Summer Internship Report
on
"Standard Cost Estimation of a manufacturing Item"

At

TATA HITACHI

Reliable solutions

Company Guide:

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Submitted by:
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ACKNOWLEDGEMENT

TATA HITACHI is one of the leading companies in the world in the field of Earth moving equipment (excavators, dumper, road making, wheeled and concrete mixing equipment). Undergoing training in such an industry is a great opportunity. First of all I owe my greatest dept. to **Mr. Somen Lodh** (**HR**, TATA HITACHI, Kharagpur) for allowing me to undergo this training.

I extend my sincere thanks to **Mr.Abhijit Kar(Head, PPC,** TATA HITACHI) and **Mr.Shashank Shekhar(Head, Planning,** TATA HITACHI**) ,**Kharagpur for their help in extending all possible facilities during tenure of my project work.

I wish to take this opportunity to express my ineffable sense of profound gratitude to **Mr. Nikhil Kumar (Senior**

Manager,Production,Planning and Control ,TATA HITACHI), Kharagpur for his expert guidance and encouragement during the execution of the project made my project work a reality.

Last, but not the least, I would like to acknowledge my sincere regards to my family who shared every bit of my life and for providing encouragement from time to time.

Date: 29th July,2020

Place: Kharagpur

(SHASHI NANDAN PRASAD)

SYNOPSIS

1. Title of the project:

"Standard Cost Estimation of a Manufacturing item".

2. Objective of the study:

- Study about the processes involved in production,planning and control.
- Study about the small group activity Improvemen Circle(SGA).

- Study about the significance of work centre and cost centre.
- Increase productivity and easy operation for the workers using Kaizen.
- Study about the SIPOC technique to analyse input and output processes.
- Study about the Inventory Optimisation Techniques.
- Preparing Excel sheet involving calculation related to manufacturing item.

3. Rationale for the study:

In industry, we can't manually calculate cost of each and every part of a product as because there is a high chance of error while performing calculation manually in production department.So in order to avoid such issue,we perform calculation on MS Excel and analyse each and every cost and Finally reach up to the total cost incurred during manufacturing of an item and visualize some facts using Tableau.

4. Detailed Methodology to be used for the project work:

By doing calculation on each and every Item identifier, an excel sheet is made with details related to total cost incurred while manufacturing of an item which will help the operators to work in a specified sequence and action plan will be adopted to reduce the loss.Some visualization using graph is also done so that department will get to know about the most cost incurred by which item identifier and further will try to reduce their cost.

5. Expected contribution from the study:

This study of project work is expected to enlighten the way of development to ensure the coordinated flow of work so that the required number of products are manufactured in the required quantity and of the required quality at the required time at optimum efficiency.

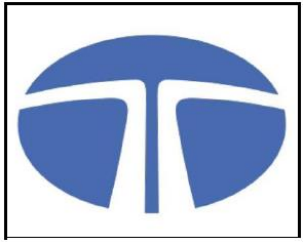
6. Time Schedule for activities during the project work:

Starting Date: 17th June, 2020

Ending Date: 29th July,2020

7. Problems envisaged during the project implementation:

Due to first time exposure to such a heavy industry and machine of high operational technicality it took a lot of time in the phase to understand the basic functioning of the processes involved in production,planning and control and analyzing manufacturing time of each and every item identifier and further performing calculation related to cost incurring during manufacturing of an item and visualising some facts using graph as well.



The TATA Group

The Tata group comprises 98 operating companies in seven business sectors: information technology and communications (16%), engineering (17%), materials (52%), services (4%), energy (5%), consumer products (3%) and chemicals (3%).

The group was founded by Jamsetji Tata in the mid-19th century, a period when India had just set out on the road to gaining independence from British rule. Consequently, Jamsetji Tata and those who followed him aligned business opportunities with the objective of nation building. This approach remains enshrined in the group's ethos to this day.

The Tata group is one of India's largest and most respected business conglomerates, with revenues in 2008-2009 of $62.5 billion and a market capitalization of $37.95 billion as on May 2009. Tata companies together employ over 300000 people, largest employer in private sector. The group's 27 publicly listed enterprises – among them Tata Steel, Tata Consultancy Services, Tata Motors and Tata Tea – have a combined market capitalization that is highest among Indian business houses in the private sector, and a shareholder base of over 3.2 million. The Tata group has operations in over 80 countries across 6 continents, and its companies export products and services to 85 nations.

HITACHI

The HITACHI Group

- Total Group Revenues of over ¥ 115 Bn (2011-12)
- Employing over 400,000 people worldwide
- Over 1100 companies worldwide
- Benefiting 482,738 shareholders
- Serving the globe for last 100 years

Industry Segments

Information & Telecommunication Systems
Revenue: 23% of Group's Revenue

Electronic Devices
Revenue: 10% of Group's Revenue

Financial Services
Revenue: 4% of Group's Revenue

Power & Industrial Systems
Revenue: 29% of Group's Revenue

Digital Media & Consumer Products
Revenue: 11% of Group's Revenue

High Functional Material & Components
Revenue: 14%

Logistics Services & Others
Revenue: 9% of Group's Revenue

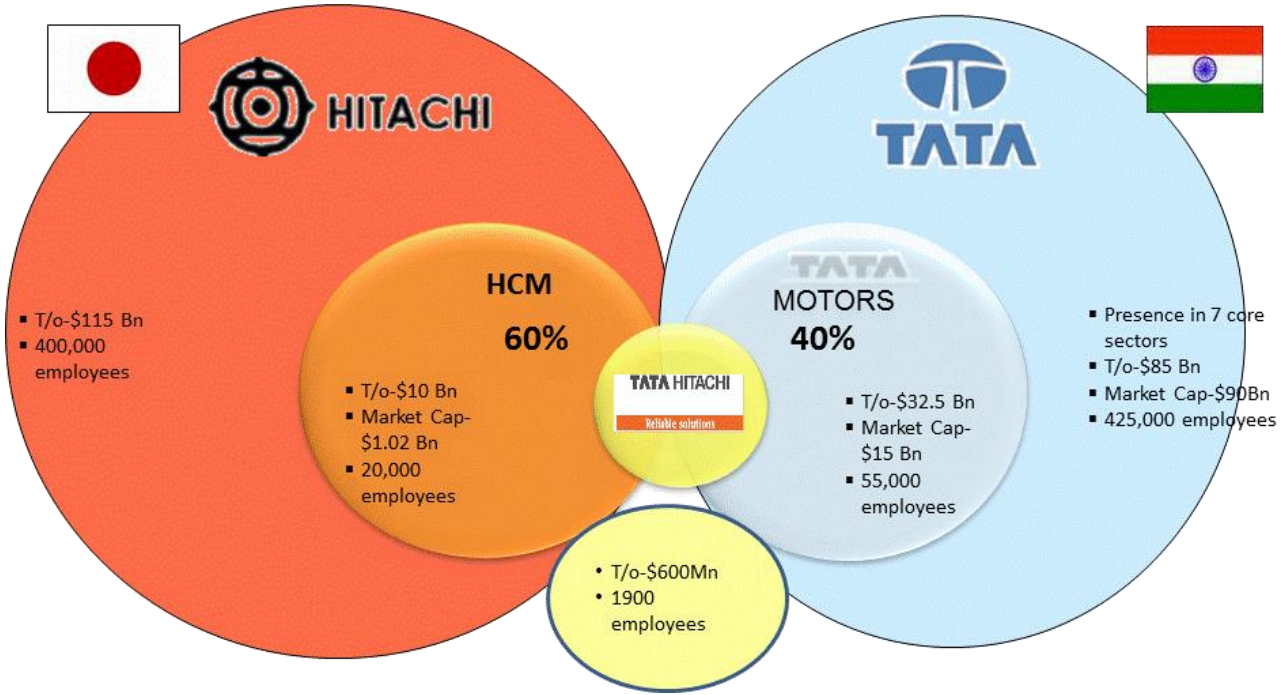
Hitachi was founded in 1910 by electrical engineer **Namihei Odaira**. The company's first product was Japan's first 5-horsepower electric induction motor, initially developed for use in copper mining. Odaira's company soon became the domestic leader in electric motors and electric power industry infrastructure. [4]

The company began as an in-house venture of Fusanosuke Kuhara's mining company in Hitachi, Ibaraki prefecture. Odaira moved headquarters to Tokyo in 1918. Long before that, he coined the company's toponymic name by superimposing two *kanji* characters: ***hi*** meaning "sun" and ***tachi*** meaning "rise". The young company's national aspirations were conveyed by its original brand mark, which evoked Japan's imperial rising sun flag.

Hitachi America, Ltd. was established in 1959. Hitachi Europe, Ltd. was established in 1982.

In October 2012, Hitachi agreed to acquire the United Kingdom-based nuclear energy company Horizon Nuclear Power, which plans to construct up to six nuclear power plants in the UK, from E.ON and RWE for £700 million.

TATA HITACHI



Tata Hitachi Construction Machinery Co. Ltd, the Leader in Construction Equipment in India, enhances the operational performance of its customers, leading to improving their profitability and competitiveness by offering constructive solutions. Tata Hitachi is a subsidiary company of Hitachi Construction Machinery Co. Ltd., which holds 60% share, and Tata Motors Ltd

holding the balance 40%. The company commenced manufacturing of construction equipment in 1961, as a division of TELCO. In 1984, it entered into a technical collaboration with HCM, Japan for manufacturing state of the art hydraulic excavators.

Tata Hitachi is focused on capitalizing the opportunity in the domestic arena for which the key market segments are Excavators, Wheeled Products, Cranes and Others. Tata Hitachi's consistent growth and success have been built on the foundation of their ability to understand customers' needs and provide Equipment and Support solutions that increase profitability and competitiveness for them. What we call Reliable Solutions. Our capabilities to deliver Reliable Solutions starts with our comprehensive range of Equipment that ensures that the customer has exactly the right kind of equipment for all Mining, Infrastructure, Construction and Agricultural needs.

The construction industry involves heavy use of excavators, wheel loaders, and backhoe loaders. Tata Hitachi's range of excavators starting at 2 tonnes with a maximum size of 120 tonnes is made in the country. But sizes even bigger than this including the giant 250 tonnes excavator have been brought in from Tata Hitachi's Principals, Hitachi Construction Machinery Limited, Japan.

Tata Hitachi is one of the largest manufacturers of construction equipment in the country and has three manufacturing plants - at Jamshedpur in Jharkhand, at Dharwad in Karnataka and at Kharagpur in West Bengal. It also has a full – fledged Design and Development set-up for developing indigenous and collaborated equipment. Hitachi is actively participating in creating the new R&D facilities at Kharagpur with the aim to make the new centre a global R&D hub.

JAMSHEDPUR

Joint ventures, Subsidiaries, Associates

- Hitachi Construction, Japan (hydraulic excavators and cranes)
- Lebrero, Spain (compactors)
- Hitachi Truck Manufacturing, USA (dumpers)
- Tadano, Japan (tyre-mounted cranes)
- Hitachi-Sumitomo, Japan (crawler cranes)
- Berco (undercarriages)

Vision, Mission& Values

VISION:

"Reliable Solutions For building of greater tomorrow"

Mission:

To be The Most Trusted Partner for providing Full Line of Constructive Solutions for Mining, Construction, Infrastructure & Agriculture Sectors.

While Dominating the Indian Market, we shall make concerted efforts to meet our Global Ambitions.
Our Hallmark shall be OUR Motivated People, Strong Partnership at all levels, Superior Technologies and Our Widespread Customer Support, all working in Unison with Environment and Society.

HITACHI VALUES:

- Business values
  - ❖ Customer satisfaction and loyalty.
  - ❖ Maintaining high standards.
  - ❖ Growth and profitability.
  - ❖ Commitment to productivity.
  - ❖ Environment friendly products and process.
- **Cultural values**
  - ❖ Corporate ethics and discipline
  - ❖ Developing peoples and team.
- Social values

- ❖ Resources conservation environment protection.
- ❖ Social consciousness**.**

PRODUCTS

TYPE	**MODEL NO.**
Hydraulic excavators	TMX 20, EX 70, EX 100, EX 110, EX 200, EX 210V, EX 300, EX 350V, EX 1200, ZX 50, ZX 70, ZX 120, ZX 210, ZX 370, ZX 450, ZX 650
Backhoe Loaders	315 V, 315 E

Wheel Loaders	TWL 3036, 10T Loader
Crawler Cranes	T 320, TFC 280, TFC 75, KH 500
Agency Products	EX 1900, EX 2500, EX 3600 excavators, Tadano truck mounted cranes
Motor Graders	TG 140
Compactors	VTA 90, VM 3
Dumpers	EH 600
Transit Mixer	TM 06

PRODUCTION,PLANNING AND CONTROL

- **Production Planning** can be referred to as a technique of forecasting every step in the long process of production, taking them at right time and in the right degree and trying to complete operations at the maximum efficiency.

- **Production control** is the process that keeps a watchful eye on the production flow, size of resources along with any deviation from the planned action. It also includes arrangement for the prompt remedy or adjustment in case of any deviation so that the production may run according to the original or revised schedule.

HISTORY:-

PPC concept developed since late 19th Century.

- Factories were simple and relatively small.
- Small number of products with large batches.
- Work for each man and each machine used to be chalked out.
- Even as factories grew,they were just bigger,not more complex.

- Main Industry – Textiles , Railways.

❑ IMPORTANT FACTS

- **1776** -Specialization of labor in manufacturing -**Adam Smith**
- **1799** -Interchangeable parts, cost accounting -**Eli Viihitney and others**
- **1832** -Division of labor by skill; assignment of jobs by skill; basics of time study -**Charles Babbage**

- **1900**- Scientific management time study and work study developed; dividing planning and doing of work - **Frederick W. Taylor**
- **1900**- Motion of study of jobs -**Frank B. Gilbreth**
- **1901**- Scheduling techniques for employees, machines jobs in manufacturing -**Henry L. Gantt**
- **1915** -Economic lot sizes for inventory control -**F.W.Harris**
- **1950**- Mathematical programming, on-linear and stochastic processes –**A. Charnes, W.W. Cooper & others**
- **1951**- Commercial digital computer; large scale computations available. -**Sperry Univac**
- **1960**- Organizational behavior; continued study of people at work -**L. Cummings, L. Porter**
- **1970**- Integrating operations into overall strategy and policy. Computer applications to manufacturing. Scheduling and control. Material requirement planning (MRP)-**W. Skinner J. Orlicky and G. Wright**
- **1980**-Quality and productivity applications from Japan robotics. CAD-CAM -**W.E. Deming and J. Juran.**

CHARACTERISTICS

- Inputs like materials, men and machines are efficiently used
- Factors of production are integrated to use them economically
- Division of work is undertaken carefully so that every available element is properly utilized
- Work is regulated from the first stage of procuring raw materials to the stage of finished goods
- Questions like ***what, when and how*** to be manufactured are decided

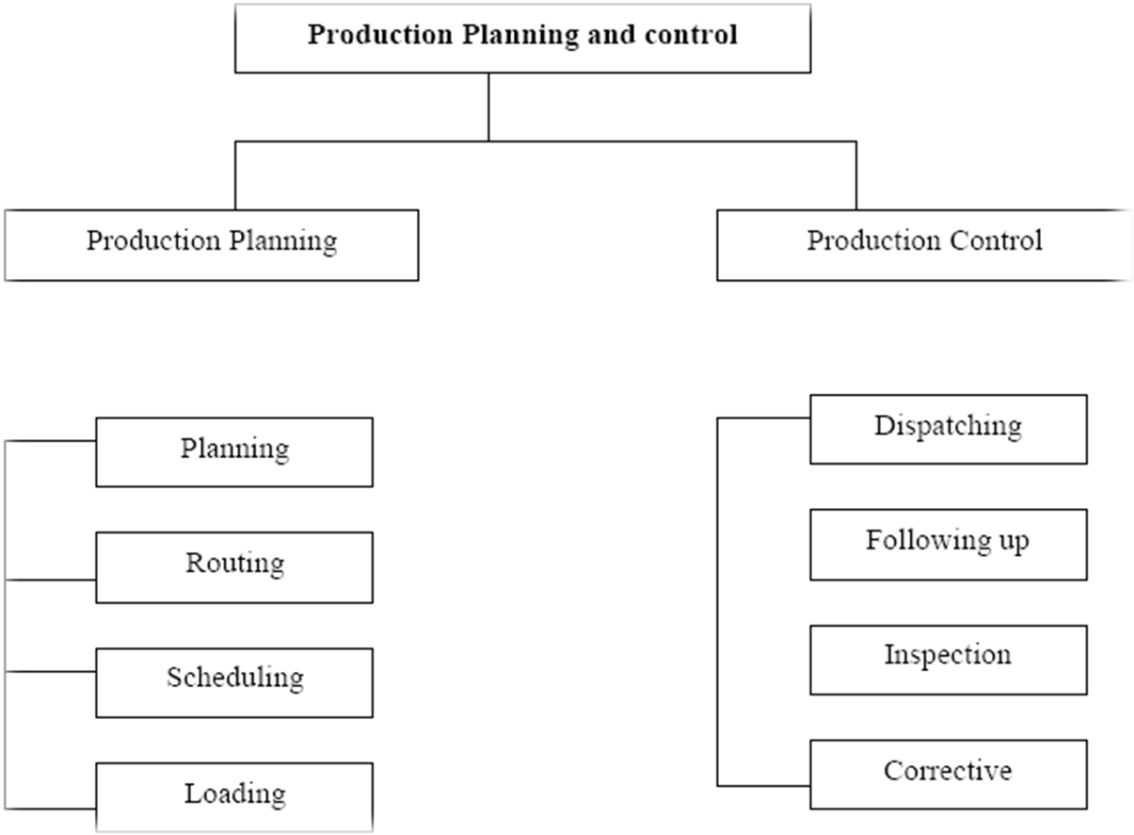
OBJECTIVES


Objectives of Production Planning
Effective utilization of resources
Steady flow of production
Estimate the resources
Ensures optimum inventory
Co-ordinates activities of departments
Minimize wastage of raw materials
Improves the labour productivity
Helps to capture the market
Provides a better work environment
Facilitates quality improvemen t
Results in consumer satisfaction
Reduces the production costs

Overview:

- Preparation of production budget
- Devising manufacturing methods and sequence of operations
- Deciding type of machines and equipments
- Preparation of operation sheets and instruction cards
- Estimating men, machine and material requirements
- Undertaking time and motion studies
- Preparing master schedules

PROCESSES INVOLVED IN PPC



PLANNING

- It is the first element of production planning and control. Planning means deciding in advance what is to be done in future. An organizational set up is created to prepare plans and policies.
- Various charts, manuals and production budgets are also prepared.
- Planning provides a sound base for control. A separate department is set up for this work.

ROUTING

- Routing is determining the exact path which will be followed in production.
- It is the selection of the path from where each unit have to pass before reaching the final stage.
- The stages from which goods are to pass are decided in this process.

ROUTING PROCEDURE

- Deciding what part to be made or purchased
- Determining Materials required
- Determining Manufacturing Operations and Sequences
- Determining of Lot Sizes
- Determining of Scrap Factors

- Analysis of Cost of the Product
- Preparation of Production Control Forms

SCHEDULING

- Scheduling is the determining of time and date when each operation is to be commenced or completed.
- The time and date of manufacturing each component is fixed in such a way that assembling for final product is not delayed in any way

TYPES OF SCHEDULES

Master Scheduling – It is the breakup of production requirements. It is the start of scheduling. It is prepared by keeping in view the order or likely sales order in near future.

Manufacturing Scheduling – It is used where production process is continuous. The order of preference for manufacture is also mentioned in the schedule for a systematic production planning.

Detail Operation Scheduling – It indicates the time required to perform each and every detailed operations of a given process.

LOADING

- The next step is Loading which is execution of the scheduled plan as per the route chalked out. It includes the assignment

of the work to the operators at their machines or work places.

- So Loading determines who will do the work.

DISPATCHING

- Dispatching refers to the process of actually ordering the work to be done. It involves putting the plan into effect by issuing orders.

- It is concerned with starting the process and operation on the basis of route sheets and schedule charts.

DISPATCHING PROCEDURES

- **Centralized Dispatching –** Under this, orders are directly issued to workmen and machines. It helps in exercising effective control.

- **Decentralized Dispatching –** Under this procedure all work orders are issued to the foreman or dispatch clerk of the department or section. It suffers from difficulties in achieving co-ordination among different departments.

FOLLOWING UP

Progress may be assessed with the help of routine reports or communication with operating departments. The follow up procedure is used for expediting and checking the progress.

INSPECTION

- Inspection is the process of ensuring whether the products manufactured are of requisite quality or not.

- Inspection is undertaken both of products and inputs. It is carried on at various levels of production process so that pre-determined standards of quality are achieved.

- Inspection ensures the maintenance of pre-determined quality of products.

CORRECTIVE MEASURES

- Adjusting the route
- Rescheduling of work
- Changing the workloads
- Repairs and Maintenance of machinery or equipment,
- Control over inventories
- Certain personnel decisions like training, transfer,demotion etc.
- Alternate methods may be suggested to handle peak loads.

LIMITATIONS

- Assumption based
- Rigidity
- Difficult for small firms Costly
- Dependence on external factors
- Team work is a must
- Demands high level of co-ordination & efficiency.

SIGNIFICANCE

- Structured & Planned Process
- Increased Production
- Seamless Plant Activity
- Better Co-ordination
- Optimal Resource Utilization
- Cost Control
- Rationalization of production Activities

PPC : TOYOTA WAY

- 7 Principles of Toyota Production System:-
  - Reduced Set up time
  - Small lot production
  - Employee involvement and empowerment
  - Quality at source
  - Equipment Maintenance

- Pull production
- Supplier Involvement

❑ Few Toyota Concepts :-

- Elimination of 7 Muda's (Wastefulness) (Transport,Inventory,Motion,
- Waiting, Over-Processing Overproduction, Defects) Poka Yoke (mistake-proofing)
- Jidoka (automation with a human touch)
- Kanban (inventory-control system to control the supply chain)
- Kaizen (change for better)
- Respect & Empowerment to Employees.

KAIZEN

- It is basically a method of problem solving within company.
- The business lesson of the 1980's was that Japanese firms, in their quest for global competitiveness, demonstrated a greater commitment to the philosophy of continuous improvement than Western companies did.
- For such a philosophy the Japanese used the term "**Kaizen**".
- Kaizen means improvement, continuous improvement involving everyone in the organization from top management, to managers then to supervisors, and to workers.
- Kaizen as a customer-driven strategy for improvement.

- The essence of Kaizen is that the people that perform a certain task are the most knowledgeable about that task; consequently, by involving them and showing confidence in their capabilities, ownership of the process is raised to its highest level.
- Kaizen is an umbrella concept that embraces different continuous improvement activities
  on an organization.
- It is used to increase productivity, to obtain the competitive advantage and to rise the overall business performance on a tough competitive market like the one in the European Union.
- Kaizen techniques became famous when Toyota used them to rise to world automotive leadership. Rather than undertake large projects, Toyota's staff was encouraged to identify problems, no matter how small, trace their root causes, and implement all necessary solutions.

SMALL GROUP ACTIVITIES(SGA)

- Small Group Activity is also known as focused or continuous improvement in English.SGA finds its origin in the Japanese industry where it is called “Kobetsu Kaizen" or Quality Circles.

- SGA is a method for problem solving in teams by structurally searching for the root causes and eliminating them.

- The composition of the SGA is a team of people working on solving a specific problem or improve an important issue (optimal team size of 5-8 people).

❑ **SGA** deal with two types of issues:

❖ The idea – simple and easy solution that can be implemented immediately (e.g. raising the height of the conveyor belt after which attracts displays for palletizing,thereby facilitating the work of the person which palletizing)

❖ Subject to improvement – a more complex issue, on which it must consider and work on a group of people, often from different departments. The time to implement such a topic could take several months (e.g. increasing the efficiency of the line).

SGA IMPROVEMENT CIRCLE

1. **Choose a subject:-**It includes presentation of problem,describing symptoms of problem.

2. **Set a target:-**The objective should be determined by the team or the manager, objective should be measured in the same units what problem was.

   The objective should be: Specified and saved, Measurable, Acceptable, Realistic, Timely and ambitious (SMART).

3. **Problem analysis:-**the purpose of this step is to identify all current or possible causes of problem.

4.Invent Solutions:–It involves the team in collecting facts and listen to everyone. Search solutions for the SGA should be based on facts, not opinions.

5. Analyze/Interpretation of data:-search solutions for the SGA should be based on facts not opinions. Is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making.

6.Execute the solutions – This stage is a bridge between theoretical activities in
solving problems and bringing to the actual operation.

7.Check if it works:- Watch the result **for** some time to see if actions bring expected results.Is the objective set by the team has been achieved? If not, the team should decide to return to step 1.

8.Standardize – It occurs when the team finds satisfactory solution. Standardin this case means: the best, safest and easiest way, to achieve and maintain a defined quality level.

ADVANTAGES OF SGA:-

- Team own solutions always refer with more enthusiasm than imposed Improving the relationship between the participants
- Group usually generates better solutions than the unit.
- Team-building
- Improved communication Higher involvement
- Learn how to analyze and solve problems Realization of business objectives Continuous improvement.

SIPOC

- In process improvement, a **SIPOC** (sometimes **COPIS**) is a tool that summarizes the inputs and outputs of one or more processes in table form.
- It is used to define a business process from beginning to end before work begins.
- The acronym SIPOC stands for **s**uppliers, **i**nputs, **p**rocess, **o**utputs, and **c**ustomers which form the columns of the table.
- It was in use at least as early as the total quality management programs of the late 1980s and continues to be used today in Six Sigma, lean manufacturing, and business process management.

OBJECTIVES:-

- It has three typical uses depending on the audience:-

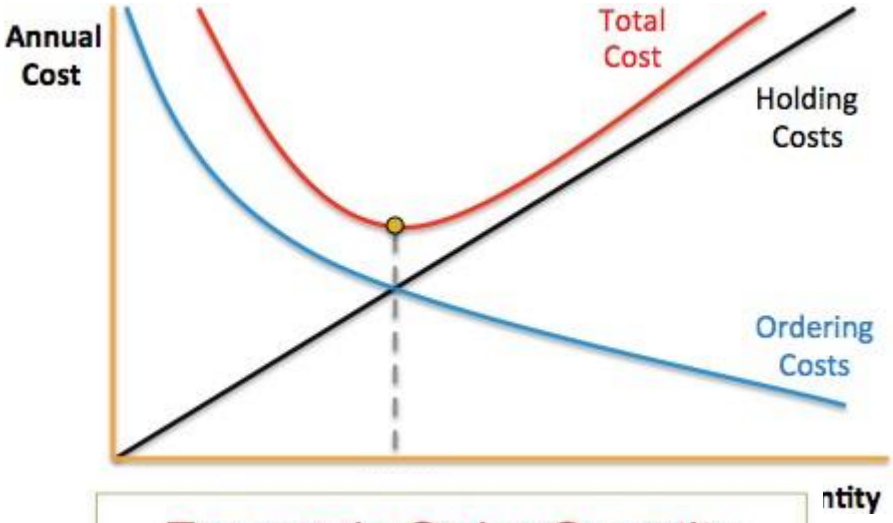
- To give people who are unfamiliar with a process a high-level overview
- To reacquaint people whose familiarity with a process has faded or become out-of-date due to process changes
- To help people in defining a new process

Example SIPOC: Automobile repair

Supplier	Input	Process	Output	Customer
• Vehicle owner • Customer service representative • Facility manager • Parts window	• Repair inquiry • Vehicle for repair • Permission to proceed with individual recommendations • Open bay • Parts for approved repairs • Observations	• Schedule visit • Diagnose problem • Prepare work order • Source parts • Perform repairs • Notify that service is complete	• Appointment date and time • Repair recommendations and cost estimates • Work order • Parts for approved repairs • Repaired vehicle • Telephone/e-mail/text message notification	• Vehicle owner • Mechanic • Customer service representative

INVENTORY OPTIMISATION TECHNIQUES:-

1.)ECONOMIC ORDER QUANTITY:-



Economic Order Quantity

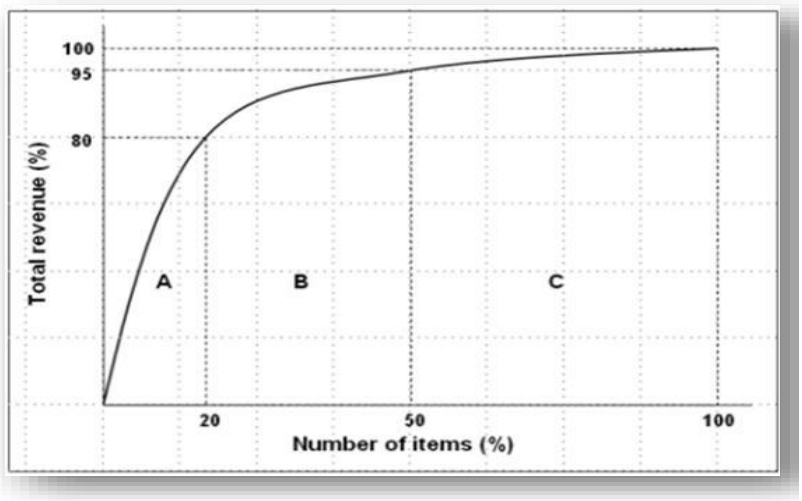
$$EOQ = \sqrt{\frac{2 \times D \times S}{H}}$$

D = Annual demand (units)
S = Cost per order ($)
C = Cost per unit ($)
I = Holding cost (%)
H = Holding cost ($) = I x C

- EOQ is a quantity of inventory which can reasonably be ordered economically at time
- In determining this point, ordering costs and Carrying Costs are taken into consideration.
- Ordering costs are basically the cost of placing an order.
- Carrying cost includes costs of storage facilities and loss of value through physical deterioration, cost of obsolescence.

- The balancing point is "Economic Order Quantity".

2.)ABC ANALYSIS:-



- It means "Always Better Control".
- Under this the inventory is classified into 3 categories viz. A B and C. These categories are based upon the inventory value and cost significance.
- Items of High value and small in no. are termed as A.
- Items of moderate value and moderate in no. are termed as B.
- Items of small value and large in no. are in category C.
- The cost of each item is multiplied by the no. used in a given period and then these items are tabulated in descending

numeric value order.

3.JUST IN TIME:-

- ❖ It is a philosophy that focuses attention on eliminating waste by purchasing or manufacturing just enough of the right items just in time.
- ❖ It is a Japanese management philosophy applied in manufacturing which involves having the right items of the right quality and quantity in the right place and at the right time.

❑ It involves having products arrive as soon as the customers order them.

BILL OF MATERIALS

- ❖ Basically, a bill of material (BOM) is a complete list of the components making up an object or assembly.
- ❖ It is also part of material requirements planning (MRP).

❑ TYPES OF BOMS:-

- Standard BOM
- Model BOM
- Option class BOM
- Planning BOM
- Engineering BOM

What information is on a BOM?

1. Quantity
2. Item ID
3. Description of Item
4. Cost of Item
5. Total Project Cost

Quantity:-

- Tells user how many of each part is needed for each project
- Example:

A chair needs 1 seat, 4 legs, 1 back, and 5 nails.

Item ID #

- Tells us which part to order
- Can be any of the following:
  - Catalog number, UPC, or any other identification number.
- Example:
  - The chair needs a 2PC seat, 5DR legs, 6TU8 back, and 1 inch nails.

Description of Item:-

Provides a check that the correct item is being ordered.

Cost of Item:-

- Cost is included to show how much each part is per item and the total cost of all like parts.

Example:

The cost of a leg is $5 per leg. Then the total price of the legs ordered would be $20 because there are 4 legs.

Total Project Cost:-

- Shows the total cost of all items and is also the total cost of the direct materials used in the project.

STANDARD COST ESTIMATE:-

The Standard cost estimate of a manufactured item has the following componenets:-

1.**Material Cost:-**It is the sum of all the material taken used for the item taken by explosion of multilevel bom.

2.**Material Overheads:-**It is calculated as a percentage(%) of the material cost which is preconfigured based on historical data.

3.**Conversion Cost:-**The SMH is multiplied by the cost centre rate to derive the conversion cost."Cost centre rate" is the sum of

(variable+fixed)cost per unit.

4.**Subcontracting Charges:-**It is the sum of all the subcontracting charges of the Mashop items.

STANDARD MAN HOUR(SMH)

- **SMH** is the amount of work performed by the average worker in one hour.
- It is used for estimation of the total amount of uninterrupted labour required to perform a task.
- The formula to calculate SMH is:-
  (Setup time/Costing lot size)+(Process time/Base Quantity)
- **SETUP TIME:-**The amount of **time** taken to change a machine from the last part of a **production** lot to the first good part of the next **production** lot.
- **COSTING LOT SIZE:-** The Quantity of product for which costing is done.
- **PROCESS TIME:-** The **time** spent transforming raw materials into finished goods.
- **BASE QUANTITY:-** The Planned total amount of the component to be issued divided by the planned number of units to be produced.

COST CENTRE:-

A Cost Centre is a product, physical place (e.g. sales department) or person within a business that can be held responsible for certain expenses incurred in the running of that business.

WORK CENTRE:-

A WorkCentre is an area in a business in which productive

resources are organized and work is completed.

❖ STANDARD COST ESTIMATE

- ❖ Standard Cost estimate is the basis of product cost planning. This is nothing but the estimation of cost of a particular product, being manufactured.
- ❖ Product Cost planning is an area within SAP product cost controlling where,the companies can plan cost for materials without referring to production orders,and other cost controlling objects.
- ❖ We usually create a standard cost estimate for a material at the beginning of a fiscal year or a new season.
- ❖ The standard cost estimate then remains valid for the entire year or season.
- ❖ We can use it to establish a standard price for materials for the time period.
- ❖ We should not change the standard cost estimate during this time.
- ❖ The standard costs then remain constant and are not influenced by price fluctuations or changes in the production structure during the planning period.
- ❖ We valuate the planned quantity structure of a standard cost estimate with standard prices.

❖ STEPS TO ESTIMATE STANDARD COST

❖ First of all,we need to prepare product cost planning and for that we need to create master data such as BOM,Routings,work centres and cost centres.

❖ Thereafter Material cost,material Overhead cost,conversion cost are calculated.

❖ Finally,total cost is calculated by summing up the above mentioned costs.

BENEFITS OF STANDARD COST ESTIMATE

- To understand the material cost,material overhead cost,conversion cost in the production process.
- What measures can be taken to improve the overall efficiency of the production?
- Is it possible to sell the product at a competitive and profitable price in the market?

TATA HITACHI

Reliable solutions

ENGINE BOM TABLE

Level	Item Identifier	Proc type	Child Serial	Quantity	Material Cost Per item	Material Overhead Per item	Total Material Cost	Conversion Cost Per item	Total Conversion Cost	TOTAL COST
-	TB0XXX1	Inhouse	---	1			-	38,666.7	38,666.7	**364,902.1**
1	YB0XXX1	Procured	1	1	3,063.0	153.2	3,216.2			3,216.2
1	469XXX1	Procured	3	2	2,910.0	145.5	6,111.0			6,111.0
1	102XXX1	Procured	4	1	6,110.0	305.5	6,415.5			6,415.5
1	ZC0XXX1	Inhouse	5	1	7,733.0	386.7	8,119.7	5,315.7	5,315.7	13,435.3
2	ZC0XXX1@10	Procured	1	1	7,733.0	386.7				-
1	XV0XXX1	Procured	6	16	40.0	2.0	672.0			672.0
1	A59XXX1	Procured	7	16	50.0	2.5	840.0			840.0
1	308XXX1	Procured	8	1	11,600.0	580.0	12,180.0			12,180.0
1	YB6XXX1	Procured	9	1	55,651.0	2,782.6	58,433.6			58,433.6
1	443XXX1	Procured	10	1	161.0	8.1	169.1			169.1
1	102XXX1	Procured	12	1	6,110.0	305.5	6,415.5			6,415.5
1	308XXX1	Procured	13	3	11,600.0	580.0	36,540.0			36,540.0
1	443XXX1	Procured	14	6	161.0	8.1	1,014.3			1,014.3
1	428XXX1	Procured	15	6	27.0	1.4	170.1			170.1
1	431XXX1	Inhouse	16	3	682.0	34.1	2,148.3	805.0	2,415.0	4,563.3
2	431XXX1@90	Procured	101	1	682.0	34.1				-
1	411XXX1	Procured	17	3	13.0	0.7	41.0			41.0
1	308XXX1	Inhouse	18	1	682.0	34.1	716.1	1,850.0	1,850.0	2,566.1
2	308XXX1@60	Procured	101	1	682.0	34.1				-
1	102XXX1	Inhouse	20	1	12,710.0	635.5	13,345.5	37,575.3	37,575.3	50,920.8
2	102XXX1@40	Procured	1	1	12,710.0	635.5				-
1	XV0XXX1	Procured	21	24	40.0	2.0	1,008.0			1,008.0
1	204XXX1	Procured	23	1	1,774.0	88.7	1,862.7			1,862.7
1	440XXX1	Procured	24	2	119.0	6.0	249.9			249.9
1	308XXX1	Procured	25	3	11,600.0	580.0	36,540.0			36,540.0

Initially total material cost and material overhead were calculated using VLOOKUP function and SUM function in MS EXCEL.

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ROUTING TABLE

Material	Operation Name	Work ctr	Set Up Hrs	Set Up Min	Setup (Hr)	Proc Hrs	Proc Min	Process time (Hr)	Base qty	Costing lot size	SMH	Cost center No.	Variable Conversion Rate	Fixed Conversion Rate	Total Variable cost	Total Fixed Cost	Total Conversion Cost
102XXX1	Turning	TA323	1	0	1.0	0	22	0.4	1.0	30.0	0.4	AB65	400.0	8,000.0	160.0	3,200.0	3,360.0
102XXX1	Turning	TA323	0	15	0.3	0	15	0.3	1.0	30.0	0.3	AB65	400.0	8,000.0	103.3	2,066.7	2,170.0
102XXX1	Turning	TA435	1	0	1.0	2	10	2.2	1.0	30.0	2.2	AB65	400.0	8,000.0	880.0	17,600.0	18,480.0
102XXX1	Turning	T1624	0	0	-	0	40	0.7	1.0	30.0	0.7	AB65	400.0	8,000.0	266.7	5,333.3	5,600.0
102XXX1	Heat Treatment	H4656	0	0	-	2	40	2.7	12.0	30.0	0.2	AB63	400.0	7,000.0	88.9	1,555.6	1,644.4
102XXX1	Heat Treatment	H2544	0	0	-	10	0	10.0	12.0	30.0	0.8	AB63	400.0	7,000.0	333.3	5,833.3	6,166.7
102XXX1	Heat Treatment	H4630	0	0	-	0	7.5	0.1	6.0	30.0	0.0	AB63	400.0	7,000.0	8.3	145.8	154.2
308XXX1	Heat Treatment	H4281	0	0	-	5	0	5.0	20.0	20.0	0.3	AB63	400.0	7,000.0	100.0	1,750.0	1,850.0
421XXX1	Turning	T7364	0	15	0.3	0	10	0.2	1.0	20.0	0.2	AB65	400.0	8,000.0	71.7	1,433.3	1,505.0
431XXX1	Turning	T7364	0	15	0.3	0	5	0.1	1.0	20.0	0.1	AB65	400.0	8,000.0	38.3	766.7	805.0
440XXX1	Turning	T7364	0	15	0.3	0	5	0.1	1.0	20.0	0.1	AB65	400.0	8,000.0	38.3	766.7	805.0
TB0XXX1	Assy	T1655	0	0	-	2	0	2.0	1.0	1.0	2.0	AB64	500.0	7,500.0	1,000.0	15,000.0	16,000.0
TB0XXX1	Assy	T1605	0	0	-	2	50	2.8	1.0	1.0	2.8	AB64	500.0	7,500.0	1,416.7	21,250.0	22,666.7
ZC0XXX1	Heat Treatment	H3552	0	20	0.3	0	37	0.6	1.0	20.0	0.6	AB63	400.0	7,000.0	253.3	4,433.3	4,686.7
ZC0XXX1	Heat Treatment	H2554	0	0	-	1	0	1.0	12.0	20.0	0.1	AB63	400.0	7,000.0	33.3	583.3	616.7
ZC0XXX1	Heat Treatment	H2554	0	0	-	0	0.1	0.0	1.0	20.0	0.0	AB63	400.0	7,000.0	0.7	11.7	12.3

Thereafter,SMH was calculated using parameters like setup time,process time,base quantity and costing lot size.

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WORK CENTRE AND COST CENTRE TABLE

	A	B
1	Work ctr	Cost ctr
2	HX253	AB63
3	HX281	AB63
4	HY552	AB63
5	HY552	AB63
6	H2544	AB63
7	H2544	AB63
8	H3552	AB63
9	H2544	AB63
10	H2554	AB63
11	H2656	AB63
12	H4656	AB63
13	H4630	AB63
14	TV360	AB65
15	TV365	AB65
16	TV658	AB64
17	TW316	AB65
18	TW323	AB65
19	TW323	AB65
20	TW435	AB65
21	TW435	AB65
22	TX385	AB65
23	TX431	AB65
24	TX435	AB65
25	TY405	AB65
26	TY406	AB65
27	T2605	AB64
28	T2624	AB65
29	T2655	AB64

	A	B	C	D	E
1	Cost Center	CO area currency	Total Price	Price (Variable)	Price (Fixed)
2	AB30	INR	1,400.00	400.00	1,000.00
3	AB31	INR	2,000.00	500.00	1,500.00
4	AB32	INR	2,600.00	600.00	2,000.00
5	AB33	INR	3,200.00	700.00	2,500.00
6	AB34	INR	3,800.00	800.00	3,000.00
7	AB35	INR	4,400.00	900.00	3,500.00
8	AB38	INR	4,700.00	700.00	4,000.00
9	AB48	INR	5,300.00	800.00	4,500.00
10	AB49	INR	5,700.00	700.00	5,000.00
11	AB50	INR	6,200.00	700.00	5,500.00
12	AB51	INR	6,700.00	700.00	6,000.00
13	AB52	INR	7,200.00	700.00	6,500.00
14	AB63	INR	7,400.00	400.00	7,000.00
15	AB64	INR	8,000.00	500.00	7,500.00
16	AB65	INR	8,400.00	400.00	8,000.00

After that cost centre rate was calculated using Routing,work centre and cost centre table respectively.

Finally,Sum of total material cost and conversion cost gives us the

"Standatd Cost" of a manufacturing product.

ANALYSIS ON THE BASIS OF COST PARAMETER

TOP_5 ITEM IDENTIFIER IN TERMS OF TOTAL MATERIAL COST

Sum of Total Material Cost for each Item Identifier. The view is filtered on Item Identifier, which keeps 102XXX1, 308XXX1, YB0XXX1, YB6XXX1 and ZC0XXX1.

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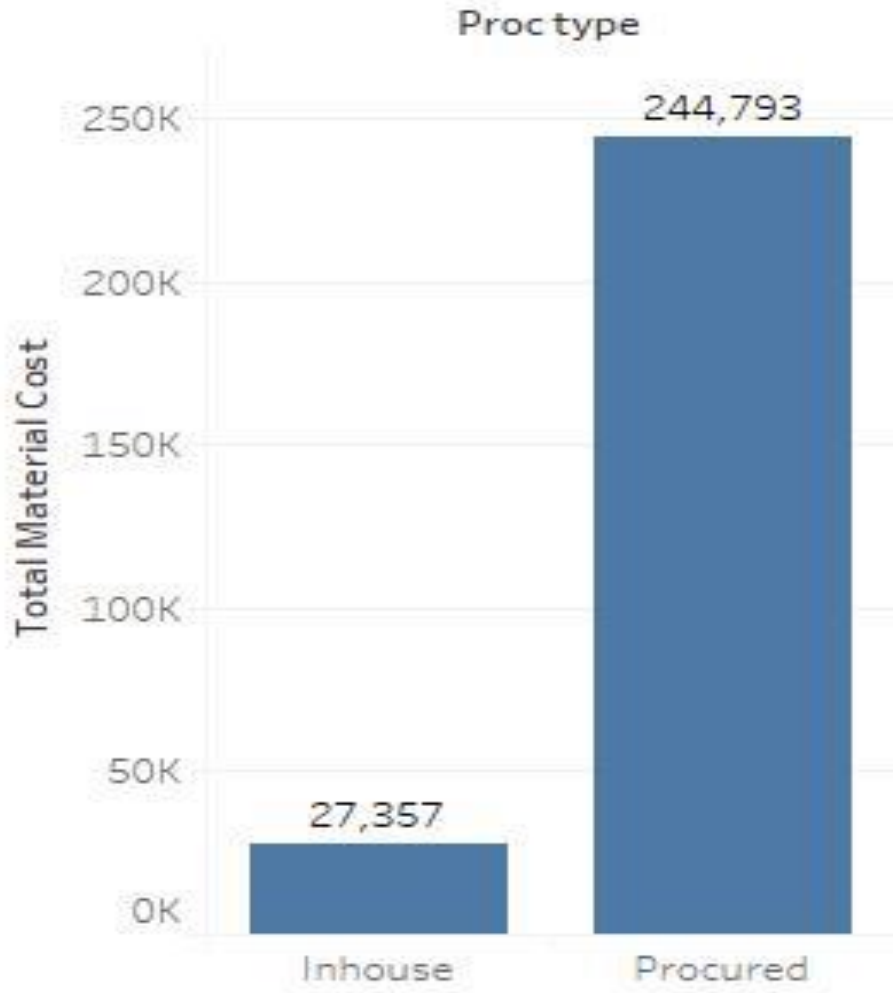
TOP_5 ITEM IDENTIFIER IN TERMS OF TOTAL CONVERSION COST

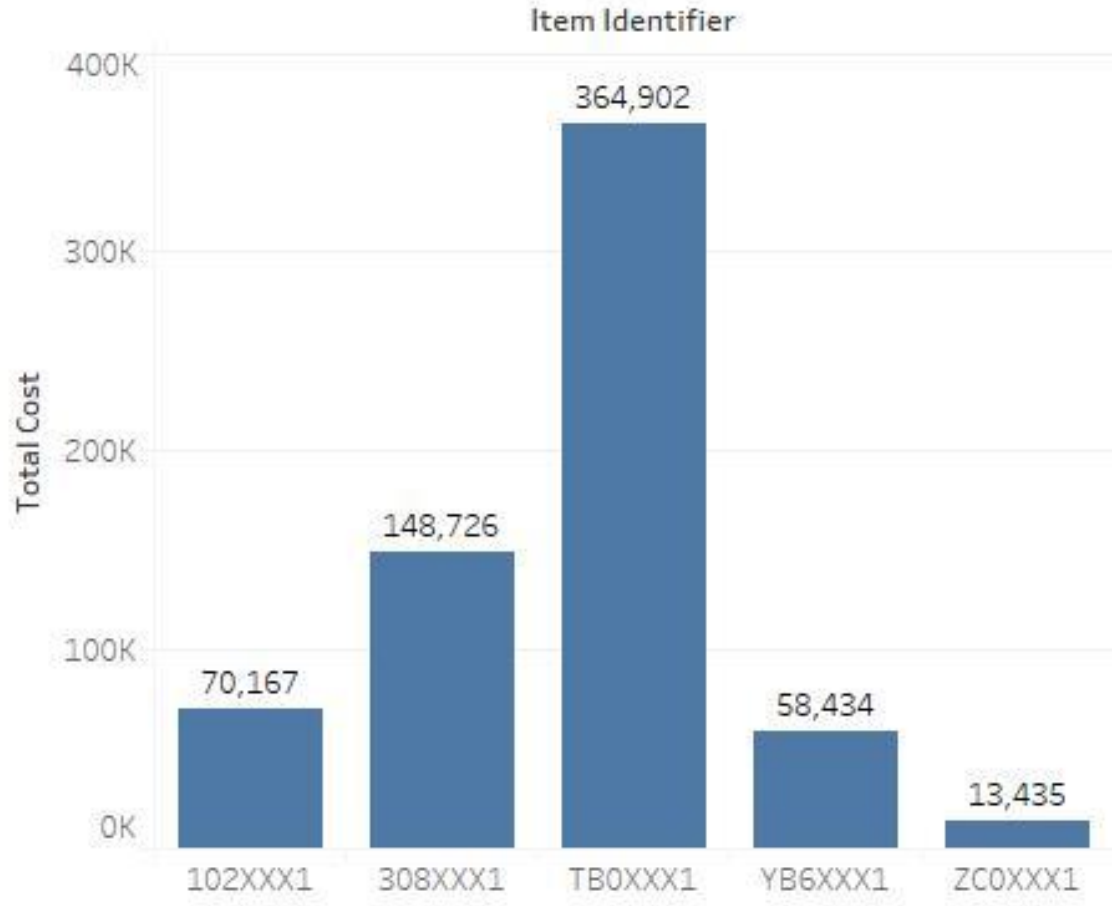
Sum of Total Conversion Cost for each Item Identifier. The view is filtered on Item Identifier, which keeps 102XXX1, 421XXX1, 431XXX1, TB0XXX1 and ZC0XXX1.

INHOUSE VS PROCURED



Sum of Total Material Cost for each Proc type. The view is filtered on Proc type, which keeps Inhouse and Procured.

TOP_5 ITEM IDENTIFIER IN TERMS OF TOTAL COST



Sum of Total Cost for each Item Identifier. The view is filtered on Item Identifier, which keeps 102XXX1, 308XXX1, TB0XXX1, YB6XXX1 and ZC0XXX1.

LEARNING OUTCOMES:

I got a great exposure in such a big & recognized company, so I got to know many things related to such a company. All I have learnt was

the theoretical part, but here I got a very different environment & I was able to co-relate my study with their practical applications.

Personal Learning:

- Interaction with company employees
- Communication
- Time Management
- Used advanced functions in MS EXCEL
- Visualisation Analysis Using Tableau

Professional Learning:

- How to analyse practical processes
- Process study & their applications
- Applying advanced MS EXCEL functions for "estimating standard cost".
- Drew some conclusion using visualization analysis in Tableau.
- Analysing different processes involved in Process,Planning department
- Significance of Small Group Activities(SGA)
- Importance of SIPOC Technique
- Analysing Inventory Optimisation Techniques
- Significance of Cost Centre and Work Centre

Conclusion:-

After analysing each and every process related to production,planning and control like Planning,Routing,Scheduling,Dispatching etc and also different Inventory Optimisation Techniques like EOQ,Just in time etc as well as SGA and SIPOC techniques,
I conclude that Production,Planning and Control represents the beating heart of any Manufacturing Process and are essential for customer delight and overall success of an organisation.

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Reliable solutions