

Production Planning With Reference To Gray Woven Fabric

By

Shahzad Anjum 060820049

Tariq Mehmood 060820087

Imran Jahangir 06820028

University Of Management and Technology

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Abstract:

This research article is related to production planning and control. In this article we study the weak points of production planning and conclude the result after visiting 3 valuable unit of Pakistan. We 3 members visit the units work in shifts and try to conclude the points which planners miss while making the plan or controlling the project. These factors directly have an effect on our production but decrease our value after some time. It is some type of hidden loses of which we miss when we plan to save the cost. At the end of the article we write the points in form of results and discuss them briefly.

CHAPTER # 1	4
PRODUCTION PLANNING AND CONTROL	4
<i>Process characteristics</i>	4
<i>The Screening Step</i>	5
<i>The Mapping Step</i>	5
<i>The Passive Step</i>	6
Plan	6
Collect	6
Analyze and interpret.....	7
Report	7
Factors and responses.....	7
Correlation	7
Causality.....	7
CHAPTER #2	9
TOOLS FOR PPC	9
<i>Tools to plan</i>	9
Gantt chart.....	9
Logic Network	9
PERT Chart.....	9
Product Breakdown Structure (PBS)	10
Work Breakdown Structure (WBS).....	10
<i>Tools to control</i>	10
Fish bone diagram.....	10
Method to use this tool.....	10
Microsoft Excel.....	12
CHAPTER # 3	13
TYPES OF PRODUCTION PLANNING	13
<i>Discrete Manufacturing</i>	14
<i>Repetitive Manufacturing</i>	14
Process Manufacturing	15
Continuous production	15
Discontinuous production.....	15
Regulated production	16
<i>Process manufacturing</i>	16
<i>Kanban</i>	17
Replenishment strategies	18
(WM) Administered storage location.....	18

<i>Engineer-to-Order Production</i>	19
CHAPTER #4	19
FACTORS INVOLVED IN PRODUCTION	19
CHAPTER # 5	20
MACHINE MONITORING.....	20
<i>INTRODUCTION</i>	20
<i>MACHINE MONITORING</i>	21
<i>Support of incentive payment systems</i>	22
<i>Machine settings, and component evaluations</i>	23
<i>Detection of rogue' machines</i>	24
<i>Production control</i>	24
<i>Information for weave-room supervision</i>	25
<i>Information for mill supervision</i>	26
<i>The equipment</i>	27
<i>COMPUTER PRODUCTION MANAGEMENT (CPM)</i>	28
Capabilities of PAS/2 Computer management system.....	29
Fabric specification and disposition	29
For a particular fabric style	29
Machine disposition	29
Spare parts consumption	30
Servicing, support and maintenance plan	30
Production data and order performance record.....	30
CHAPTER # 6	31
OTHER GENERAL FACTORS.....	31
<i>LIGHTING</i>	31
<i>Necessary services</i>	33
<i>Air-Conditioning</i>	35
Latest development in weave-room air-conditioning	36
CHAPTER #7	40
MASTER PRODUCTION PLAN.....	40
<i>Production planning process in a weaving unit</i>	40
Production scheduling	40
<i>Materials planning</i>	40
<i>Master Production Plan</i>	42
1. Prepare cloth specification sheet to know the following points:	42

2.	Check availability of	43
3.	Warping plan:	43
4.	Sizing plan:	43
5.	Drawing in plan.....	43
6.	Weaving plan	44
7.	Plan yarn ordering	44
8.	Yarn received checking	44
9.	Yarn testing.....	44
	<i>Weft contraction</i>	44
	Correct reed finding	44
	<i>Fabric specification sheet</i>	45
	<i>Master production planning of Shafi textiles, Example</i>	47
	Solution for specification sheet.....	48
	<i>Warping plan</i>	51
	<i>Time required in sizing</i>	53
	<i>No of beams required in weaving</i>	53
	<i>Drawing in process</i>	54
	<i>Time required to start 1loom</i>	54
	<i>Weaving plan</i>	55
	<i>Conclusion</i>	57
	Untrained worker.....	57
	Supplier as a partner	57
	Compromise.....	58
	Maintenance	58
	Utilize full capacity	58
	Over time management	58

Production planning and control

Production planning and control entails the acquisition and allocation of limited resources to production activities so as to satisfy customer demand over a specified time horizon. As such, planning and control problems are inherently optimization problems, where the objective is to develop a plan that meets demand at minimum cost or that fills the demand that maximizes profit. Or in other words we can say that production planning and control address decisions on the acquisition, utilization and allocation of production resources to satisfy customer requirements in the most efficient and effective way.

This was defined according to the demands of customer or on order base but the definition of production planning and control not ends here it is the complete process which help us to under stand the process and control during process so we can define it as this also. Production Planning and Control determines the jobs needed and what will be produced on each job, whether items will be purchased outside or produced in house, and the detailed schedule for performing the work. The Production Planning and Control Department creates the necessary jobs, creates the work orders required to perform the work, schedules the work orders, and forwards special material requirements to purchasing. Requirements for materials to be issued from inventory and purchased to the job are automatically generated by the work order creation process. With the work in progress, Production Planning and Control uses the Job Management and Control Module to monitor the progress of the work and keep the jobs on schedule. So according to these definitions we can say that The most important PP processes are sales and operations planning, demand management, material requirements planning, long-term planning, production order creation, production order execution, and capacity requirements planning.

Process characteristics

Process characterization is an integral part of any continuous improvement program. There are many steps in that program for which process characterization is required. These might include:

- 1:- When we are bringing a new process or tool into use.
- 2:- When we are bringing a tool or process back up after scheduled/unscheduled maintenance.
- 3:- When we want to compare tools or processes.
- 4:- When we want to check the health of our process during the monitoring phase.
- 5:- When we are troubleshooting a bad process.

In PPC we can

- 6:- identify the key inputs and outputs of a process
- 7:- collect data on their behaviour over the entire operating range
- 8:- estimate the steady-state behaviour at optimal operating conditions
- 9:- and build models describing the parameter relationships across the operating range

So according to production planning and control characteristics this activity is typically a three-step process.

The Screening Step

In this phase we identify all possible significant process inputs and outputs and conduct a series of screening experiments in order to reduce that list to the key inputs and outputs. These experiments will also allow us to develop initial models of the relationships between those inputs and outputs.

The Mapping Step

In this step we map the behaviour of the key outputs over their expected operating ranges. We do this through a series of more detailed experiments called Response Surface experiments.

The Passive Step

In this step we allow the process to run at nominal conditions and estimate the process stability and capability.

All these steps are mostly used when we are going to start a new type of business but PPC functions not enough smart as looking above. But it is complete map which helps us during process also. So when the production is under process and we are going to produce a new type of product then we can describe the PPC work in these steps.

Plan

The most important step by far is the planning step. By faithfully executing this step, we will ensure that we only collect data in the most efficient manner possible and still support the goals of the PPC. Planning should generate the following:

- A statement of the goals
- A descriptive process model (a list of process inputs and outputs)
- A description of the sampling plan (including a description of the procedure and settings to be used to run the process during the study with clear assignments for each person involved)
- A description of the method of data collection, tasks and responsibilities, formatting, and storage
- An outline of the data analysis

All decisions that affect how the characterization will be conducted should be made during the planning phase. The process characterization should be conducted according to this plan, with all exceptions noted.

Collect

Data collection is essentially just the execution of the sampling plan part of the previous step. If a good job were done in the planning step, then this step should be pretty straightforward. It is important to execute to the plan as closely as possible and to note any exceptions.

Analyze and interpret

This is the combination of quantitative (regression, ANOVA, correlation, etc.) and graphical (histograms, scatter plots, box plots, etc.) analysis techniques that are applied to the collected data in order to accomplish the goals of the PPC.

Report

Reporting is an important step that should not be overlooked. By creating an informative report and archiving it in an accessible place, we can ensure that others have access to the information generated by the PPC.

Factors and responses

Besides just observing our processes for evidence of stability and capability, in ppc we quite often want to know about the relationships between the various Factors and Responses. There are generally two types of relationships that we are interested in for purposes of PPC. They are:

Correlation

Two variables are said to be correlated if an observed change in the level of one variable is accompanied by a change in the level of another variable. The change may be in the same direction (positive correlation) or in the opposite direction (negative correlation).

Causality

There is a causal relationship between two variables if a change in the level of one variable causes a change in the other variable.

Generally, our ultimate goal in PPC is to find and quantify causal relationships. Once this is done, we can then take advantage of these relationships to improve and control our processes. We first need to find and explore correlations and then try to establish causal relationships. It is much easier to find correlations as these are just properties of the data. It is much more difficult to prove causality as this additionally requires sound engineering judgment. There is a systematic procedure we can use to accomplish this in an efficient manner. In order to find the correlation first we have to identify and quantify sources of variation. Only by doing this will we be able to define an effective plan for variation reduction and process improvement. Sometimes, in order to achieve this goal, we must

first build mathematical/statistical models of our processes. In these models we will identify influential factors and the responses on which they have an effect. We will use these models to understand how the sources of variation are influenced by the important factors.

Tools for PPC

Tools to plan

Gantt chart¹

A Gantt chart is a popular bar chart that aims to show the timing of tasks or activities as they occur across time. Although the Gantt chart did not initially indicate the relationships between activities, this has become more common in current use as both timing and interdependencies between tasks can be identified.

Since the initial introduction of Gantt charts, they have become an industry standard and a key project management tool for representing the phases, tasks and activities that are scheduled as part of a project Work Breakdown Structure or timeline of activities.

Logic Network

A Logic Network shows the sequence of activities in a project across time. It shows which activity logically precedes or follows another activity. It can be used to identify the milestones and critical path of a project.

PERT Chart

The Programme Evaluation and Review Technique commonly abbreviated PERT is a model for project management invented by United States Department of Defense's US Navy Special Projects Office in 1958 as part of the Polaris mobile submarine launched ballistic missile project.

PERT is basically a method for analysing the tasks involved in completing a given project, especially the time needed to complete each task and identifying the minimum time needed to complete the total project.

¹ Projectsmrt.co.uk/projectmanagementtools.pdf

Product Breakdown Structure (PBS)

In project management, a Product Breakdown Structure (PBS) is an exhaustive, hierarchical tree structure of components that make up a project deliverable, arranged in whole-part relationship.

A PBS can help clarify what is to be delivered by the project and can help build a work breakdown structure.

The project management method mandates the use of product based planning, part of which is developing a product breakdown structure.

Work Breakdown Structure (WBS)

A Work Breakdown Structure (WBS) is an exhaustive, hierarchical tree structure of deliverables and tasks that need to be performed to complete a project. Work breakdown structure is a very common project management tool and the basis for much project planning.

Tools to control

Fish bone diagram²

Cause-and-effect diagrams were developed by Kauro Ishikawa of Tokyo University in 1943 and thus are often called *Ishikawa Diagrams*. They are also known as fishbone diagrams because of their appearance (in the plotted form). Cause-and-effect diagrams are used to systematically list the different causes that can be attributed to a problem (or an effect). A cause-and-effect diagram can aid in identifying the reasons why a process goes out of control. As such, they should be part of the PLAN stage of the PDCA CIRCLE.

Method to use this tool

1. *Identify the problem:*

Write down the exact problem we face in detail. Where appropriate identify who is

² <http://itl.nist.gov/div898/handbook/ppc/ppc.htm>

involved, what the problem is, and when and where it occurs. Write the problem in a box on the left hand side of a large sheet of paper. Draw a line across the paper horizontally from the box. This arrangement, looking like the head and spine of a fish, gives us space to develop ideas.

2. *Work out the major factors involved:*

Next identify the factors that may contribute to the problem. Draw lines off the spine for each factor, and label it. These may be people involved with the problem, systems, equipment, materials, external forces, etc. Try to draw out as many possible factors as possible. If we are trying to solve the problem as part of a group, then this may be a good time for some brainstorming.

Using the 'Fish bone' analogy, the factors we find can be thought of as the bones of the fish.

3. *Identify possible causes:*

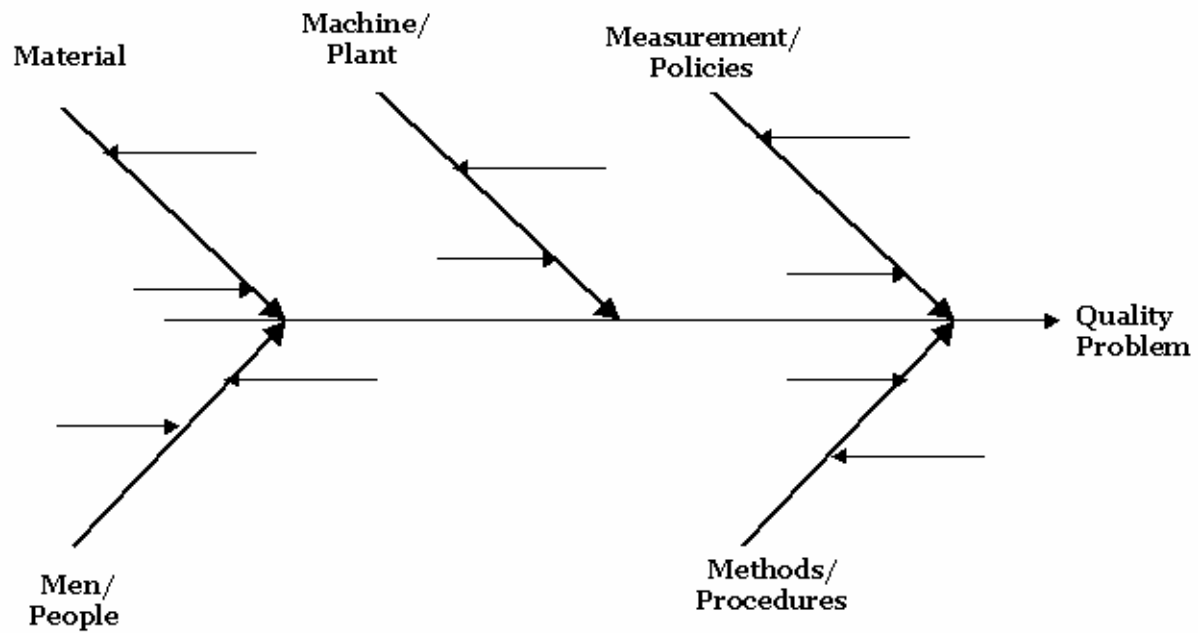
For each of the factors considered in stage 2, brainstorm possible causes of the problem that may be related to the factor. Show these as smaller lines coming off the 'bones' of the fish. Where a cause is large or complex, then it may be best to break it down into sub-causes. Show these as lines coming off each cause line.

4. *Analyze r diagram:*

³By this stage we should have a diagram showing all the possible causes of our problem that we can think of. Depending on the complexity and importance of the problem, we can now investigate the most likely causes further. This may involve setting up investigations, carrying out surveys, etc. These will be designed to test whether our assessments are correct.

Fish bone diagram is given below.

³ <http://itl.nist.gov/div898/handbook/ppc/section4/ppc4.htm>



Microsoft Excel

Microsoft Excel is a spreadsheet application used to perform financial calculations, statistical analysis, and other related operations. Microsoft Office Excel 2007 brought many enhancements to previous versions of the software, including the Ribbon, aesthetic aspects, and overall performance. It is a power full tool for production planning in any unit. In this we can make or save any type of information but mostly this tool is used for calculation of costs, taxes, and raw material calculations.

Types of production planning

The production type characterizes the frequency with which a specific order is produced in the production process. The frequency with which production of identical or similar specific order is repeated and the production quantity of production orders are typical characteristics that determine the production type. Production organization is closely related to production type, as the production type often significantly affects the structure of the production process. Thus, the flow manufacturing production type, for example, implies the production of large quantities of identical fabric orders. At the same time, flow manufacturing ensures that the production equipment is arranged in accordance with the organizational form of flow manufacturing. The degree of product standardization and the depth of the product structure also often affect the actual production type used. Therefore, various forms of production types, implicitly including production organization or units, have arisen from the basic theoretical type (mass production, repetitive manufacturing, small-lot production, make-to-order production)

- Discrete manufacturing
- Repetitive manufacturing
- Process manufacturing
- Kanban
- Engineer-to-order production

Discrete Manufacturing

Discrete manufacturing (also called shop floor production) describes the production of a product on the basis of production orders. Discrete manufacturing is used if the specific order in question changes frequently.

If the pattern of demand is very irregular and if production is workshop-oriented in character then range of master data is required for discrete manufacturing; the most important of these are material, bill of material (BOM), work centre, and routing. Discrete manufacturing starts when a production order is created and processed. A production order is created either manually or when a planned order that was created in the production and procurement planning process is converted. A production order is a request to the production department to produce or provide fabric or services at a specific time and in a specific quantity. It specifies the work centre and material components that are to be used for production. The creation of a production order automatically creates reservations for the required material components. Purchase requisitions are created for externally procured material components and services, and capacity requirements are created for the unit at which the order will be executed. Production orders are released on the release date, provided that the required materials and capacity are available. The relevant documents in the production order can be printed in order to prepare for the execution of the production order. The capacity situation can be evaluated and any required capacity levelling can be carried out in any phase of production order processing, although this is usually done before production starts. The components required to produce the fabric are read out from the production order, and the goods issue is posted. The fabric is then produced on the basis of the production order. The finished quantity and the services provided are then confirmed back to the production order. The product is put into storage and the goods receipt is posted. Finally, the production order is settled.

Repetitive Manufacturing

Repetitive manufacturing is characterized by the interval-based and quantity-based creation and processing of production plans (in contrast to single-lot and order-based processing). With repetitive manufacturing, a certain quantity of a stable product is produced over a certain period of time. Fabric order moves through the machines and