

Supply Chain

Best Practices

September 21, 2006

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Outline

- Pre-Production Planning/Design
- Sales Forecasting/Production Planning
- Production Scheduling/Parts Ordering
 - Heijunka Concept
- Inbound Logistics
- Distribution
- Key Variation Metrics

Pre-Production Planning/Design

- **Product Design**
 - Common components across product lines – minimize number of unique components
 - Standard components for a product line – limit the components that vary with optional features
- **Package Design**
 - Returnable containers/standardized/stackable – ensure inbound logistics is optimized
 - Space efficiency - avoid shipping air (i.e. L shape part)
- **Plant Design**
 - Multiple lines/multiple products – Increase plant flexibility to react to changing demand and maintain stable operation
 - Multiple source products - Increase flexibility to react to changing demand
- **Parts Sourcing**
 - Multiple source - reduce risk of supplier production issues
 - Location – consider lead-time and impact on inbound logistics

Sales Forecasting/Production Planning

- **Annual Planning** (1-3 Years)
 - Sales Forecasting
 - Product volume/mix by geographic area
 - Marketing strategy/risk management
 - Profit maximization
 - Production Planning
 - Operational plan based on sales forecast and plant capacity
 - Supplier capacity analysis – ensure flexibility to respond to change
- **Monthly Planning** (1-3 months)
 - Sales Forecasting/Order
 - Volume by individual product configuration by month
 - Geographical area allocation of production
 - Production Planning
 - Heijunka – smooth product volume/mix by week/day/hour
 - Operational plan based on level production including workforce at 8.5 hrs/day
 - Schedule additional daily OT plus Saturdays to meet peak demand

Production Scheduling/Parts Ordering

- **Production Scheduling**

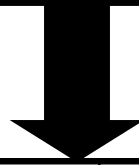
- Control Change
 - Fix daily volume at monthly timing
 - Allow limited mix change i.e. 10%
- Scheduling
 - Heijunka – to smooth out production
 - Sequenced – to minimize production spikes

- **Parts Ordering**

- Frequency
 - Rolling 13 week forecast updated weekly
 - Daily parts calculation and order based on production sequence
- Lead-time
 - Based on each suppliers lead-time from supplier location to line side installation point
 - Automatic adjustment in order release based on actual plant operation rate

Heijunka Concept

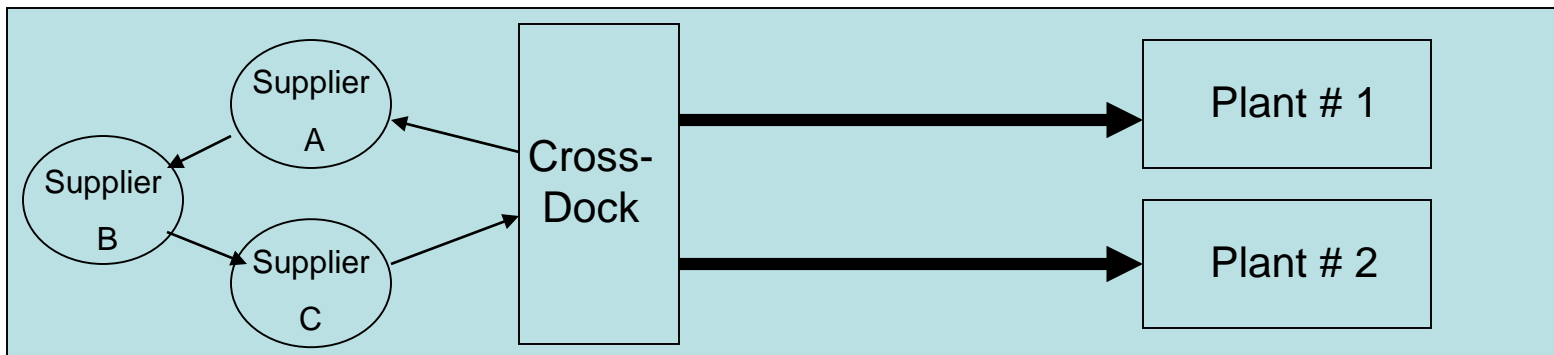
Demand					
Color	Week 1	Week 2	Week 3	Week 4	Total
Red	80	10	10	10	110
Green	10	30	60	20	120
Blue	10	60	30	70	170
Total	100	100	100	100	400



Heijunka					
Color	Week 1	Week 2	Week 3	Week 4	Total
Red	28	27	28	27	110
Green	40	40	40	40	120
Blue	42	43	42	43	170
Total	100	100	100	100	400

Inbound Logistics

- **Network Structure**
 - Milk routes by area
 - Cross Docks
- **Route Planning**
 - 3rd party partner for inbound logistics
 - Monthly route planning to optimize routes/costs
- Small lots/high frequency shipments



Distribution

- **Mode of transport based on distance**
 - Ship
 - Rail
 - Truck

- **Synchronize with Production**
 - Share production schedule by destination with transportation partners
 - Batch production for selected destinations to meet low frequency departure schedules
 - Performance metrics for on-time delivery and damage

Key Variation Metrics - Objectives

- Day-to-day Fluctuations – 10%
- Month-to-month – 20%
- 3 month forecast – 40%

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