Best Practice

eXensys – Manufacturing Environment

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Introduction:

The particular type of production system used varies form organization to organization, but all should perform the preceding functions. However, the relative importance of these functions will depend on the type of manufacturing process. Manufacturing processes can be broadly divided into three categories:

1. Flow Manufacturing
2. Intermittent Manufacturing

Flow Manufacturing is concerned with the production of high volume standard products. If the units are discrete (e:g , cars and appliances), the process is usually called repetitive manufacturing, and if the goods are made in a continuous flow (e:g , gasoline), continuous manufacturing**.** There are four major characteristics to flow manufacturing:

1. Routings are fixed, and work centers are arranged according to the routing. The time taken to perform work at one work center is almost the same as at any other work center in the line.
2. Work centers are dedicated to producing a limited range of similar products. Machinery and tooling are especially designed to make the specific products.
3. Material flows from one work center to another using some form of mechanical transfer. There is little buildup in WIP inventory, and throughput times are low.
4. Capacity is fixed by the line

Intermittent Manufacturing is characterized by many variations in product design, process requirements, and order quantities. This kind of manufacturing is characterized by the following:

1. Flow of work through the shop is varied and depends on the design of a particular product. As orders are processed, they will take more time at one work center than at another. Thus, the work flow is not balanced.
2. Machinery and workers must be flexible enough to do the variety of work. Machinery and work centers are usually grouped according to the function they perform (e:g, all lathes in one department)
3. Throughput times are generally long. Scheduling work to arrive just when needed is difficult, the time taken by an order at each work center varies, and work queues before work centers, and causing long delays in processing. WIP inventory is often large.
4. The capacity required depends on the particular mix of products being built and is difficult to predict.

Overview: We will see how it is addressed in eXensys-Manufacturing Solution

Flow Manufacturing

Plant Code	Work Center	Production Rate (Applicability)	Line Balanced	Per Day Capacity (Hrs)
Car Plant	Altis	Yes	Yes	18

Machine Code	Operation Code	Work Center	Activity Element	Routing Type	Operation Sequence	Production Rate (Hrs)
CA1	Chasis Assembly	Altis	AE CA	Rate	1	15
MA1	Main Body Assembly	Altis	AE_MA	Rate	2	15
FA1	Finishing Assembly	Altis	AE FA	Rate	3	15

Setup Time = 30 minutes

BOM Item Code: Car Plant Altis **BOM Size: 15 Nos.**

Operation Code	Input Item Code	Input Qty (Nos)	Output Item Code	Output Qty (Nos)
Chasis Assembly	RM	100	WIP CA	15
Main Body Assembly	WIP_CA	15	WIP_MBA	15
Finishing Assembly	WIP MBA	15	Car Altis	15

POG Code: MFG/0001/0809, PO Qty = 1500, Start Date: 11.09.08, End Date: 16.09.08

End Date Calculation: [(POQty/ProductionRate) + (Setup Time/60)] / Shift Hours

Raw Material Required: 100X100 = 10,000 Nos. of Item Code "RM"

Item Request Code: IRC/0001/0809

Issue Price of "RM": 140000 Rs.

Shop Floor Reporting Code: SFR/0001/0809

Operation Code	Input Item Code	Consumed Qty	UOM	Output Type	Output Item Code	Output Qty	UOM
Chasis Assembly	RM	10000	Nos	Phantom	WIP CA	1500	Nos
Main Body Assembly	WIP_CA	1500	Nos	Phantom	WIP_MBA	1500	Nos
Finishing Assembly	WIP MBA	1500	Nos	Finished Item	Car Altis	1500	Nos

Labor Reporting Code: LR/0001/0809

Labor Reporting

Operation Code	Employee Code	Standard Rate (Rs/Hr)	Time (Minutes)
Chasis Assembly	Ramesh	500	4000
Main Body Assembly	Suresh	400	2000
Finishing Assembly	Ganesh	100	2000

Total Value of labor Cost = 50000/-

Overhead Reporting

Operation Code	Activity Element	Std Rate	Time (Minutes)
Chasis Assembly	AE CA	1	4000
Main Body Assembly	AE_MA	1.2	2000

Finishing Assembly	AE FA	1.5	2000

Total Value of Overhead Cost = 156.67

PO Settlement Code: POS/0001/0809 (Full settlement)

Reference Code	Item Code	UOM	Qty	Unit Rate
SFR/0001/0809	Car Altis	Nos	1500	933366.8

Raw Material Cost	1400000000
Labor Cost	50000
Overhead Cost	156.67
Total Cost	**1400050157**
Unit Rate	Total Cost/Qty

Whenever PO Receipt is approved, inventory will get updated by 1500 Nos.@933366.8

Intermittent Manufacturing

Plant Code	Work Center	Production Rate (Applicability)	Per Day Capacity(Hrs)
White Paint	Mixing	No	18
White Paint	Grinding	No	18
White Paint	Filtering	No	18

Machine Code	Operation Code	Work Center	Activity Element	Routing Type	Operation Sequence	OLT (Minutes)	IOLT (Minutes)
Mixer	Mixing	Mixing	AE_Mix	Normal	1	20	10
Grinder	Grinding	Grinding	AE_Grind	Normal	2	30	15
Filter	Filtering	Filtering	AE_Filter	Normal	3	40	20

In the above e:g for each operation only one machine is used

Recipe Item Code: Off-White Paint

Recipe Type: Percentage Recipe Size=100 Kg

Recipe Routing Ingredient Details

Operation Code	Input Item Code	Input Qty (%)	Output Item Code	Output Qty (%)
Mixing	RM	100	Intermediate_Mix	100
Grinding	Intermediate_Mix	100	Intermediate_Grind	100
Filtering	Intermediate_Grind	100	Off-White Paint	100

POG Code: MFG/0001/0809

PO Qty = 1500 Kg

Start Date: 11.09.08 End Date: 11.09.08

End Date Calculation: [(PO Qty/Recipe Size) * (OLT/60) + IOLT/60]
Shift Hours*No. of Machines

Operation Code	Start Date	End Date
Mixing	11.09.08	11.09.08
Grinding	11.09.08	11.09.08
Filtering	11.09.08	11.09.08

Raw Material Required: 1500 Kg. of Item Code "RM"

Item Request Code: IRC/0001/0809

Issue Price of "RM": 50 Rs.

Shop Floor Reporting

Shop Floor Reporting Code	Operation Code	Input Item	Consumed Qty	UOM	Output Type	Output Item Code
SFR/0002/0809	Mixing	RM	1500	Kg	Intermediate	Intermediate_Mix
SFR/0003/0809	Grinding	Intermediate_Mix	1500	Kg	Intermediate	Intermediate_Grind
SFR/0004/0809	Filtering	Intermediate_Grind	1500	Kg	Final Item	Off-White Paint

Labor Reporting

Shop floor Reporting Code	Labor Reporting Code	Operation Code	Employee Code	Standard Rate Per Hrs	Time (Minutes)
SFR/0002/0809	LR/0001/0809	Mixing	Ramesh	500	400
SFR/0003/0809	LR/0002/0809	Grinding	Suresh	400	500
SFR/0004/0809	LR/0002/0809	Filtering	Ganesh	100	800

Total Value of Labor Cost = 8000/-

Overhead Reporting

Shop floor Reporting Code	Operation Code	Activity Element	Std Rate	Time (Minutes)
SFR/0002/0809	Mixing	AE Mix	1	400
SFR/0003/0809	Grinding	AE_Grind	1.2	500
SFR/0004/0809	Filtering	AE Filter	1.5	800

Total Value of Overhead Cost = 36.67/-

PO Confirmation Code: POC/0001/0809 (Full settlement)

Reference Code	Item Code	UOM	Qty	Unit Rate
SFR/0004/0809	Off-White Paint	**Kg**	1500	**55.36**

Raw Material Cost	75000
Labor Cost	8000
Overhead Cost	36.67
Total Cost	**83036.67**
Unit Rate	55.35778

Whenever PO Receipt is approved, inventory will get updated by 1500 Kg@55.36

Benefits:

1. eXensys Routing management helps in planning of bottleneck resources.
2. eXensys Normal Routing concept provides batch manufacturing firms, the flexible manufacturing system which caters to significant changes because of technological development in work center designs.
3. eXensys helps to match the rate of customer demand and becomes the heartbeat of the production system.
4. eXensys line balancing concept reduces the worker resentment of uneven work loads – can be handled with proper communication and assurance by management.
5. Line balancing helps in improving the efficiency, greater utilization of resources.
6. eXensys helps in improving the performance measures of a work center in a flow line- cycle time and throughput which are influenced considerably by the performance of the prior work center.

Conclusion:

Manufacturing organizations have been subject to dramatic changes with the emergence of low-cost, globally distributed manufacturing bases that need to be tightly integrated to meet competitive requirements. eXensys manufacturing practice has dedicated industry specialists and technology experts who continually track and analyze manufacturing industry trends to deliver quality solutions to clients. Increasing manufacturing flexibility is a key strategy for efficiently improving market responsiveness in the face of uncertain market demand for final products. The manufacturing system consists of multiple plants, of which individual plants have multiple manufacturing lines which are designed to produce limited types of products in accordance with their size, materials, etc. Imbalance in the workload occurs among plants as well as among manufacturing lines due to the fluctuations in market demand for final products, thus resulting in idleness of some manufacturing lines and longer lead time in some manufacturing lines due to the high workload. Three types of manufacturing flexibility are considered because they are interrelated: machine flexibility, routing flexibility and process flexibility. Machine flexibility refers to the various types of operations that a machine can perform without requiring the prohibitive effort of switching from one order to another. Routing flexibility is the capability of processing a given set of part types using more than one line (alternative line) in the plant. Process flexibility results from being able to build different types of final products at the same plant.