

Master Series:

Everyday Uses of Process Modeling



Session 1 | © 2020 | www.moresteam.com | 614.602.8190

About Your Instructor Lars Maaseidvaag, PhD Vice President of Product Development

- Leads MoreSteam's product development teams dedicated to data analytics and project management software, eLearning, and training simulations
- Co-curriculum director for Master Black Belt certification program in partnership with The Ohio State University
- Illinois Institute of Technology PhD in Operations Research
- University of Texas in Austin Masters in Operations Research and Industrial Engineering; MBA





The Need for Process Design

For every product or service process that is designed, there are dozens or hundreds of supporting processes.

How many of those are intentionally designed?

How many processes have a mechanism for feedback and continuous improvement?

| C Completion |
|---|
| Cartificate of Conce |
| Certific |
| This certificate is awarded to |
| Ellen Milnes |
| for successfully computer to Process Modeling (The |
| Introduction May 13,2000 Date Reg. Personant free |
| Winn the Hanney Winn M. Harraway, CTO |
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| Quality 7 Plots, |
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Our goal is to introduce you to a technique for process modeling called discrete event simulation.

As product and process offerings becoming increasingly complex and segmented, having a tool to understand the dynamic interactions within a process is critical.



Masters Series Agenda

Week 1

- Introduction to simulation
- Understand the basic components of modeling
- The importance of understanding the impact of interactions in a dynamic process

Week 2

- Push vs Pull models
- Data collection and model validation
- Techniques to model MTBF, MTTR, batching, blocking, assemblies, etc.

Week 3

- Social distancing models
- Your challenges email your process model challenges to modeling@moresteam.com

HOMEWORK

OBJECTIVES

eLearning course, Kathy's Best Wursts case study, build models from the webinar Build the Drury Lane Muffin Company model from the webinar, complete the eLearning quiz



Remember the old days...



https://ohiostatebuckeyes.com/amt-media/202235

https://upload.wikimedia.org/wikipedia/comm ons/thumb/3/37/RAZR_V3i_opened.JPG/220p x-RAZR_V3i_opened.JPG

https://corporate.ford.com/content/dam/corporate/en/company/history/1908 _Ford_Model_T_Runabout.jpg





Select Your Model:



Select Your Color:





Versus...

2020 F-150 $(\boldsymbol{\boldsymbol{\langle}})$

Change Vehicle



How Many F150 Combinations?

How Many Different Ways Are There To Build a Ford F-150? Would You Believe 2 Billion?

Written by Tom Appel in Ford, Honda, Industry News, Pickup Trucks

0 Comments



https://blog.consumerguide.com/how-many-different-ways-are-there-to-build-an-f-150-would-you-believe-2-billion/



Takt Time Analysis – Model T Style





Expected Lead Time

4.6 minutes



Takt Time

60 seconds

Takt Time Analysis – With A Little Variation



| Task min: | 40 | 39 | 50 | 45 | 50 |
|------------|-----|-----|-----|-----|-----|
| Task mode: | 47 | 46 | 55 | 55 | 58 |
| Task max: | 62 | 59 | 75 | 75 | 66 |
| Mean: | 50 | 48 | 60 | 58 | 58 |
| Std.Dev: | 4.6 | 4.1 | 5.4 | 6.2 | 6.2 |



What about interactions?

Capability to meet customer needs?

Lead Time?





Takt Time Analysis – Complexity Creeps...



Task Mean 📕 95% Tail 🗖 Takt

At the mean this process looks like it should be okay, but is it?

Dynamic modeling can predict the performance of this process.

| Item A | 60% | Та | 100 | |
|--------|-----|-------------|------|---------|
| Min | Max | Mode | Mean | Std Dev |
| 40 | 47 | 62 | 50 | 4.6 |
| 39 | 46 | 59 | 48 | 4.1 |
| 75 | 100 | 125 | 100 | 10.2 |
| - | - | - | - | - |
| 45 | 55 | 75 | 58 | 6.2 |
| 50 | 58 | 66 | 58 | 3.3 |
| | | | | |
| Item B | 40% | Takt Time = | | 150 |
| Min | Max | Mode | Mean | Std Dev |
| 40 | 47 | 62 | 50 | 4.6 |
| 50 | 75 | 100 | 75 | 10.2 |
| - | - | - | - | - |
| 200 | 225 | 275 | 233 | 15.6 |
| 25 | 30 | 45 | 33 | 4.2 |
| FO | го | | го | 2.2 |



Discrete Event Simulation – Inputs and Outputs



OBSERVE YOUR:

- Queue time and variation
- Utilization
- Cycle Time
- Lead Time
- Throughput
- Blocking and bottlenecks

Processes are dynamic, and the events within those processes are all interconnected. Increasing complexity of service and product offerings demand dynamic tools to help us:

- Meet customer expectations by...
- The proper application of resources



Modeling with Process Playground



Time to build some models





Homework and More

HOMEWORK:

- Follow the instructions in your enrollment email to access the "Introduction to Process Modeling" course.
 - Don't see the email in your inbox? Check your spam folder.
- Complete the lessons, including the "Kathy's Best Wursts" case study.
- Answer the quiz questions based on the case study and the models built in Session 1.

Today's slides & recording will be available at: https://www.moresteam.com/webcasts/processmodeling-master-series.cfm

Questions about course content or the Process Playground modeling tool? Contact <u>modeling@moresteam.com</u>

For more information about MoreSteam's products & services: Contact Kathy Miller at <u>kmiller@moresteam.com</u>



COMING UP IN SESSION 2: Complex processes including staff planning, batching, and kitting.