AnyLogic Conference

ERP Emulator to Conduct Supply Chain Diagnostics
Agenda

- Who is MOSIMTEC
- What is ERP?
- What is MRP & MRPII?
- Shortcomings of ERP
- Shortcomings of Planning & Assessing
- Significance of ERP Emulator
- Architecture & Constructs
- Application
- Other Use Cases
Headquarters in Washington, D.C.
Focus on modeling, simulation & data management
Provide data analytics and visualization, consulting, advisory services, software sales, support & training
Extensive experience in multiple industries
Industry partner of Virginia Modeling, Analysis and Simulation Center (VMASC)

Helping industry to make informed decisions by applying Modeling and Simulation Technology
What is ERP?

E-commerce
CRM
Sales & Marketing

Customer

Supply Chain

Admin, Finance, Accounting

Production

Human Resource
Financial Resource
Business Intelligence

Management
Maintenance
Project Management

Transactions

Logistics
Inventory

(Layout derived from ERP prezi by Rania Hamdy)
What is MRP & MRPII?

Input
- Customer Orders
- Sales Forecast
- Master Production Schedule
- BoM
- Inventory Control

Material Requirements Planning

Output
- Work Orders
- Reports
- Material Plan
- Purchase Orders

\[ f(x) = ? \]

- Economic Order Quantity
- Dynamic Lot-Sizing
- Silver-Medal Heuristic
- Least-Unit-Cost Heuristic
- ...

MOSIMTEC™
ERP & MRP Shortcomings

- Assumption of unlimited capacity of resources
- Non-stochastic
  - Fixed Lead-time
  - Fixed Routing – alternative routings during unplanned events
- Overall inflexible because it is designed as for transactional bookkeeping purposes, not dynamic planning
How ERP is Used for Planning

- Master Planning
  - Silo’d preparation
  - Different goals
  - Level of detail

- Integrated Planning

- Detailed Planning
Shortcomings of ERP Planning

1. Product lines
2. Unstable process
3. Changes in learnings

Variability
Simulation as an ERP Emulator

Better decisions.
What-if scenarios.
Systems view.
Risk mitigation tool.
Counter-intuitive effects.

why?

Information is Money

* The “Digital Twin” identified as one of Gartner’s Top 10 Strategic Technologies for 2017
But only if it’s “Fit for Purpose”

ASK THE RIGHT QUESTIONS
Customer Specific Application

- Rebalancing of the production locations
- Service Level Agreements validation
- Testing staffing levels
- Learning curves and productivity levels
- MRP reorder algorithms
ERP/MRP Emulator Constructs

Inputs
- Parameters
- Logic
- Data

Processing Times
- Safety Stock Logic
- Transport Costs
- Supplier Lead Times
- Buffer Sizes
- Quality Settings
- Routing Logic
- Equipment Downtime
- Demand
- Lot Sizing Quantity
- Lot Sizing Rules
- Product Types
- Conveyor Speeds
- Safety Lead Time

Statistics
- Throughput
- Capacity
- Utilization
- (Derivatives)

Outputs
- Financials
- Revenue
- Costs

Investment
- Net Income
- NPV
- ROI
- IRR

MOSIMTEC™
Why AnyLogic?

- Instantiate Locations
- User Defined Interface
- Instantiate Parts & BoM
- Instantiate Statistics
- Select Optimization Or Heuristic
- Instantiate Production
Use Case Possibilities

- **Strategic Planning & Analysis (2 to 5 years)**
  - Capacity Planning
  - Risk Mitigation
  - Business Continuity Planning

- **Tactical (6 to 24 months)**
  - Demand fluctuations
  - Supplier Material shortages
  - Departmental Alignment – “Getting all to communicate and have better understanding of decisions”

- **Operational (1 to 12 weeks)**
  - Resource planning: personnel, equipment, vehicles
  - Finished Products Delivered Late (FPDL)
  - Daily production planning covering 2 to 5 weeks of activity
Possibilities of Industry 4.0

Framework for Determining Production Lead Time

Simulation Software
- Lead Time
- Parameters

ERP Software

Fixed Data
- Work Centers
- Routing Data
- Setup Times
- Process Times
- Fixed Capacities

Dynamic Data
- Shift Schedules
- Preventive Maintenance
- Labor Capacity