

# Use Simulation When...

- There are nonlinear relationships between variables
- The variables are stochastic leading to a dynamic system
- Needing to analyze different scenarios
- Concerned about complex systems and the behavior of the system
- Making long-term or medium-term decisions

# Examples of Questions Answered by Simulation

- Does it make sense (e.g., cost, labor hours, efficiency) to expand or contract the current intermodal system?
- How will the system respond to a change of conditions, e.g., throughput increase of 30%, rail congestion increases, or global market slowdown in year 20XX?
- What do inventory volumes (containers, widgets, materials) look like over time?
- How do different container storage assignment policies affect the supply chain?

# When not to use Simulation...

- Needing to find high-quality and exact solutions
- Having static and fairly robust variables
- Concerned about simplified systems where the behavior is known
- Making short-term decisions
- Simple heuristics can be used to make decisions

# Benefits of Simulation...

- Improves decision making
  - Better insight into system design
  - Understanding of supply chain reliability
  - Effects of changing events
- Adds the element of “randomness” to models
- Understanding of systems and situations too complex for the human brain to comprehend
- More flexible than mathematical models

# Weaknesses of Simulation...

- Only as good as the question needing to be answered and the design of the model.
- Always possibility of having an real world outlier occur
- Costly to design models and analyze data
- Not a “one size fits all” tool, i.e., the model answers only the question it was designed for