Chapter III

CAD - Definition and Functions

Computer-aided design (CAD) can be defined as any d activity that involves the effective use of the computer t ate, modify, or document an engineering design. CAD is commonly associated with the use of an interactive com graphics system referred to as a CAD system. The followin the reasons for using a computer-aided design

1. To increase the productivity of the designer – This is ac plished by helping the designer to conceptualise the pro and its components. In turn this helps to reduce the required by the designer synthesise, analyse and docu the design.
2. To improve the quality of the design – The use of a system with appropriate hardware and software capabil permits the designer to do a more complete enginee analysis and to consider a larger number and variet design alternatives. The quality of the resulting desig thereby improved
3. To improve design documentation – The graphical outpu a CAD system results in better documentation of the des than what is practical with manual drafting. The enginee drawings are superior and there is more standardisa

among the drawings, fewer drafting errors and greater legibility

4. To create a manufacturing data base – In the process of creating the documentation for the period design (geometric specification of the product, dimensions of the components, material specifications, bill of materials etc.,) much of the required data base to manufacture the product is also created.

Functions of CAD

A typical CAD system consists of the following components - one or more design workstations, processor, secondary storage and plotter and / or other output devices. Computer Aided Design (CAD) is used for developing designs, pattern making, pattern grading, marker planning and lay planning.

Creating Designs – Textile designs for weaving / printing and garment designing (2D and 3D) can easily done with CAD.

Pattern Making – Patterns for garments can be drafted using Pattern Design Systems (PDS). This involves mathematical skills and is a complicated process by nature. Thanks to CAD this process is made easy. This helps in digitizing the patterns. Also the patterns can be saved in the computer and can be reused.

Pattern Grading – This is a complicated process like pattern making involving x, y and z axis. The increase or decrease of patterns size is simpler with CAD

Marker Planning – Efficient marker plan helps in fabric reduction and also to reduce the fabric cost. Economic marker plan can be easily achieved by arranging and rearranging the pattern pieces in the specific width. The sizes to be cut and number of layers of fabric to be spread is determined in marker / lay planning. The required pattern pieces for the sewing should be available on time.

CAM - Definition and Functions

Computer-aided manufacturing (CAM) is defined as the e
tive use of computer technology in the planning, manage
and control of the manufacturing function. CAM is used in
following process – stores, cutting, sewing, pressing, finis
and despatch.

Stores – Fabric rolls are measured after subjecting it to
ric inspection. It is sent to the other departments when
needed

Cutting – Patterns generated by marker making systems ca
directed to automatic cutting machines, which can be oper
without a human hand. The cutting head has cutting drill
notches in addition to the straight knife.

Sewing – Computer controlled sewing machines incre
the production and the quality of the product. Small pa
pieces like pockets and collars can be stitched easily.
operator positions the fabric on the machine and it auto
cally sews the fabrics. The special functions like button
making, button fixing and bar tacking can be done
precisely.

Pressing – Fabric pressing under the specified temperature
pressure is very important. Finally folding the garment to
required size is made easier, thanks to the CAM

Finishing and despatching – Finished packets are arranged
loaded in the cartons and packed. The carton is then sen
despatching. Special tracks are designed for the movemen
the packages.

CAA – Definitions and functions

Computer aided Administration is an area indispensable to
clothing industry. It is an inevitable equipment in the office
harding accounts, wages, Human resource and logistics

The functions of the CA may be listed as follows – Personnel, marketing and sales, order processing, procurement, stock control, costing and accounting

Personnel:

- Hiring people, training them with regard to the job, record keeping, payment and termination of the worker details.
- Describing employment requisitions, job description, training specification, personal data, pay roll, changes in working hours, pay checks, benefits and termination notice.
- Producers for action like training, hiring and termination, changing pay rates etc. are also programmed and functioned accordingly.
- Finally the available results obtained by the company checks for the difference between the plan and actual performance as in number of employees hired, cost of recruiting, composition of skilled inventory, cost of training, salary paid, etc. is com aganist profit obtained. The deviation can be analyzed and corrective measures can to be taken.

Marketing and Sales:

- The need for a product is identified by the marketing division. The specification of the product, the projection of manufacturing quantities and the strategy for marketing the product is also decided by the marketing department.
- Transaction process involves the sales order, promotion orders; etc. CAA includes operational control activities like training of sales force, day to day scheduling of sales and promotion efforts, periodic analysis of sales volume by region, product and customers etc.
- Comparison of overall performance against a marketing plan, information for managerial control includes a data on

customers, competitions, products, sales force requirem
Eg using a bar chart or pie chart results can be compa
- This is very in the achievement of the marketing obje
The Outlook express helps communicate with the cu
ers, and get necessory information of the product i
through easy network systems, the latest useful in tracki
process sequence up to date information though the in
communication.

Order Processing:

Modern apparel distribution centres use computerized
age and picking system that rely on bar-coding for storag
retrieval of garments when needed to fill orders. Comput
tem permits integration of many of the ordering and distrib
process. In Customer order processing (COP) software, c
are entered into the computer and the COP system pro
bar code labels that when scanned can produce packing
bills of loading or invoices. This system can stand alone or c
integrated with the apparel production and / inventory c
systems such as these reduce administrative costs and assure
accurate delivery of products to the customers.

Procurement:

The things to be procured can be listed as follows – F
Accessories, and Stationery. The fabric starts from the raw
rial, the yarn count and the amount of raw material neede
culated. The fabric is woven or knitted as per the specifica
given by the buyer. The grey fabric is given appropriate fin
and finally is dyed or printed as per the requirements. This
cedure involving suppliers and the cost of goods is tabul
and the order is placed with the supplier who produces qu
products at a minimum price.

Accessories like thread, laces, satin ribbon and buttons are also procured. Stationeries and other miscellaneous items needed for the execution of the order is also identified and procured.

Stock Control:

- It involves the activities like purchasing, receiving inventory control and distribution.
- This function uses the information contained in reports such as past due purchases, past due shipments to customers, out of stock items, over stock items, inventory turnover reports, vendor performance summary and shipper performance analysis.
- This includes the overall comparison between planned and actual inventory cost of purchase items.
- Based on the above information, the storage planning is made regarding the new policies to vendor's information on new technology.

Accounting:

When using a computerized accounting system on the computer, input screens have been designed for ease of use. The main advantage is that each transaction needs only to be inputed once, unlike a manual double entry system where two or three entries are required. Computerized accounting programs can provide instant reports for management, for example:

Aged debtors' summary – a summary of customer, accounts showing overdue amounts, trial balance, trading and profit / loss account, balance sheet, stock valuation, sales analysis, budget analysis, variance analysis, GST/VAT returns and payroll analysis

Thus CAA works and helps in the achievement of objectives of the management.

PPC – definition and functions

PPC stands for production planning and control. Com
are used for planning the production of a produc
monitoring the quality of production. It is discussed
the following heads – Production Planning and Prod
Scheduling.

Production Planning

The basic objective of a production unit is to manuf
products at the desired quantity at the right time. This re
planning of a large number of activities directly and ind
influencing the production mechanism. The overall obj
can be listed as follows

- To meet the production target without slippages
- To meet delivery schedule as proposed
- To minimise the average inventory level of raw materia
  components
- To optimise input resources like men, material and en
- To minimise inventory of work-in-progress and fin
  goods
- To minimise cost of production and penal deduction d
  delayed deliveries
- To improve customer satisfaction and goodwill
- To assist long-term plans based on experience gaine
  effective PPC systems
- To maintain efficiency of production at the highest leve

The PPC department forms part of the production wing
provides supportive role to manufacturing activities. It rec
progress reports on production and initiates corrective ac
wherever possible. If such actions are beyond its scope, it

top management to intervene. Production planning of a product involves working out the details of the following

- Product specification
- Technology to be used
- Production method, drawing and sequence of operation
- Production infrastructure and machines
- Input materials and components
- Input manpower and manpower norm
- Tolerance and testing methods
- Quality standards and reliability testing
- After sales service and maintenance report

Production planning is therefore the sum of total the efforts which go into the planning and scheduling of the activities connected with the manufacture of a product or service. This includes arranging all the inputs not only on time but in required quality, quantity and delivery time.

Production planning is one of the most important computer applications. An efficient production planning system can assist the company in one or more of the following ways, each of the following ways, all of which can lead to substantial savings.

- Reduction in material savings
- Decrease of idle machine time and increased output by proper scheduling
- Better co-ordination between departments
- Optimisation of product-mix; determination of quantity to be produced of each product that will result in maximum profit
- Reduction in in-process inventory
- In addition to a good system can also isolate bottlenecks in machine capacity and other facilities that constrain production and make suggestions for improvement

Design Department – This the first of planning becau holds standard designs and the pattern pieces, graded pat and marker plan. The cutting plan and the daily produ plan (number of pieces of garments to be stitched) and a related activities can be planned accordingly.

Purchasing and Stock Control – The computer is of great he assisting purchasing and stock control as it can efficiently an and record prices being charged for various materials, both and semi-finished. It can also compare the performance of ous suppliers on quality, delivery and price. It can also asse reliability of the components being supplied. In the case the optimize, a computer program can be used to assess quantiti materials to hold, bearing in mind, the capital cost of storing amount of money tied up, and the heat, light and space o buildings involved. It can also consider the probability of b able to supply a customer's demands at any time. It is also po to calculate the theoretical maximum and minimum batche a detailed plan it can take an inventory control and place o for the necessary materials (fabric, thread, buttons etc) ahe production

Manufacturing Process – the computer analyses the tim delivering the goods from the date of production. It can the major activities like cut planner and sewing produc and the other related works of the other department like p ing and packing. It can analyse the floor production speed the performance against the estimate.

Sales Department – They compute the sales and examine the s with the past orders. This set the target for the product's sales

Production Scheduling

Scheduling commences when the production contr hands over the production schedule for a given per

say a week or month. The scheduler is responsible for the following

- Based on the norms issued, the scheduler prepares a standard processing time for each activity
- Prepares release time schedule specifying the times to start activities assigned to each department
- Assigns factory order number to each lot scheduled for production and prioritisation
- Assists in preparing departmental work tickets / subsidiary job cards, materials requisition, tools requisition and other forms
- Keeps a track of the availability of materials and their replacement promptly on reaching the recorder point

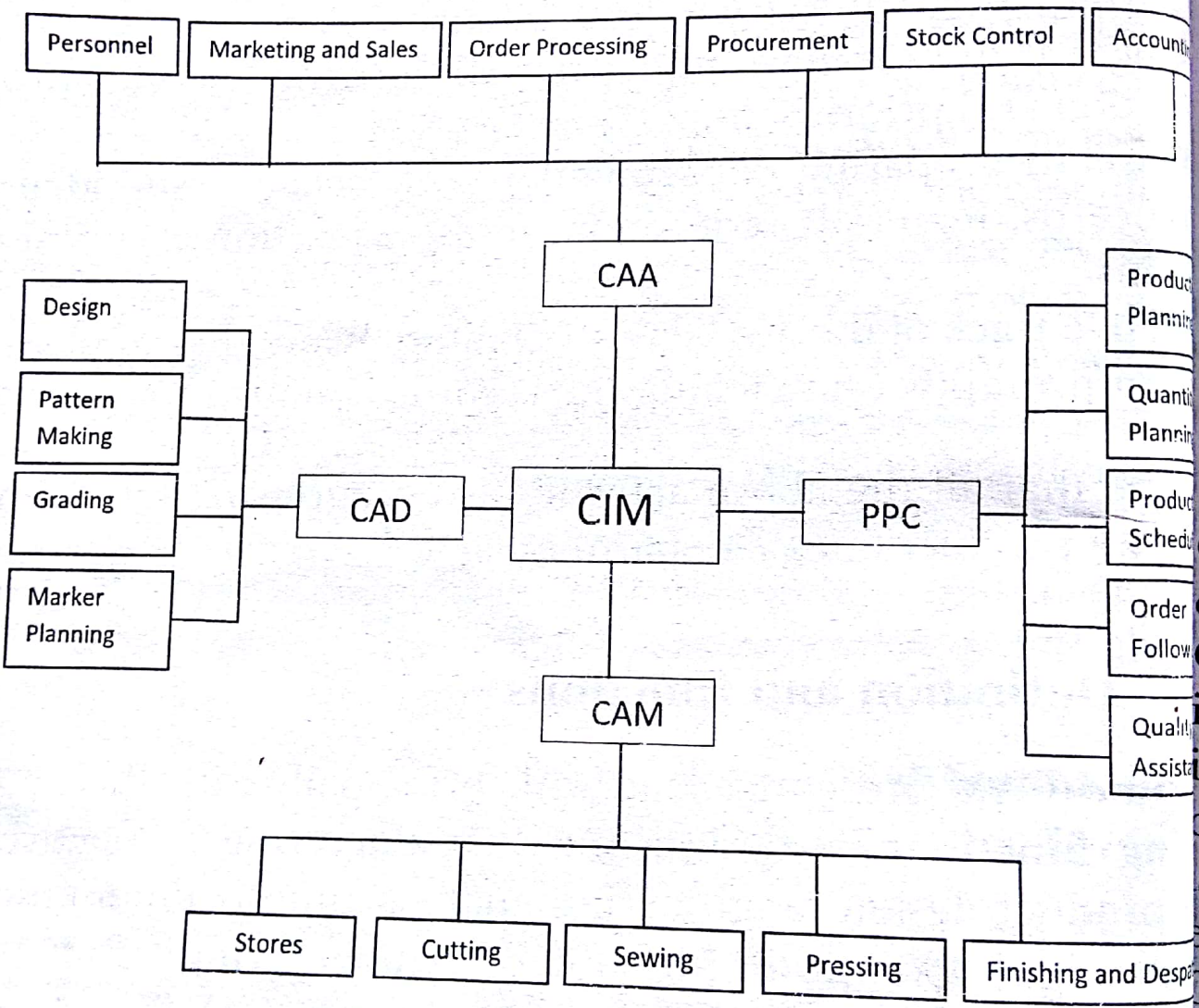
Ensures that all the above activities are progressing satisfactorily at all product lines / departments

CIM - Definition and functions

CAD and CAM are concerned with principally with the engineering functions in design and manufacturing respectively (like product design, engineering analysis and documentation of the design). Computer Integrated Manufacturing (CIM) not only includes all the engineering functions of CAD/CAM, but it also includes the business functions of the firm as well. The ideal CIM applies computer technology to all of the operational functions and information processing functions in manufacturing from order receipt, through design and production, to product shipment.

The concept of CIM is that all the firm's operations related to the production function are incorporated in an integrated computer system to assist, argument and / or automate the operations. The computer system is pervasive throughout the

firm, touching all activities that support manufacturing. In t integrated computer system, the output of one activity serve the output to the next activity, through the chain of events t starts with the sales order and culminates with shipment of product. The components of the integrated computer syst and their relationship to our model of manufacturing is gi in the illustration below



Computer Aided Administration (CAA) – computers are u for marketing, sales order processing and stock control.

Computer Aided Design (CAD) – computers are used for de oping designs, pattern making, pattern grading, marker and planning.

Computer Aided Manufacture (CAM) – computers are used for store design, lay planning and cutting, sewing and pressing.

Production Planning and Control (PPC) – Computers are used for planning the production of a product and monitoring the quality of production.

Customer orders are initially entered by the company's sales force into a computerised order-entry system. The orders contain the specifications describing the product. The specifications serves as the input to the product design department. New products are designed, the bill of materials is compiled and assembly drawings are prepared. The output of the design department serves as the input to manufacturing engineering, where process planning and tool design and similar activities are accomplished to prepare for production.

Many of these engineering activities are supported by the CIM computer system. Process planning is performed using to computer-aided process planning and tool design is done on a CAD system, making use of the product model generated during product design. The output from manufacturing engineering activities provides the input to production planning and control, where material requirements planning and scheduling is performed using computer system. And so it goes through each step in the manufacturing cycle. Full implementation of CIM results in the automation of the information flow through every aspect of the company's organisation.