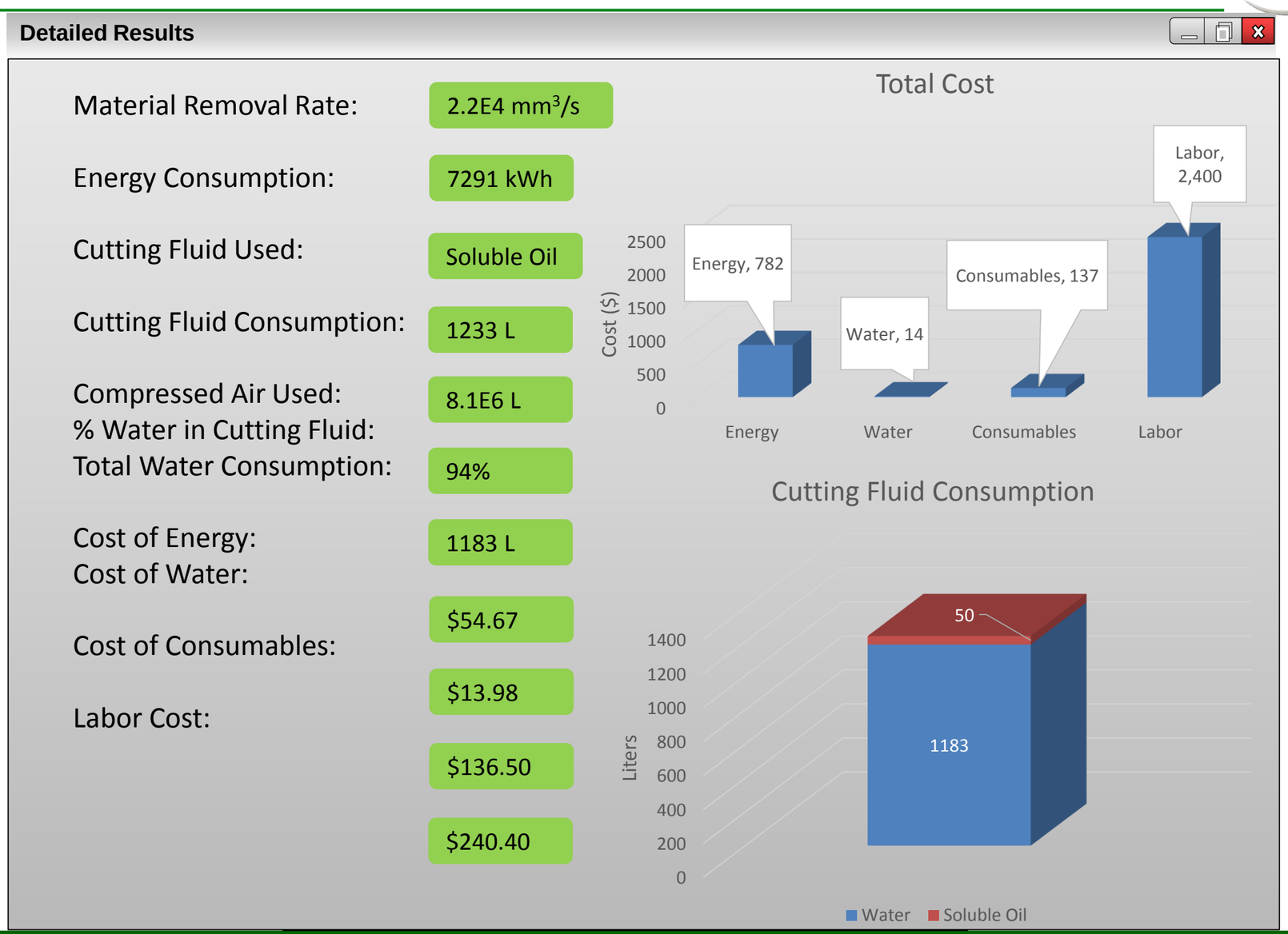
$$\$_{Labor} = hr * \frac{\$}{hr}$$

Machining Example

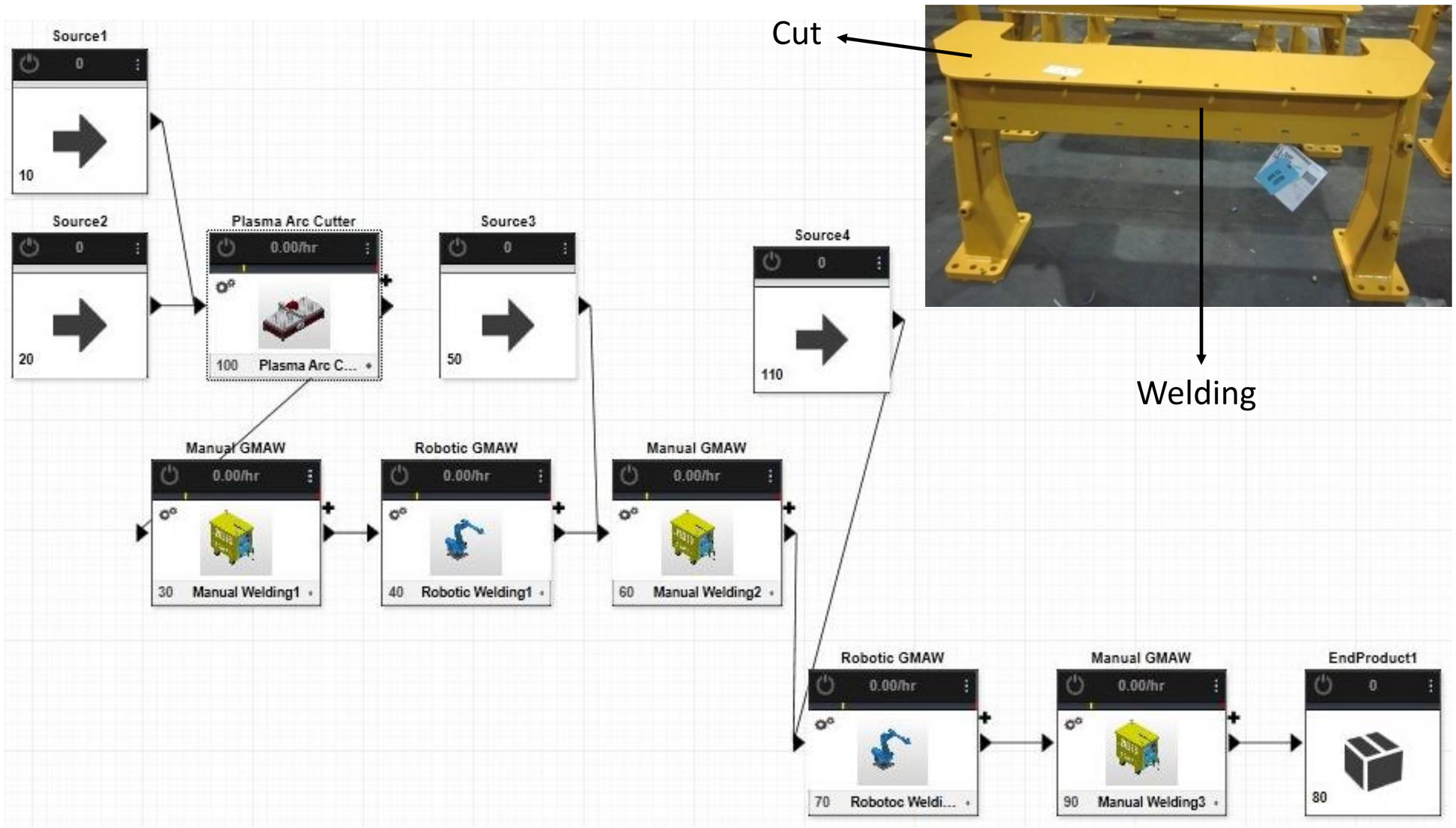




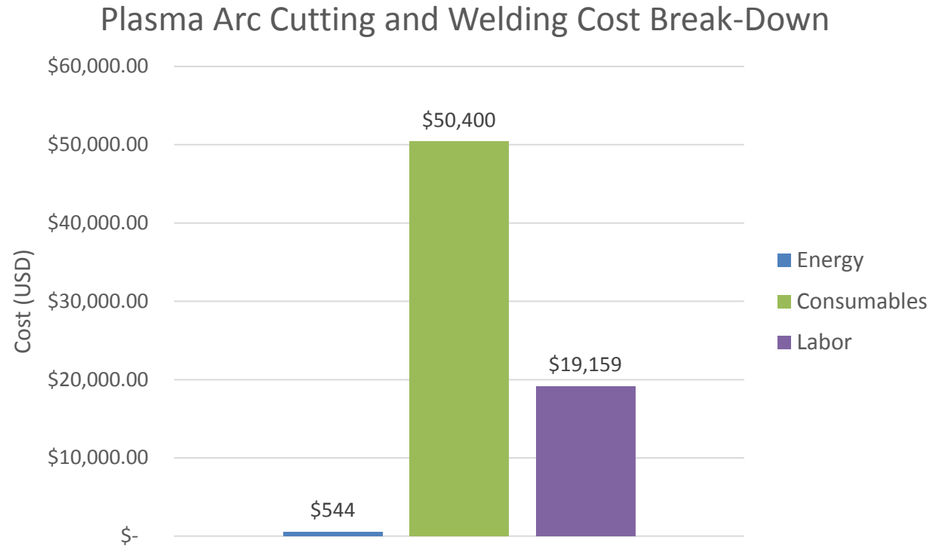
Sample User Interface: Machining

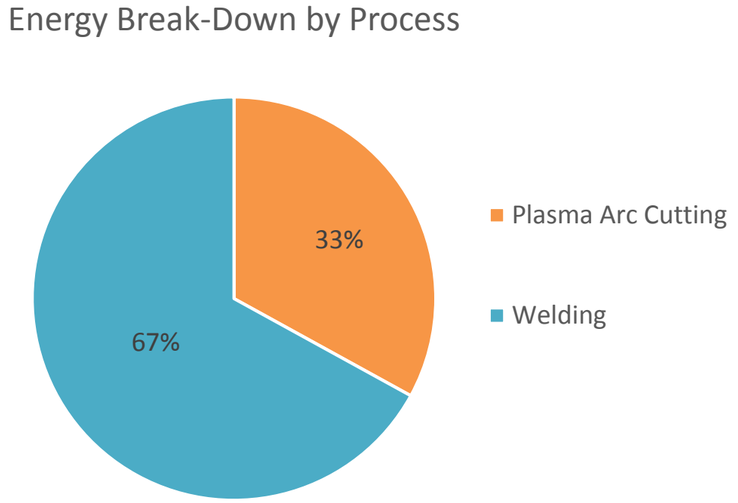


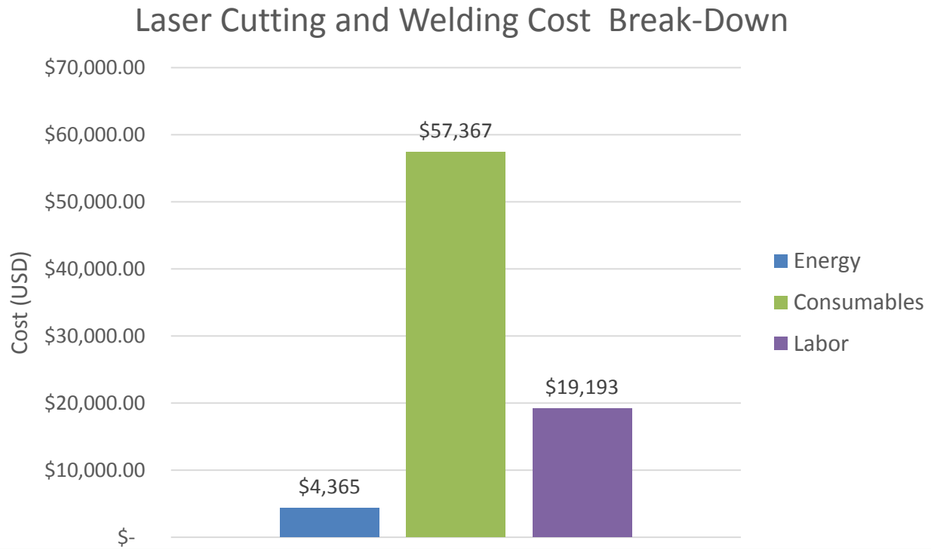
Plasma Arc Cutting and Welding Example

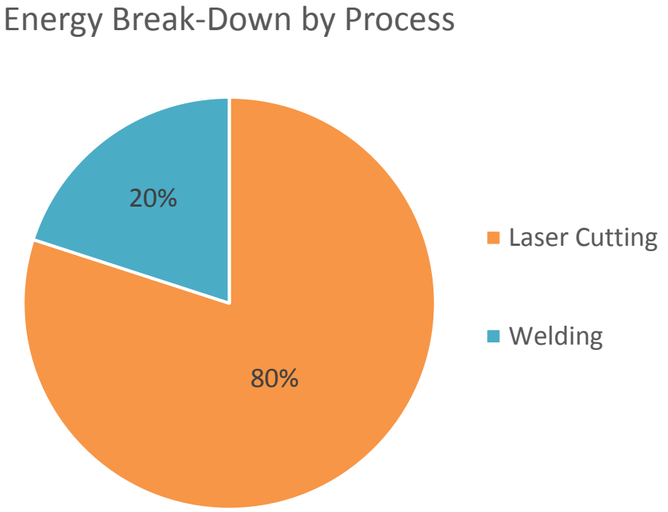


Sample Process Comparison

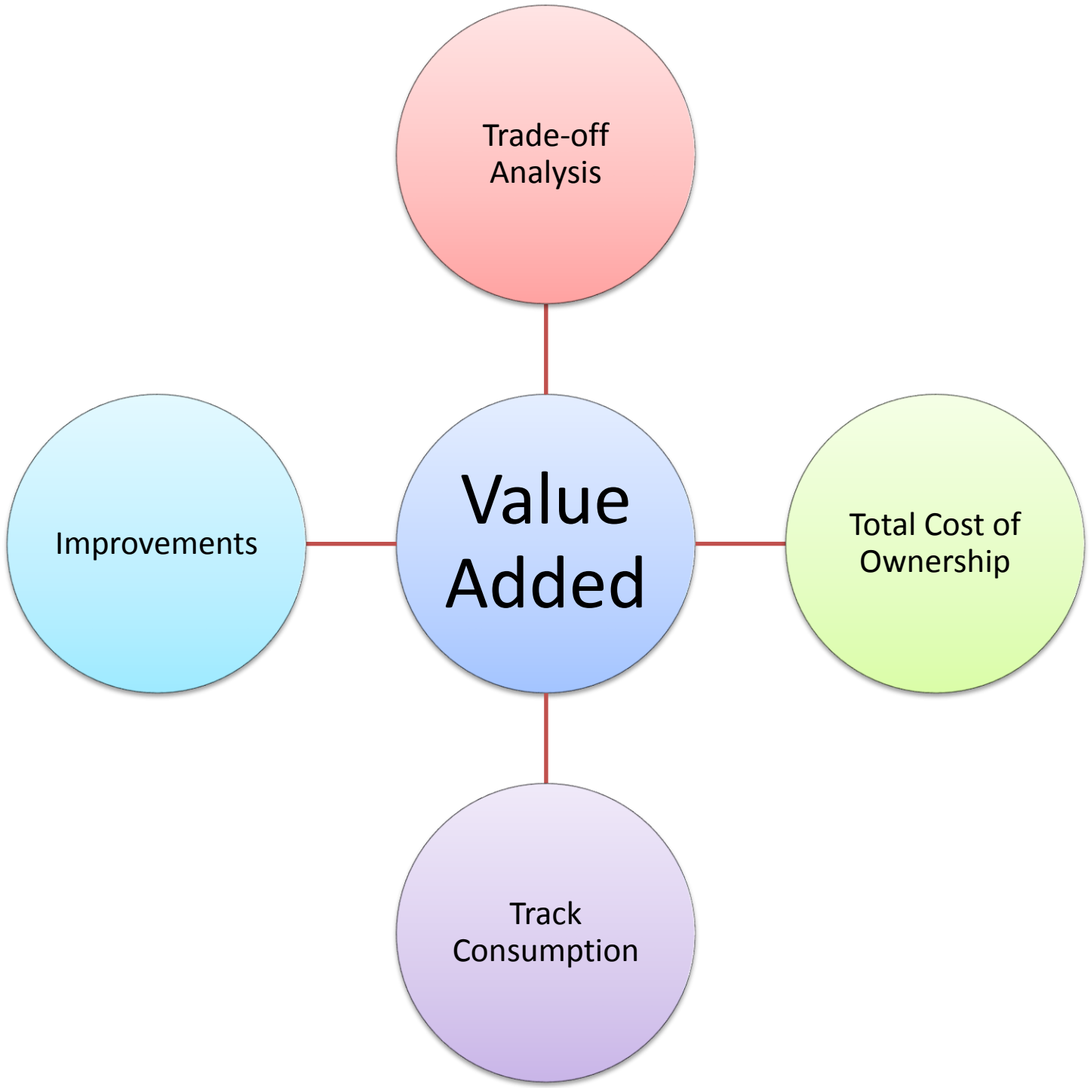








Benefits

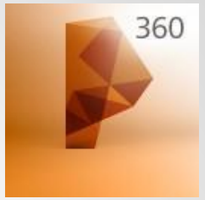

Trade-off Analysis
Improvements
Value Added
Total Cost of Ownership
Track Consumption

Questions

- Thank you
- Anna D’Alessio, adalessio@berkeley.edu

Questions?

Class Material



PA 360	http://processanalysis360.autodesk.com
Product Info	http://www.autodesk.com/products/process-analysis-360
Class Content	Autodesk University Website

Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2015 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time

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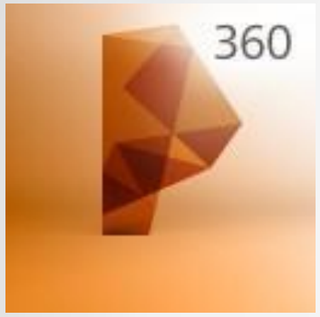
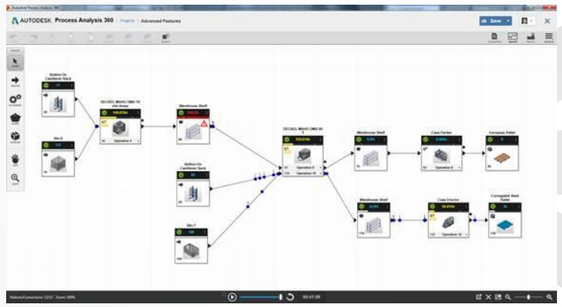
Summary

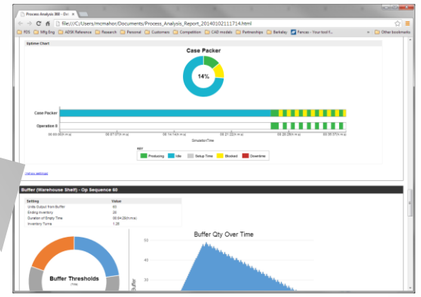


Process Analysis 360

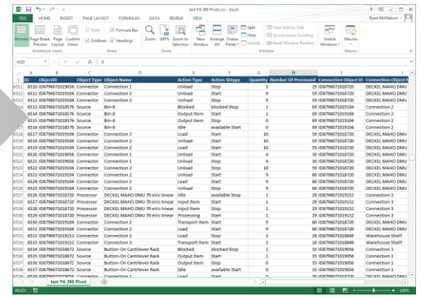
- Model, optimize and validate manufacturing processes
- Learn and get results quickly
- Accessible to all – Free!

PA 360 Outputs

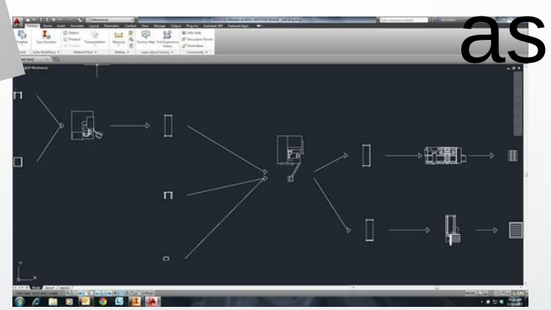




Simulation Report



Simulation Data as .csv



Export to .dwg

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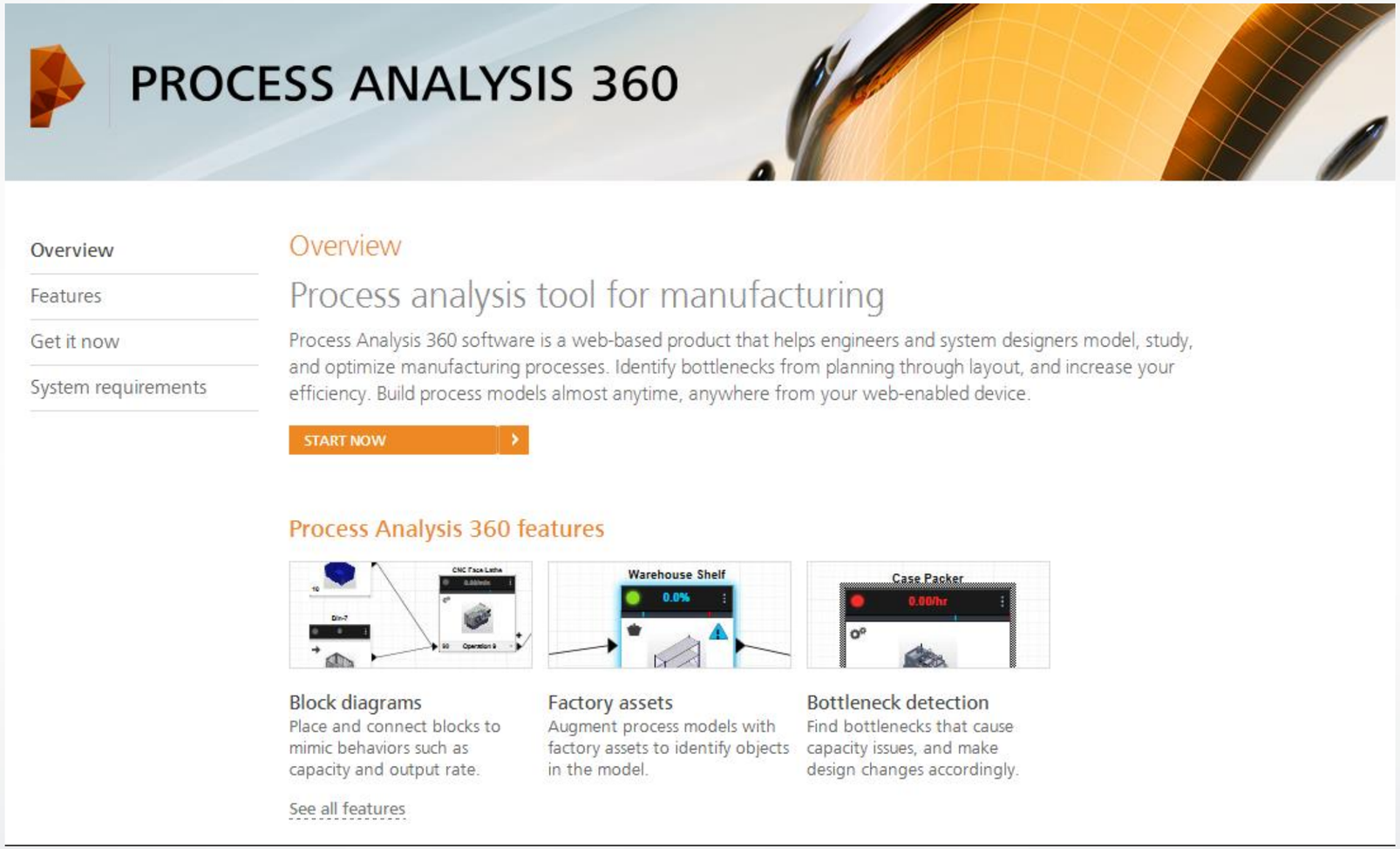
Business Value

- Higher throughput
- Improved equipment utilization
- Inventory reduction
- Reduced capital investment
- Fewer post-installation changes

Getting Process Analysis 360



http://processanalysis360.autodesk.com

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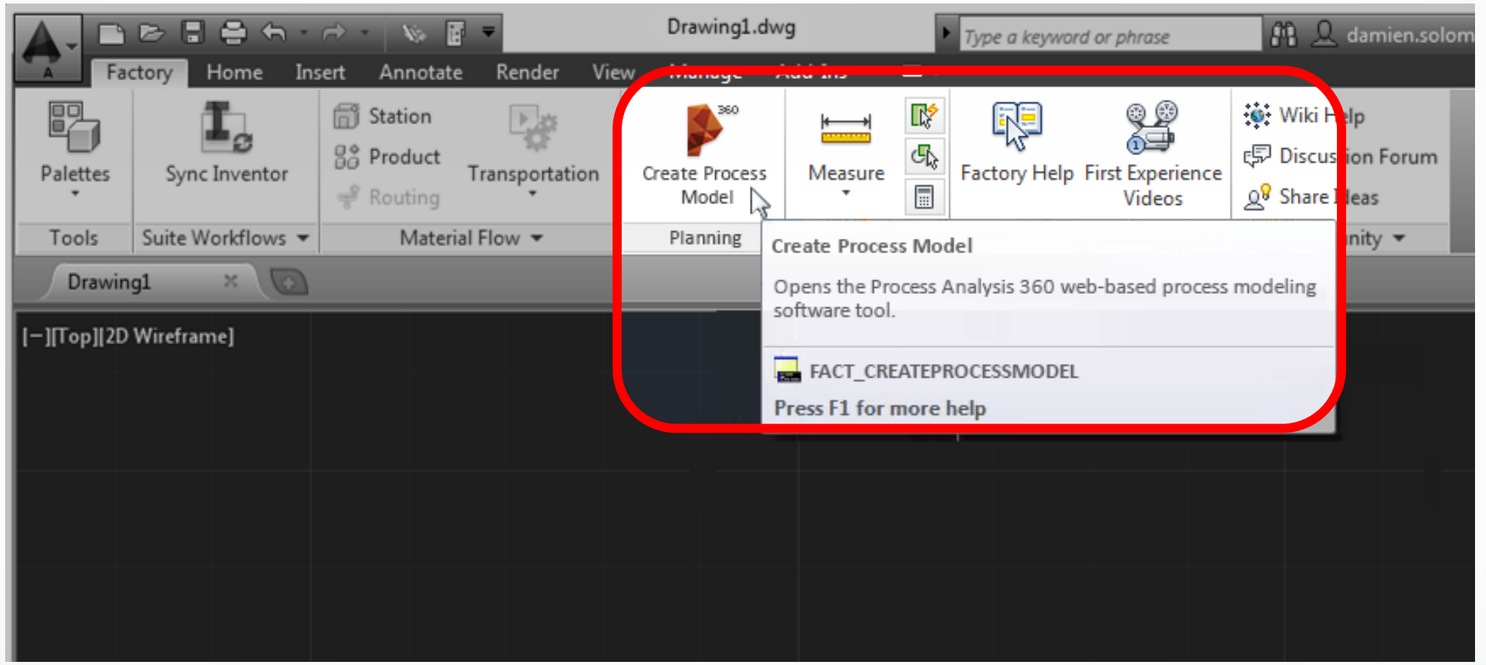
Available from within FDS



Integration with Factory Design Suite

Instantly turn conceptual process models into detailed 2D and 3D factory layouts.

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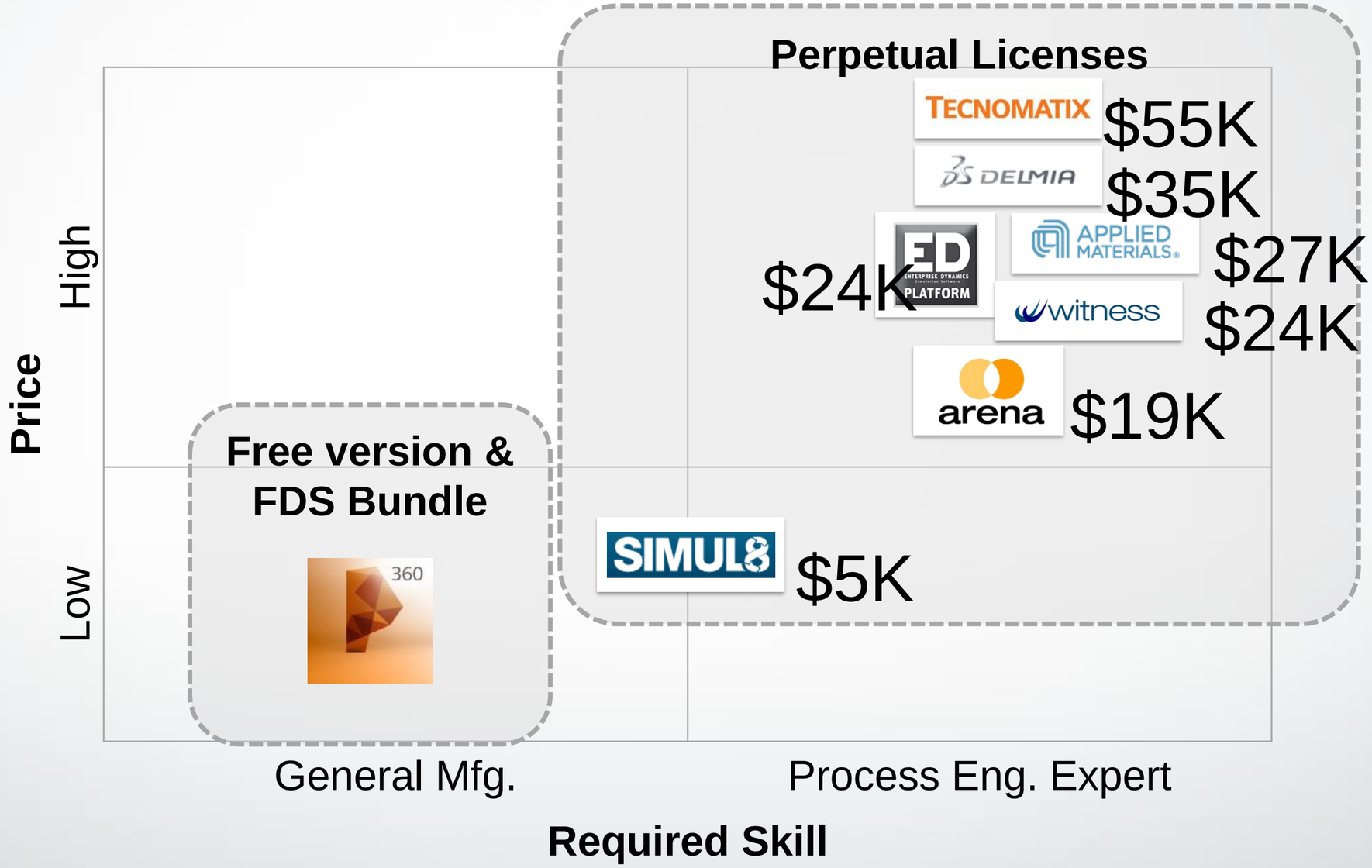
PA360 Competitive Positioning



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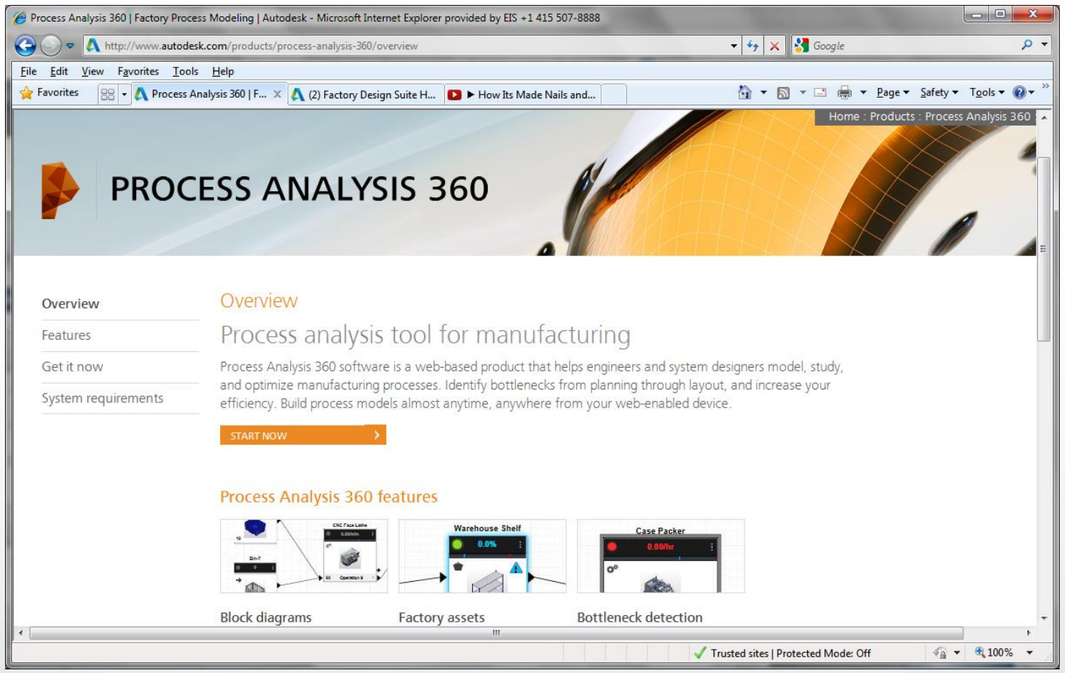

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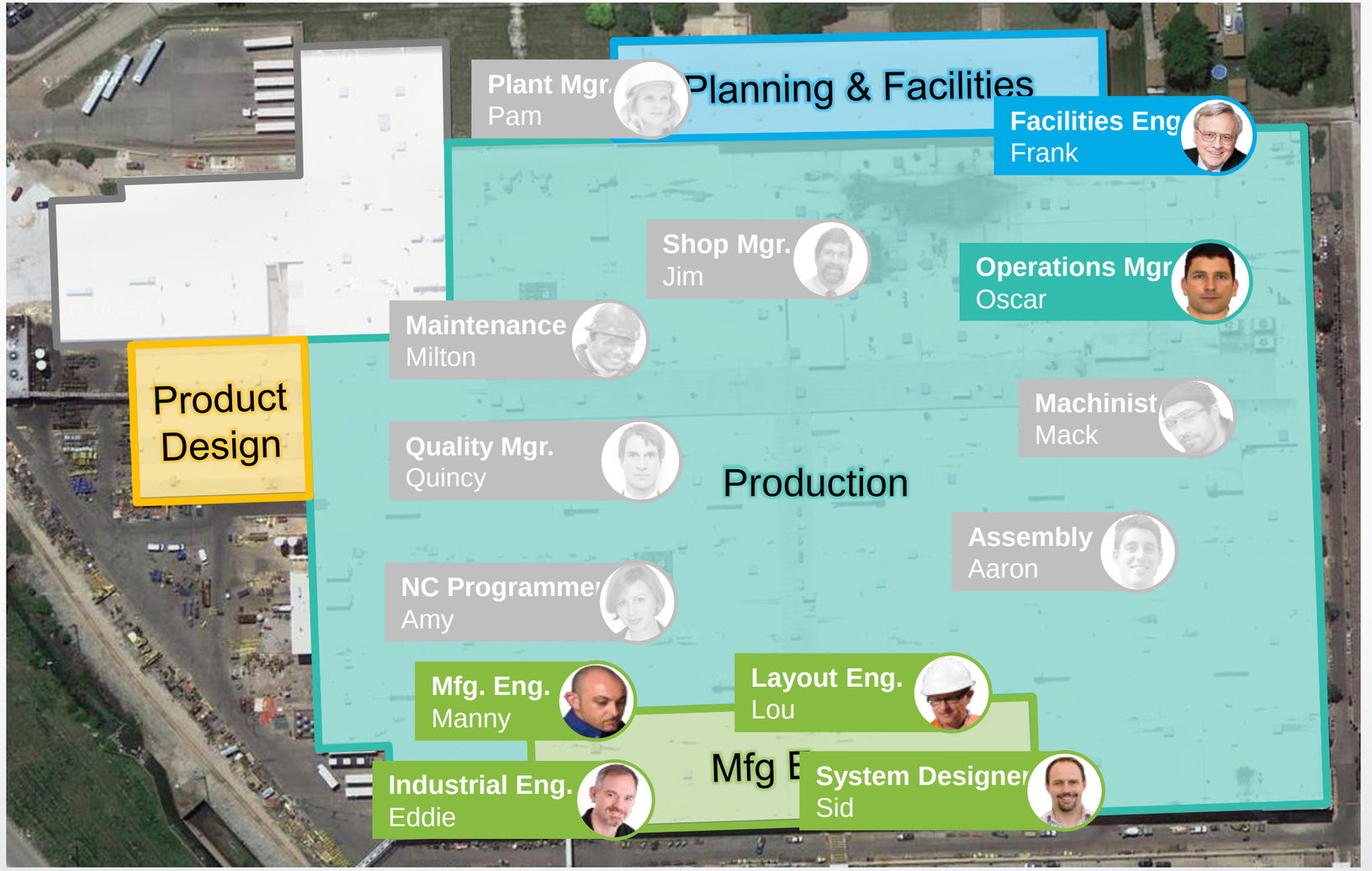
Who Uses Process Modeling?



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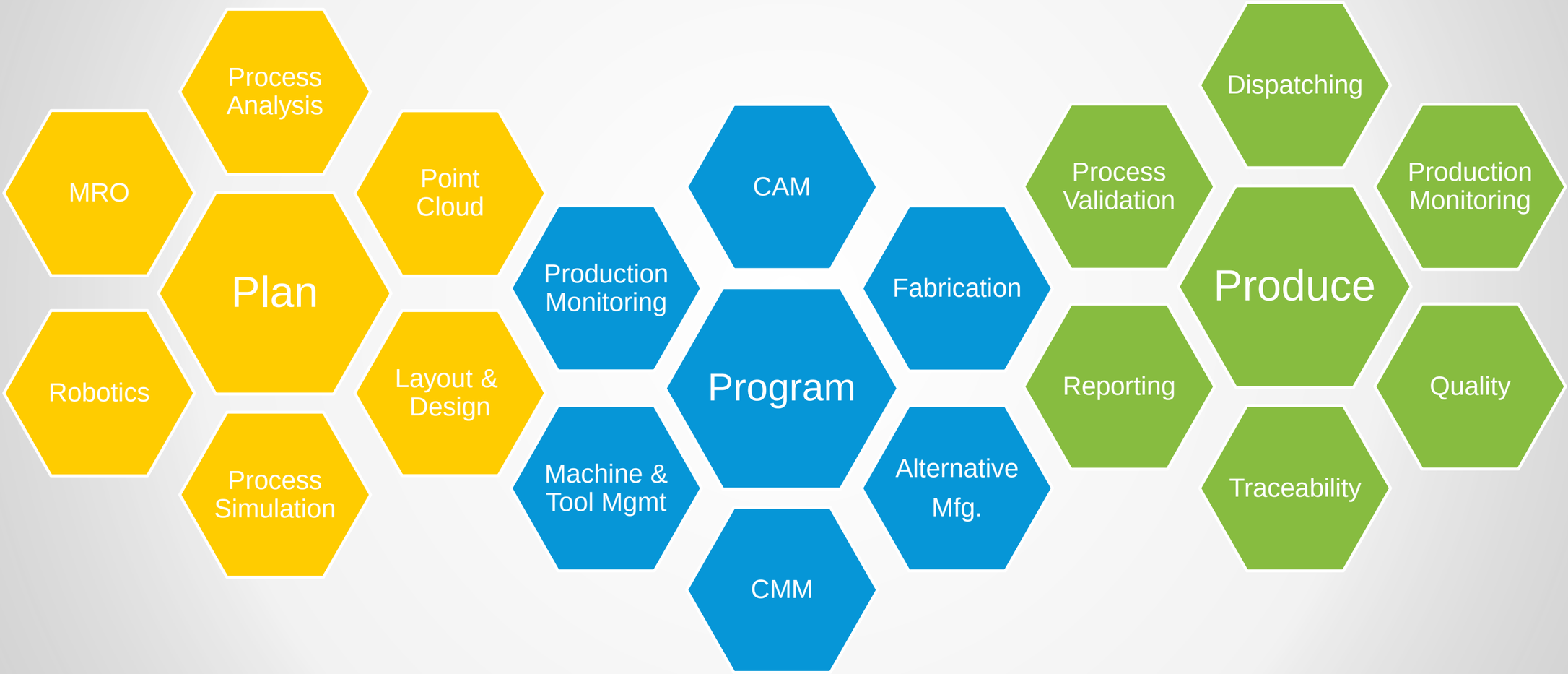

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