Empire Production Planning System Proposal

# Overview

Empire’s supply chain has a number of connected systems that are intended to meet the following challenges:

* Ensure timely customer deliveries
* Maximize inventory turns
* Minimize overtime, production fluctuations, and other disruptions to the workforce
* Avoid material obsolescence
* Keep expedited freight costs to a minimum
* Recover from disruptions that may occur anywhere along the way

Beyond a system that correctly models the “normal” flow of inventory production, Empire’s employees require systems that anticipate and are responsive to disruptions. In this context, anticipation means providing visibility and early warning mechanisms, while responsiveness means providing the flexibility to fine-tune planning as conditions evolve.

There are a few fundamental areas of unmet challenges in the current production planning system:

* Highly manual and inefficient
* Critical information blind-spots
* Unaligned objectives / Uneven enforcement of constraints

The current system(s) were pieced together over many years and were designed around specific tasks following a static weekly schedule and are loosely coupled by bulk exports and imports. The individual pieces of the system were developed independently and bare some hallmarks of the lack of a full perspective. Examples of this include things like:

* Lack of visibility of available inventory when making a recovery plan
* Inconsistent/unclear definitions of key parameters (i.e. EOP)
* Offline mechanisms for cross-cutting concerns (i.e. Critical Part List)

The end result is a system that requires massive efforts from quite a few highly trained individuals working in coordination with each other, often through offline means. By taking a more comprehensive look at the list of challenges presented above, we will seek to build a more robust system that improves efficiency, more clearly identifies issues, and better aligns objectives across the organization.

# Production Planning – Rev1, Rev2, Rev3…

The weekly planning process begins on Wednesdays and concludes on Mondays. Roughly speaking, this process is designed around the production week in Honduras and the container shipping schedule from Honduras to U.S. warehouses (EEI, EEA, EEP). The weekly plan goes through several revisions throughout the week as it is refined by various teams in response to specific conditions:

* Rev 1 (Troy Planning) – Wednesday – planning from the following week’s production out to the end of the planning horizon. From the EEH perspective, this is the Rev1 Production Requirement.
* Rev 2 (Production Control) – Friday – adjustments to Rev1 made in EEH; used to run ARS.
* Rev 3 (Production / Production Control) – Monday – adjustments to Rev2 based on Saturday container; serves as baseline for following week’s Rev1.

The first goal is to put all three revisions of the production plan revisions online with the supporting information needed to make decisions and provide collaboration tools (user comments) that support planning evolution.

# Rev1 Planning

## Current:

Troy Planners work in an offline (manually refreshed) system, starting with a schedule that reflects the prior week’s Rev3 plan. Parts are reviewed one at a time and modifications to the EEH POs are made as needed within a limited set of constraints in according to customer release fluctuations and inventory (quality)/production issues. A manual process is used to update the POs, export them, and send them to EEH for processing.

## Proposed Enhancements:

Provide an online system that is provides “live” data.

Schedule according to base part and customer ECN (i.e., not internal ECNs). Push rev-level determination to EEH.

Provide a part list that automatically flags parts with warnings pertaining to Rev1 planning. Possibly require acknowledgement of warnings to dismiss or similar work-flow. The full list of warnings and their criticality TBD, but examples include:

* Past due requirement
* Qty exceeds line capacity (line capacity lowered in EEH)
* New part SOP
* Planning after EOP
* Projected shortage
* Excess inventory
* Pending closeout
* Etc.

Provide forecast model(s) that extends requirements beyond end of customer orders. Options include:

* CSM
* Past averages (i.e. rolling 6 mo. avg.)
* Etc.

Provide popups that allow reference to the following information:

* Customer release fluctuations
* BOM
* Where used
* Part information
* Customer information
* Journal (of notes by schedulers, production control, etc.)
* Maximum buildable qty (raw material availability) by date
* Etc.

Enable simultaneous scheduling of related parts (program, production line)

Enforce additional constraints for and build request/approval for violations:

* Maximum buildable qty (raw material availability)
* Capacity of line across multiple finished goods
* Maximum % increase / decrease week over week
* 4-week requirement for shutdown
* Line restart ramp-up
* Failure to plan to required horizon (based on longest lead-time raw material)
* Etc.

Automatically load completed schedule into Rev1 in EEH.

Provide email alerts / reporting for various scenarios:

* Constraint violations that require authorization
* Completion of planning activity
* Summary of planning

Provide email function that allows a scheduler to email a page-link to an internal user for additional discussion, recovery plan, etc.

# Rev2 Planning

## Current:

Combination offline/online system for reviewing Rev1 POs from EEI schedulers. Several of the checks required are due to the manual nature of the current system of exporting data (i.e. identifying double dates) as well as failure to implement key constraints. Offline reports, emails, phone calls required for resolution with schedulers.

## Enhancement:

Provide a “warning list” using criteria that currently being enforced, including:

* Past due dates
* Shutdown week schedule
* Release fluctuation
* Parts without BOMs
* Production capacity violations
* Etc.

Put the SOP and Production Restart Tracking Sheet online, either as an uploaded document or by capturing the necessary fields in a form.

Provide email alert / reporting for various departments, such as:

* Over capacity lines to Materials Managers
* Release comparison to Cindy / Janssen / German
* Parts without BOM to APQP

# Rev3

## Current:

Production issues resulting in short shipments may force last-minute changes to the Rev2 production schedule. These are recorded and output as the Rev3 schedule. The Rev3 schedule is exported and emailed to EEI Schedulers where it is used during their Rev1 planning (manually).

## Enhancement:

Record changes that occur between Rev2 and Rev3 with notes for viewing in the Rev1 Planning (see above).

# Recovery Planning

## Current:

Recovery plans are currently handled offline by exporting a part’s Rev1 planning (Excel) and email.

## Enhancements:

Allow recovery plans to be created online with version tracking of scheduled quantities and comments.

Allow a recovery plan to be selected and used to update a Rev1, Rev2, or Rev3 plan.

# End-To-End Inventory Visibility

Utilize online and real-time NetOut calculations to provide visibility of inventory disposition, including:

* Constraints on inventory shared across multiple finished goods
* Maximum build quantity according to current on hand as well as in-transit and scheduled deliveries, while accounting for container schedules (i.e. North-South containers with raw materials)
* Build-out / obsolescence quantity

# Automated Scheduling

Define business rules and a scheduling engine that enables a system generated schedule to be introduced as the first step of the scheduling process during EEI Planning for Rev1. Set of rules TBD.