Lean Manufacturing Implementation

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Project Description

- Cedarapids is switching from a tier 1 production to a tier 2 production
- Opportunities exist to design new system using lean manufacturing principles
- Focusing on two cells that are able to perform identical tasks

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Project Goals

- Document current system
- Determine the system capability in current form
- Identify non-value added activities
- Re-assign assemblies to obtain most efficient production assignment
- Create lean environment using the concepts of just in time and kanban

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Current Inventory Methods

- Uses an outdated MRP system to create orders based on forecast demand
- Order batches to large due to price discrimination
- Very little inventory control or accuracy
- Large amount of excess inventory on hand

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Capacity Balancing

- Re-assign assemblies based on the new cell layout using capacity balancing and Lindo
- Results:
  - Cell 1: 552 front, idler, 452 front, bogie
  - Cell 2: rear drive, 400 track, 500 track
- Establishes locations for kanban indicators

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Model Formulation

- Capacity balancing for two cells
- min Σ Σ C_{ij} x_{ij}
- $i \in I$ $j \in J$
- st Σ $x_{ij} = 1$ $i \in I$
- $j \in J$
- Σ T_{ij} $x_{ij} = 1$ $j \in J$
- $i \in I$
- $x_{ij} = 0, 1$ $i \in I$, $j \in J$

C_{ij} =	1	2
1	6	10.5
2	10	11
3	9	8
4	12.5	11
5	7	8
6	7.5	9

T_{ij} =	1	2
1	4	6
2	6	7
3	5	4
4	7	5
5	4	3
6	4	3.5

B_j =	18	15.5

- i = set of batches of parts to be processed
- j = set of cells
- T_{ij} = time of processing batch i of parts in cell j
- C_{ij} = cost of processing batch i in cell j
- b_j = processing time available in cell j (capacity of cell j)
- 1 if batch i is processed on machine j, $j \in J0$ otherwisex_{ij} = {

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