

Supply Chain Resilience Evaluation And Mitigation



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Plan for the Session

- Background on Resilience
- Overview of the SCREAM Game
- Teams use tool to simulate, test policies
- Teams choose & submit final policy choice

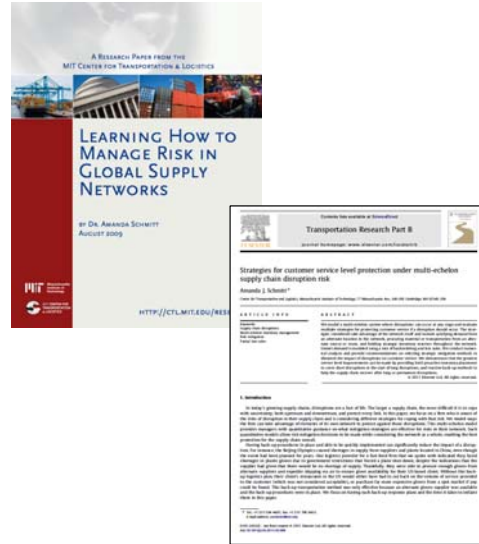
- Submit policy choices via Google Document
 - Link via Gateway Page
 - <http://tinyurl.com/ShellScream>

- Tomorrow we will start with a results review and debrief



Supply Chain Risk Evaluation and Mitigation Game

- Developed at MIT CTL
- Based on MIT research project in 2009 with a CPG manufacturing company
- Many contributors....
 - Dr. Mahender Singh, Dr. Amanda Schmitt, Dr. Yukun Liu, Dr. Shardul Phadnis (2.0), Dr. Josue Velazquez, Andre Snoek (2016)

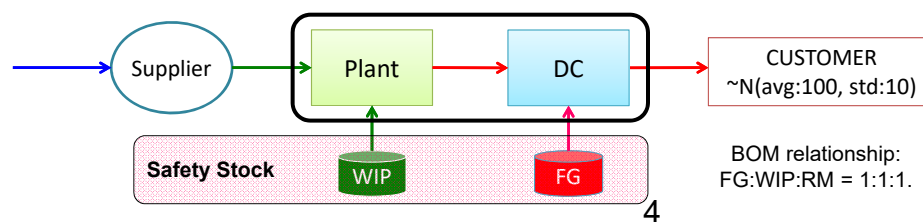


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Widget Supply Chain Overview

- Each team runs its own Widget supply chain which consists of:
 - Supplier: Receives raw material (**RM**) and converts into work-in-process (**WIP**)
 - Plant – Converts the **WIP** into finished goods (**FG**)
 - Distribution Center – Stores the **FG** for delivery to customers
- You have control over the Plant and the DC, but not the supplier
- The demand for finished goods are random and variable ~ 100 units/week ± 10 .
- The inventory policies at each facility are already established at the DC and Plant, and are very conservative.



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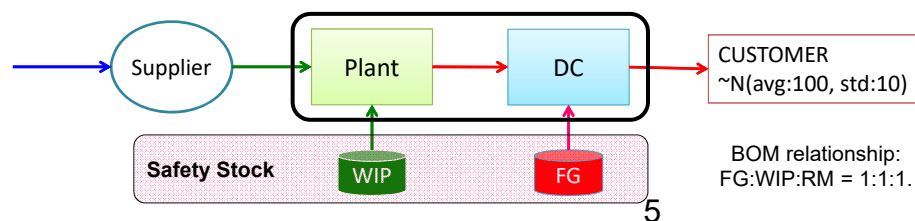


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Widget Supply Chain Overview

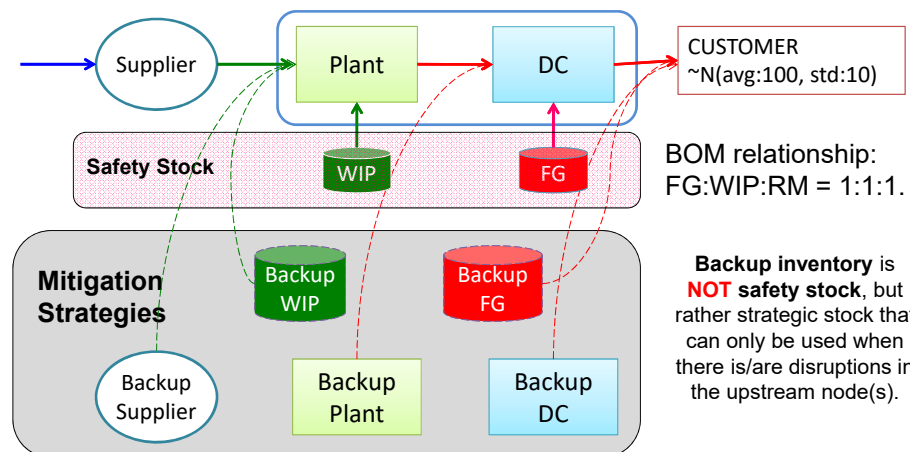
- How does a supply chain handle “normal” volatility?
 - Demand & Lead time variability => Safety Stock
- What if the supply chain is severely disrupted?
 - Supplier Disruption
 - Manufacturing Disruption
 - Distribution Disruption



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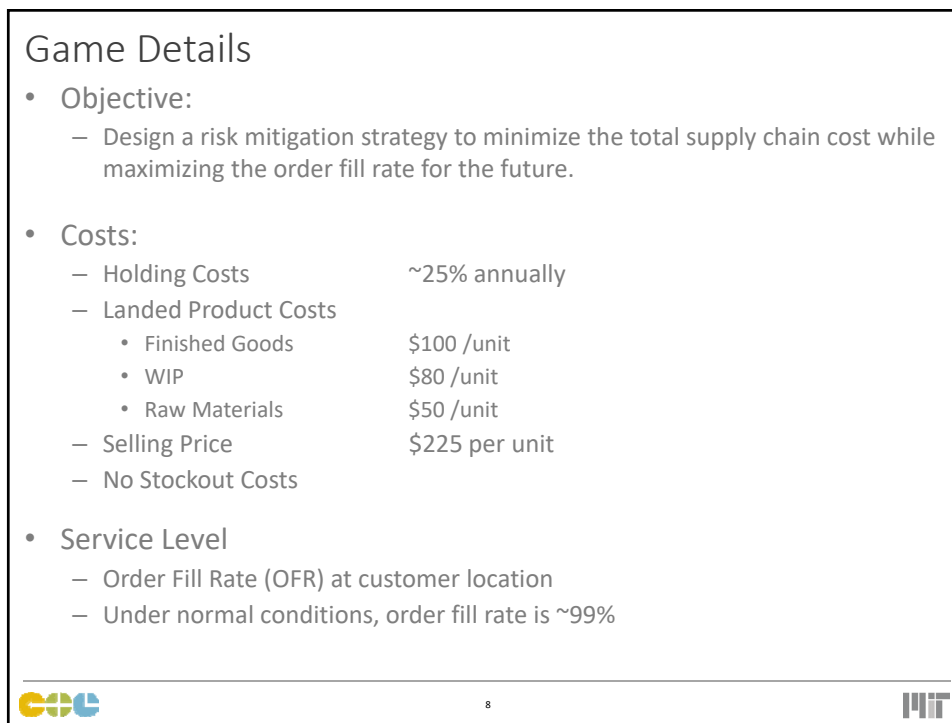
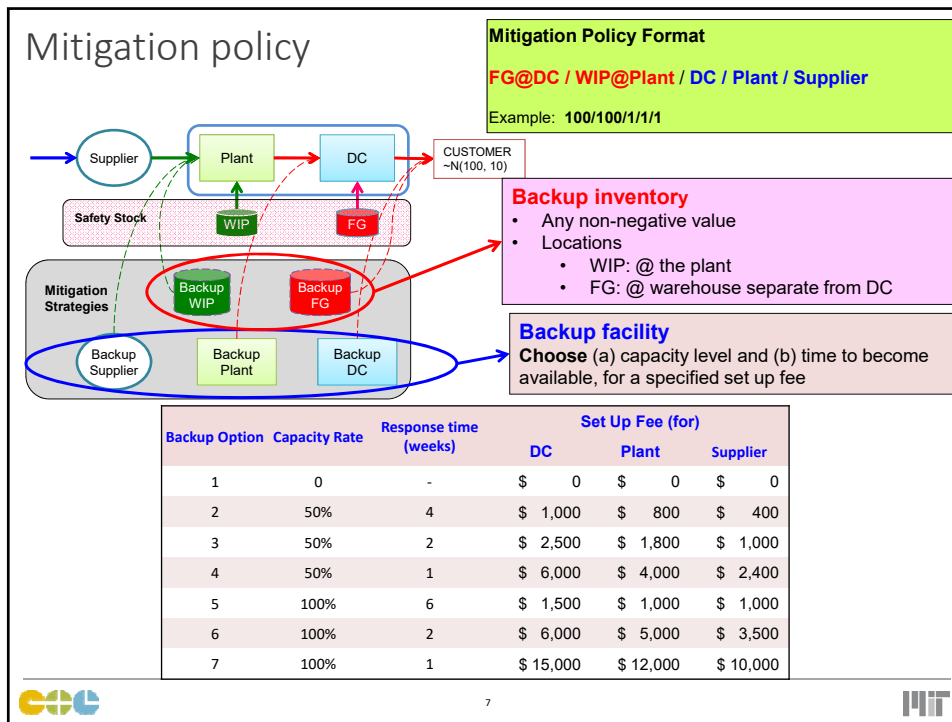


Supply Chain Disruption Mitigation Strategies



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SCREAM Simulation Model

Learning Worksheet

In this sheet, you can test the effect of a mitigation policy for a given disruption scenario.
For convenience, it allows you to specify two disruption scenarios (S1 and S2) and test the effects of two policies (P1 and P2).
Please refer to the worksheet for more details on the simulation model.

Run simulation

Scenario Descriptions

Disruption	Start	Duration	Normal	Disrupted
DC	1	10	100	0
Plant	1	10	100	0
Supplier	1	10	100	0

Policies

Policy	Inventory	Service	Options	Cost
P1	100	100	100	100
P2	100	100	100	100

Results

SCREAM Simulation Model Details

- Users can define up to 2 disruption scenarios
 - Only enter in yellow cells
 - Define a Start and Duration of the disruption for each facility.
- Users can define up to 2 mitigation policies
 - Only enter in yellow cells
 - Enter 5 digit policy code
- Run Scenario
 - Press the “Run simulation” button
 - Run should take under 5 seconds
 - Scenario 1 runs against Policy 1, & Scenario 2 runs against Policy 2
- Review Results
 - Summary results (numeric and charts) on cover sheet
 - Scenario details on other tabs (S1 and S2)
 - Use this to compare policies or how different scenarios impact the same policy

Learn Using the Simulation Tool

- **Work in 2-Person Teams**
- **Open up your SCREAM spreadsheet**
 - Download the file SCREAM2_Student_v6.xlsm
 - Make sure you allow/enable Macros
- **Two ways to Use the Simulation**
 - Use the same policy and run it against two different scenarios
 - Test two different policies and run it against the same scenario



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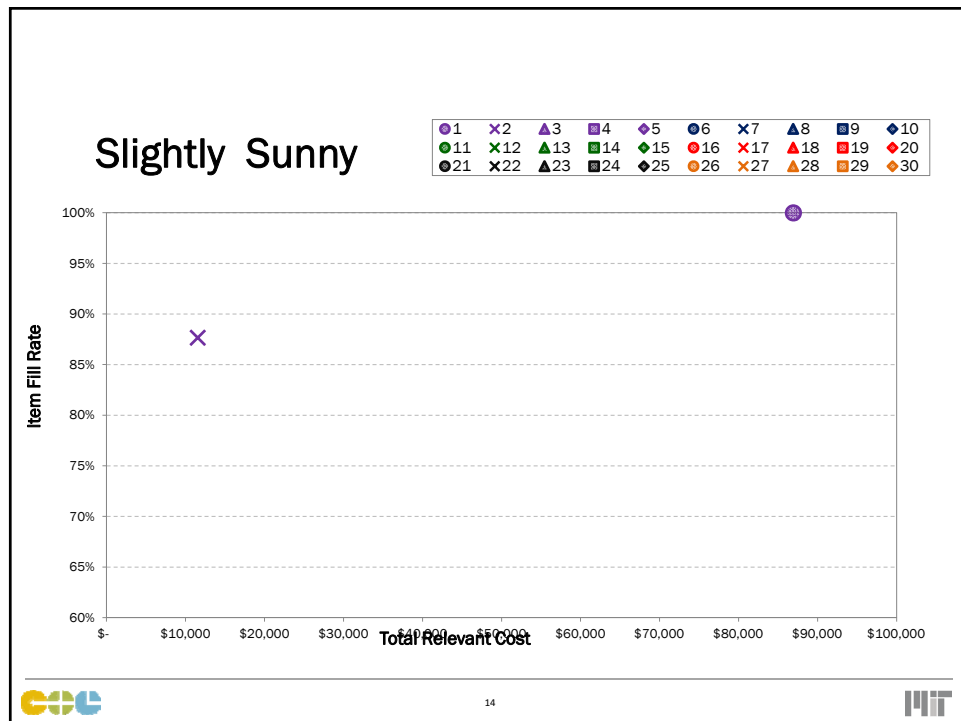
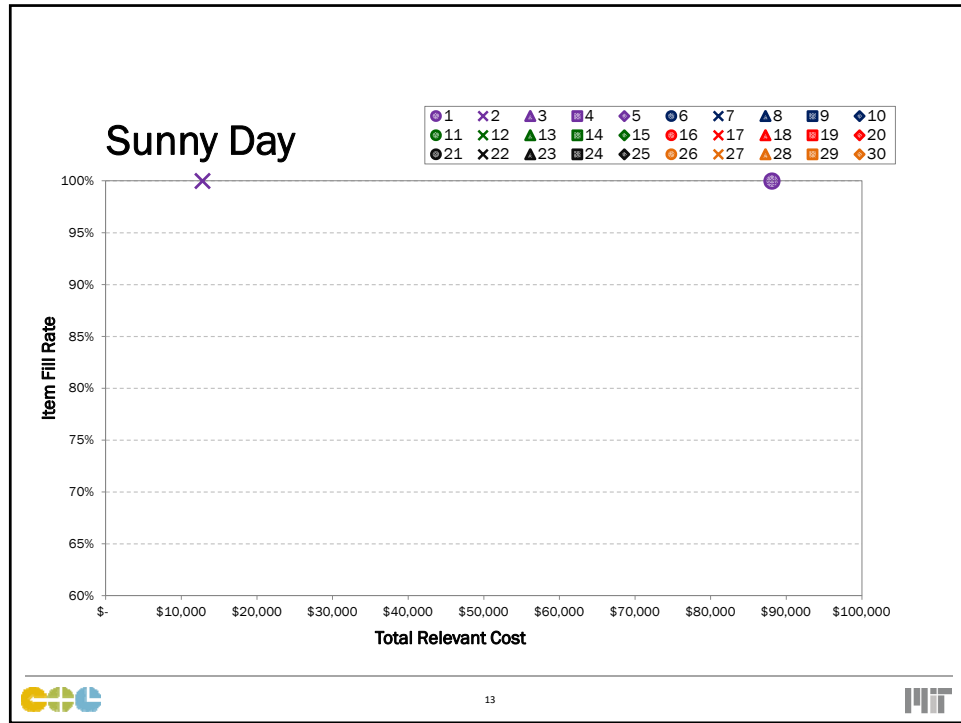
What the Results Look Like – 2 Policy Choices

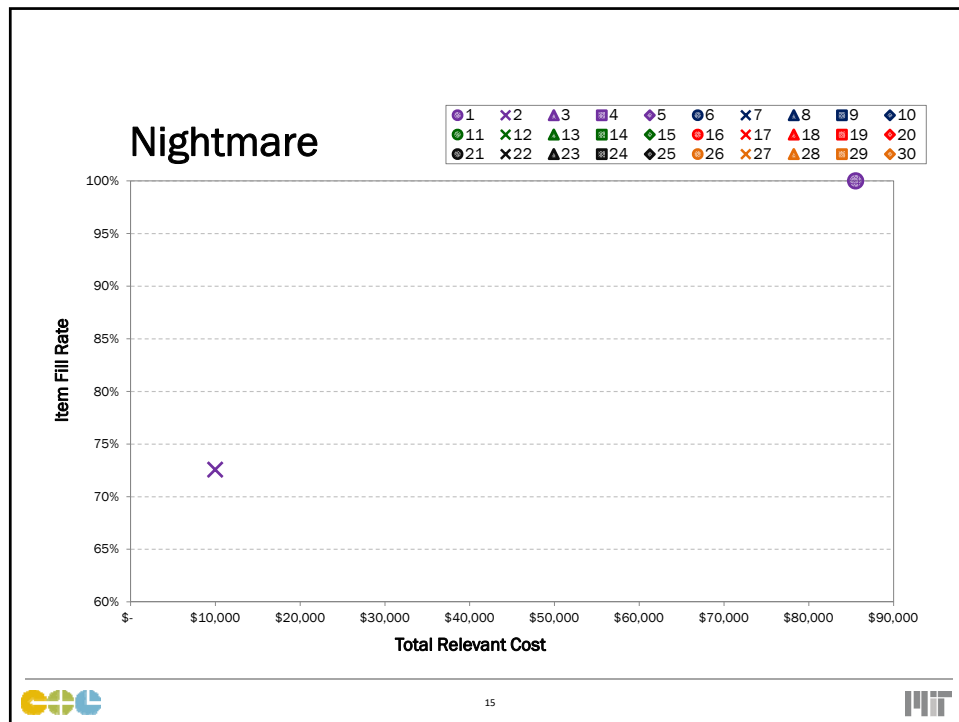
Team	Inventory		Capacity		
	FGI	WIP	DC	Plant	Sup
1	1000	1000	7	7	7
2	100	100	2	2	2



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Some Questions To Consider....

- How much is a stockout worth?
- Is speed of response more important than capacity coverage, or the other way around?
- When is it worth putting a policy in place?
- Is it important to have a uniform policy across the facilities?
- Is it better to place a full strength policy at one facility and partial at others? If so, which?
- Under what conditions is it better to use Strategic Stock versus Facility Backup plans?
- Which strategies seem to work best?