

# Developing a Program for Planning the Material and Resources to Meet the Demand

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**Abstract:** Production scheduling problems have been the subject of intense academic research for the last three decades. Scheduling is a key factor for manufacturing productivity. Effective production scheduling can improve on-line delivery, reduce inventory, cut lead time, and improve machine utilization. Super plastic forming manufacturing operations have a numerous product back logs because of the following problems as per the observations during this project study. As per the time study of the Manufacturing Operations, the Production Leader plans their activities for the upcoming week. But in reality the associates do not meet the targets due to various issues and concerns and this is mainly due to scheduling problem. And this has been repeating for the last 5 years. The objective of the study is to find out the major problems and to find remedies for minimizing the same.

**Index Terms**—production scheduling, cause and effect diagram, pareto diagram.

## I. INTRODUCTION

Industry is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing companies in India in terms of turnover. We were established in 1989. We are engaged in the design, engineering, manufacture, construction, testing, commissioning and servicing of a wide range of products and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation (Railway), Renewable Energy, Oil & Gas and Aerospace.

### Manufacturing Division

Industry diversified into engineering and manufacturing in the year 1991 with the production of fan blades. The versatile product is used the engines of aircrafts. To its high quality the production have been acknowledge as among the best in the world. The division is located adjacent to the marthahalli division.

### Experimental Details

Fan blade is produced in manufacturing division of Industry. The finished product i.e fan blade is used in the engines of aircraft. Here the problem is associates are not able to meet targets plans set by Production Leader because of various reasons like machine, maintenance, unforeseen working conditions etc. The data for the study were collected from maintenance department of the company. And major problem were identified. Root causes for these defects were found out from cause and effect diagram and remedies were suggested.

## II. RESULTS AND DATA COLLECTION

Super plastic forming manufacturing operations have a numerous product back logs because of the following problems as per the observations during this project study. Associates are not able to meet targets plans set by Production Leader because of various reasons like machine maintenance, unforeseen working conditions etc. Blue Chip Projects are done only on the scrap products. In Blue chip projects, the production data is not captured in structured and methodological manner. Even though before each manufacturing operations they punch in the Batch card, while correlating the existing data does not match. As per the time study of the Manufacturing Operations, the Production Leader plans their activities for the upcoming week. But in reality the associates do not meet the targets due to various issues and concerns and this is mainly due to scheduling problem. And this has been repeating for the last 5 years.[1]

### Details of planning

Table 1 shows the details of actual planning and result

15		Water Jet - C - Scan												
		TXWB		T1000		T900		T800		T700		T500		
		Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	
Day/ Shift														
Sat N														
Sun D														
Mon D											24	24		
A					2	2						11		
N					10	8								
Tue D										24				
A		1			6	10	6				10			
N					6			10	10		5			
Wed D					10					24	12			
A		2			6			10	10	12	12			
N		2			10	4					6			
Thu D					10									
A										24	6			
N								10						
Fri D					10						12	7		
A										4				
N														
Sat D											16			
Comm		0	9		30	32	22	16	30	20	140	81	0	0

### Details of scrap formed

Table 2 shows the details of scrap formed

PRODUCT	NO.PRODUCED	BECAME SCRAP
T 500	20	9
T 700	1590	103
T 800	304	18
T 900	114	8
T 1000	464	21
TXWB	58	4



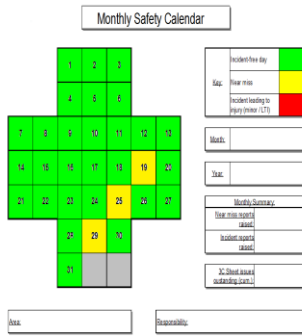


Fig.4 represents the 3c chart

**V. ISSUES AND CONCERNS IN THE CURRENT SITUATION**

In the present condition, each cell in the production is scheduled using single machine scheduling. From the pi-chart above, its very clear that major issues and concerns in production is due to MAN, MACHINE, MATERIAL. Hence it was very evident that we need to include these issues into consideration while planning. We need to find a solution to scheduling by considering various factors that has happen. Hence we changed scheduling method from single machine to flow shop scheduling so that the production leaders will get a better view of the number production as input into their cells and plan accordingly. Also structured the meeting agenda among the Production Leaders to resolve the issues in shop floor, so that everybody is aware of all the issues and concerns.

**VI. PROJECT ELEMENTS VISION STATEMENTS**

The items below indicate how the project title and its sub elements have been derived and their strategic intent. The project solution will fall into the delivery of these 4 toolsets and all together will deliver the DREAM project.

**Dream (Data Rich Environment enables Active Management)**

Strap Line: *Improving Credibility and Reliability through Consistently Achieving the Production Plan*

Vision: “To deliver a dynamic and user friendly manufacturing data capture system that enables real time management control to drive a cross functional approach to production plan adherence “

**Wrap (Weekly Resource & Asset Planning)**

Strap Line: *Robust planning that meets our customers’ needs, and guides our teams*

Purpose – A module in DREAM which helps the Production Leader’s to plan & analyze the production for the upcoming week. This production plan is analyzed with Man, Machine, and Material & FTG on shiftily basis. This analysis enables the PL to know various risks and issues for the plan.[2,3]

Man – Analysis of the Holiday Planner & Updates Fire Register.

Machine – Analysis of MTM planner + STH for the No. of products assigned in a shift.

Material – Analysis of the material flow from the Supplier to the customer.

FTG – Analysis of Fixtures, Tooling & Gauges planner.

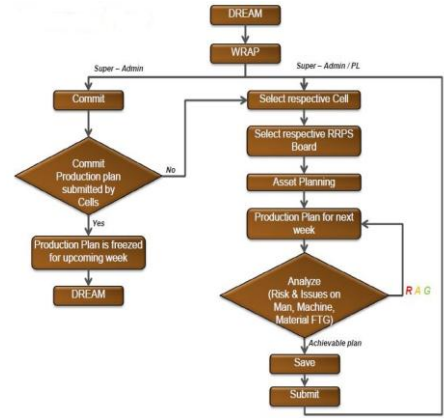


Fig.5 represents the process flow chart of wrap

**Tab (Team Achievement Board)**

Strap Line: *Enabling accountability for how we contribute to the success of the business*

Purpose – A tool in DREAM which helps the System Admin / Admin user’s to enter the production data and various concerns (if production plan isn’t met) are updated on shiftily basis. At the end of shift, a shift meeting is hosted by the admin / System admin user’s in each Department. In this meeting, the number of products processes are entered which is checked with the Plan. The user has to note the concerns if the production plan is not met. These concerns are then escalated to 3C charts under the respective KPI’s.[6,7]

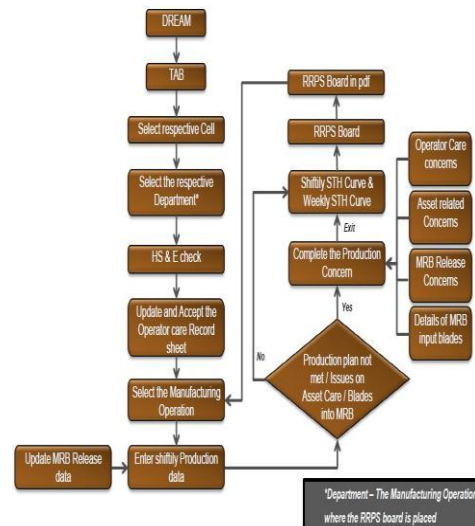


Fig.6 represents process flow chart of tab Part (Production Adherence Review Tool – D,W,M)

Strap Line: *Review the team’s achievements and take action to achieve the production plan*

Purpose: A tool in DREAM which helps the Admin user/PL to review the summary production updated by WRAP

and TAB. The achievement made by the WRAP and TAB is analysed and necessary action is taken to obtain the plan.

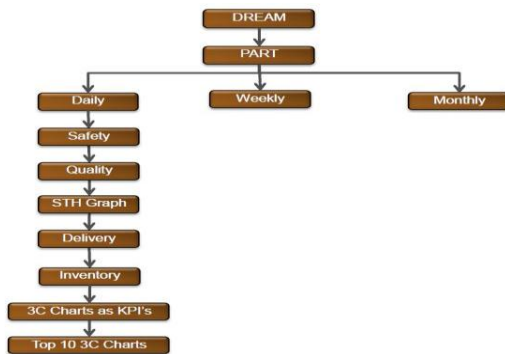


Fig.7 represents process flow chart of part

Crib (Central Reports for Intelligent Business)

Strap Line: *Information enabling intelligent business decisions to be taken based upon data*

Purpose: A tool in DREAM which help to bind all the reports that can be accessed by all cell.

## VII. SCOPE

The scope of the project covers the following sub elements

### System

- Definition of system requirements
- Identification of pilot area and desired functionality
- Development of software solution on a future proof platform
- Compliance with RR IT requirements
- Identification of software / functionality limitations
- Creation of Programmers Guide
- Creation of user manuals

## VIII. CONCLUSION

Project at industry included an organizational study and a Project. During the project period a brief study of various cells, its functions and objectives were accomplished. Major problem faced was “un-achievement of target production plan” was observed and taken up as project. The major causes and root causes are identified. The solution for the causes was found out and a new tool was created.

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