

# Production Flow Management



GALION Automotive supports in their entirety the operational manufacturing processes of the production chain of suppliers.

Galion Automotive is differentiated by its very advanced logistic calculation functionality. The production processes are modelled in the system, thus allowing the management of material flow and production activity.

Galion Automotive supports modes of production with manufacturing orders, repetitive schedules or order-less manufacturing.

The software offers the possibility to define the types of cost in order to analyze the value on the entire production process.

## Database repository

### Technical database

#### **Basic tables**

##### *Production schedules*

Schedules are allocated to sites, resources, product logistic files (customers and suppliers), production processes, inter-site transfers and transmission of supplier schedules.

##### *Family and scrap reasons*

Scrap transactions can be associated with scrap reasons in order to facilitate analysis and calculation of the costs of poor quality.

##### *Family and non-productive time causes*

Resource downtime can be entered or imported. Downtime can be allocated to a cause.

#### *Family and reasons for absenteeism*

The attendance time of operators can be monitored.

##### *Timetables*

*Weekly timetable definition*

*Tables of teams*

*Team planning*

*Personnel category tables*

*Operators, Operator absenteeism*

*Analytical centres*

*Family of means*

*Means of production*

*Operations*

*Induced Labour database*

*Absenteeism rates database*

*Types of valuation*

*Cost types (used by the inventory and the production process valuation modules)*

*Cost type decompositions (used for stock valuation and production process valuation)*

*Cost groups (used for production process valuation)*

*Control means*

The management of customer indicators is a functionality provided within sales management.

Internal article indicators can be defined together with their respective effectivity dates.

#### **The Manufacturing Processes**

The manufacturing flow model is represented by a succession of connected manufacturing processes interrupted by flow de-coupling points.

An article can be associated with any number of different processes.

One can specify that if a product "stops" for more than half a day then this constitutes a flow disruption.

## Logistics database

### *External Logistics Contracts*

These provide the parameters to analyze and correct customer demand, allowing the calculation of the ADC (average daily consumption of the customer) and to define the stock objectives associated with the customer schedule.

### *Internal Stock Contracts*

These are time-based by Site/Warehouse/Article and provide the parameters for the calculation of average daily consumption and stock objectives. The time-based effectivity allows the modelling of the evolution of different industrialization phases.

### *Inter-site and Intra-site Flow Contracts*

### *Sourcing definition by date*

For each stocked item, it is possible to define the source of the flow by date. For each article or family of articles, it is therefore possible to define, for any given period, the provenance of material in stock. The source could be multiple warehouses, specific site/warehouses, supplier sites, or manufacturing processes.

## Major Processes

### Management of Flow Data

The parameterization associated with the modelling of the flow involves a partnership of the engineering database (production process) and the logistics database (sourcing).

These two databases enable the construction of a model representing the flow; in effect the "production path"

In order to formulate the production processes, it is necessary to have a good knowledge of the physical flow, the manufactured items, and the components, in addition to the production resources (machines, labor, and tooling).

The development of the processes goes through an initial phase involving the creation of "pre-production" processes, which allow the incorporation of the engineering data modification history. The production

processes are generated from the "pre-production" processes by date of application.

## Production Logistics Plan

### *Internal commercial forecasts*

The system allows the development of internal forecast scenarios (not transmitted by EDI).

It is necessary to define a planning bill of material for the planning items. This can take into account the share of the possible market.

These forecasts are defined as monthly demand, which is exploded into daily demand and taken into account in the derivation of the demand plan.

The consumption of the forecast by actual demand is monitored for each forecast scenario.

### *The production logistics plan*

The production logistics plan represents the global commercial demand, which one uses to drive the calculation of requirements.

The system allows the creation of as many plans as are desired, and each plan can have a different purpose.

The system allows the:

- Calculation of the average daily consumption of customers
- Smoothing and anticipating of demand (e.g. to cover exacting customer requirements)
- Anticipation of demand to cover non-work periods
- Definition of stock objectives to influence the requirements calculation (by customer schedule/ item)
- Comparison of the evolution of demand
- Correction of customer demand beyond a horizon.
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### Requirements Calculation

The requirements calculation applies to the full extent of the flow modelled in the engineering database (production processes) and the logistics database (sourcing).

The system can function at different levels but using the same database. Several calculated plans can co-exist as a result of different analyses.

Several functions are available:

- Requirements calculation (using the MRP calculation principles) with or without automatic calculation of supplier schedules, capacity loads, Average Daily Consumption, with creation of exception messages
- Display of the requirements by article, planner, site and/or warehouse
- Analysis of all items
- Analysis by exception

- Analysis of planned orders that will require release
- Assistance with the release of manufacturing orders (multi article)
- Reports of the requirements calculation results
- Analysis of shortages by manufacturing schedule
- Display of the supplier schedules
- Confirmation of supplier schedules by planner or supplier
- Analysis of planned inter-site transfer orders (by Article): Values calculated in accordance with the definition of the internal flow loops (Kanban or otherwise).

The requirements calculation engine utilises production calendars by process, site, and resource.

### Production Management in Flow Mode

In order to drive production without manufacturing orders or schedules of any kind, the system maintains an engineering database by workstation. A flow decoupling point is defined at each point where production undergoes some interruption in its flow.

This method of production management is best suited to those situations where the process flow time between two flow decoupling points is short. In this situation it is the MRP process itself that drives the flow.

### Management by Manufacturing Schedules

This method entails the management of manufacturing commitments by means of releases within open ("blanket" style) manufacturing orders. Management involves

- Printout of a production monitoring aide
- Visualization of the positioning of the manufacturing releases on the TPS (Tabulated Planning System for required labels)
- Printout of the TPS
- Component availability analysis
- Close-out and purging of manufacturing releases
- Display of the manufacturing release detail.

### Production Management in TPS mode

In TPS mode it is necessary to define a production sequence for each production resource.

The system will organize production by time intervals on the basis that the resource can be relied upon to produce on a permanent basis the totality of the articles demanded of it, allocating the most

homogeneous quantities to the middle of the global cycle.

Labels are produced in the correct order to reflect the sequence of production.

Production monitoring is supported in real time on a "control board" where one may control the sequence of production and manage progress.

Since the production line manufactures all the articles, this method guarantees that all the components will be consumed on the resource.

If component replenishment to the line is managed on the basis of replacing components actually used, it then possible to arrange the stock at the line in the best fashion and so optimize the efficiency of the work station and the location of the operators.

### Management by Manufacturing Orders (MO)

Management by traditional manufacturing order is available as an option. Functions here cover:

- Declaration of production by MO
- Print of Production monitoring aide by article
- Print of Production monitoring aide by work center
- Display of current situation at a work center
- Maintenance of classes of MO
- Monitoring of MO evolution
- Mass release of planned manufacturing orders
- Display of MO history
- Display linking MO to current sales item shortages
- Display of component shortages by MO
- Purging of closed out MO
- Issue of components to MO.

### Sub-contract management

A sub contract supplier is regarded as a remote production site.

All flow management functionality can be applied to the subcontract flow, and the subcontractor can therefore easily be treated as a remote factory.

The system contains the automated functions to allow stock at the subcontractor site to be controlled.

The sub-contractor can be driven in either an open contract (schedule) or a discrete order mode.

### Production Monitoring

Monitoring production activity is an essential part of the monitoring and control of production.

Production monitoring provides a number of standard production indicators (synthetic output

rate, operator output rate, etc) by production work center.

Date input can be organized during the shift, at the end of the shift, by operator, by groups of operators etc.

The system supports entry by operator; declaration of operator clocking on and off; production start, production end; stoppages with reason etc.

The tool supports external input.

### **Production Process Valuation**

The system supports the definition of any number of cost databases, used typically to store multiple versions of standard costs and weighted average prices. In addition cost databases would also support cost simulations.

For each cost database and by production site, it is possible to manage cost increase/decrease by period.

#### ***Basic tables***

Types of valuation

Types of cost

Fixed set-up costs

Variable running costs

Accounting allocations by cost type.

#### ***Associated Functions***

Maintenance and initialization of the cost database

Valuation of production processes

Display and reporting of valuation results

Comparative analyses of valuations

Injection into the cost database from external files.