Contents

OPERATIONS SCHEDULING

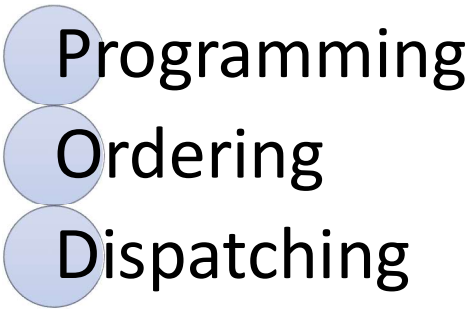
01-July-2019

- Beautiful subject 😍
- Deals with algorithm, heuristic to optimize available resource
- "Time", the key when to start to have great profit
- No. of m/c_s available, product demand, shipment

1 Production control

It is the function of most, which plans, directs and controls the material supply and processing activities of an enterprise, so that specified products are produced by specified methods to meet an approved sales program.

1.1 3 Activities



1.1.1 Programming

Plans the production output of products.

1.1.1.1 Production planning and control

1. Planning phase
2. Action phase
3. Control phase

1.1.1.2 Product design and development

- Forecasting
- Aggregate planning
- Master scheduling
- MRP

1.1.1.3 Aggregate plan

Month	J	F	M	A	M	J	J	A	S	O	N	D
No. of motors	30	45	50	30	…							

1.1.2 Ordering

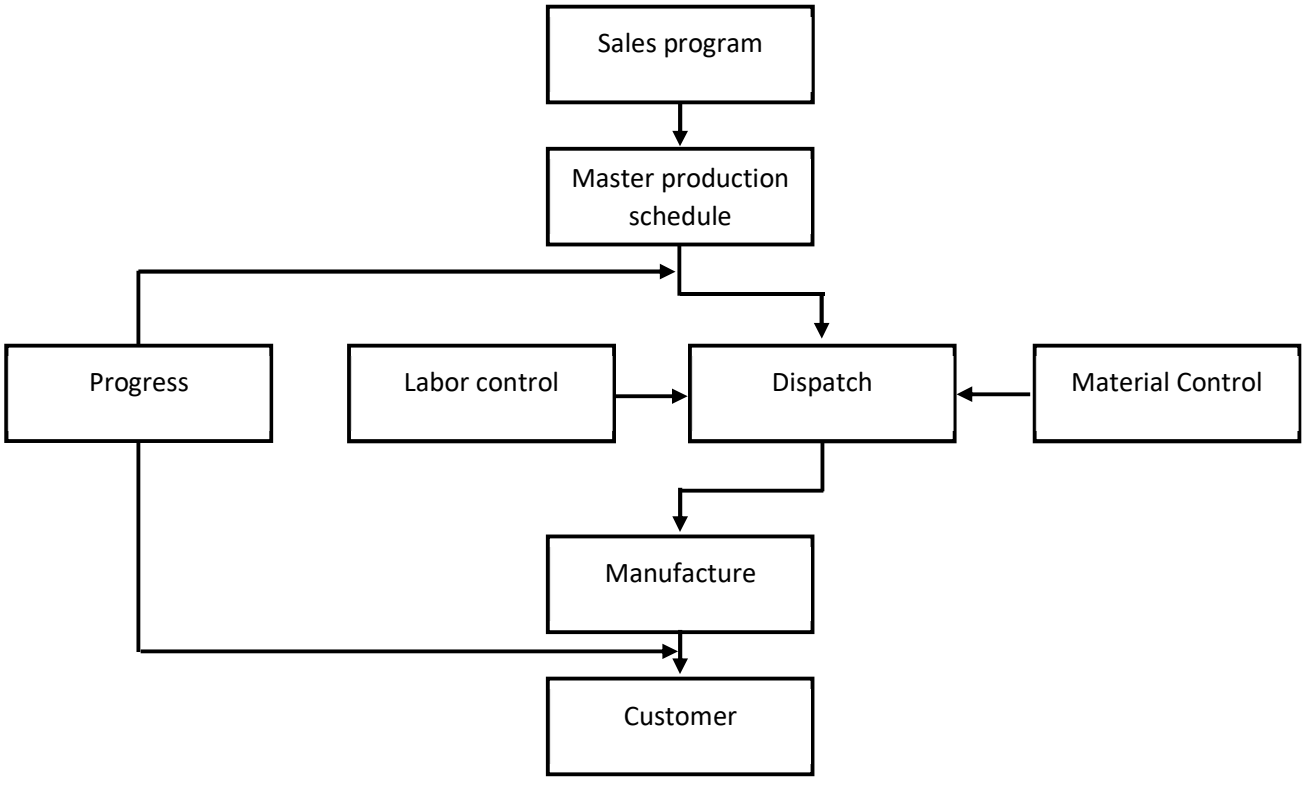
Plans the output of components from the suppliers (& dept) which is necessary to meet the 'program'.

Month	J	F	M	A	M	J	J	A	S	O	N	D
A/c motor 5hp	5	-	…									
20hp motor	10	5										
DC motor 20hp	5	10										
Motors 5hp	10	20										

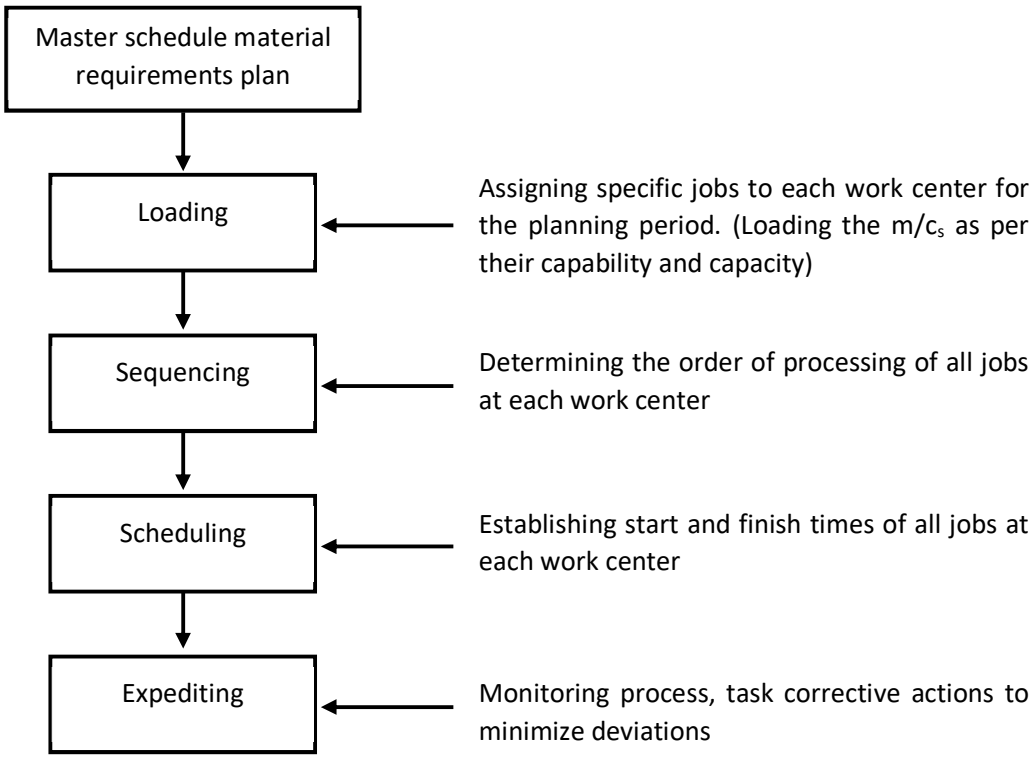
1.1.3 Dispatching

- Consider each department in turn and plans the output form m/c_s and work centers necessary to carry out the orders.
- Detailed production orders are dispatched to the shop specifying what, how and when and where the operations are to be performed.

1.2 Outline of functions of production control



2 Operations scheduling system



2.1 Introduction

- Scheduling – function theory
- Sequencing & scheduling
- The problem
- The constraints
- Systems approach

2.2 Single m/c sequencing

- Assumptions
- Terminology
- Performance measures
- Basic theorems
- Hodgson's algorithm
- Smith's method
- Wilkinson Irwin algorithm

2.3 General purpose methodologies

(for single m/c model)

- Dynamic programing approach
- Branch & bound algorithm

2.4 Extension of the basic model

- Non-simultaneous arrivals
- Problems with department jobs

2.5 Parallel m/c sequencing

Identical processors (Independent jobs)

- Minimizing make span (McNaughton's algorithm)
- Minimizing mean flow time
- Minimizing weighted mean flow time (H_l & H_m heuristics)

Identical process (Dependent jobs)

- Hu's algorithm
- Muntz Loffman algorithm

2.6 Flow shop scheduling

- Johnson's problem
- Extension of Johnson's problem
- CDS algorithm
- Palmer's algorithm
- Mitten's algorithm
- Heuristic approach
    - Ignall Schrage heuristic
    - Dispatch index Heuristic

2.7 Job shop scheduling

- Types of schedules
- Single pass approach (active schedule)
- Non-delay schedule generation
- Priority dispatching rules
- Heuristic schedule generation
- Dynamic job shop
- Open shop scheduling

Heuristic vs algorithm

Heuristic	Analytic
Learns by acting	Learns by analyzing
Uses trial and error	Uses step by step procedure
Values experience	Values quantitative information and models
Relies on common sense	Builds mathematical model
Seeks satisfying solution	Seeks optimal solution