COMPUTEC Ltd

Information Technology Solutions

PRODUCTION

MANAGEMENT

ACCOUNTING

COST

CONTROL

PMACC

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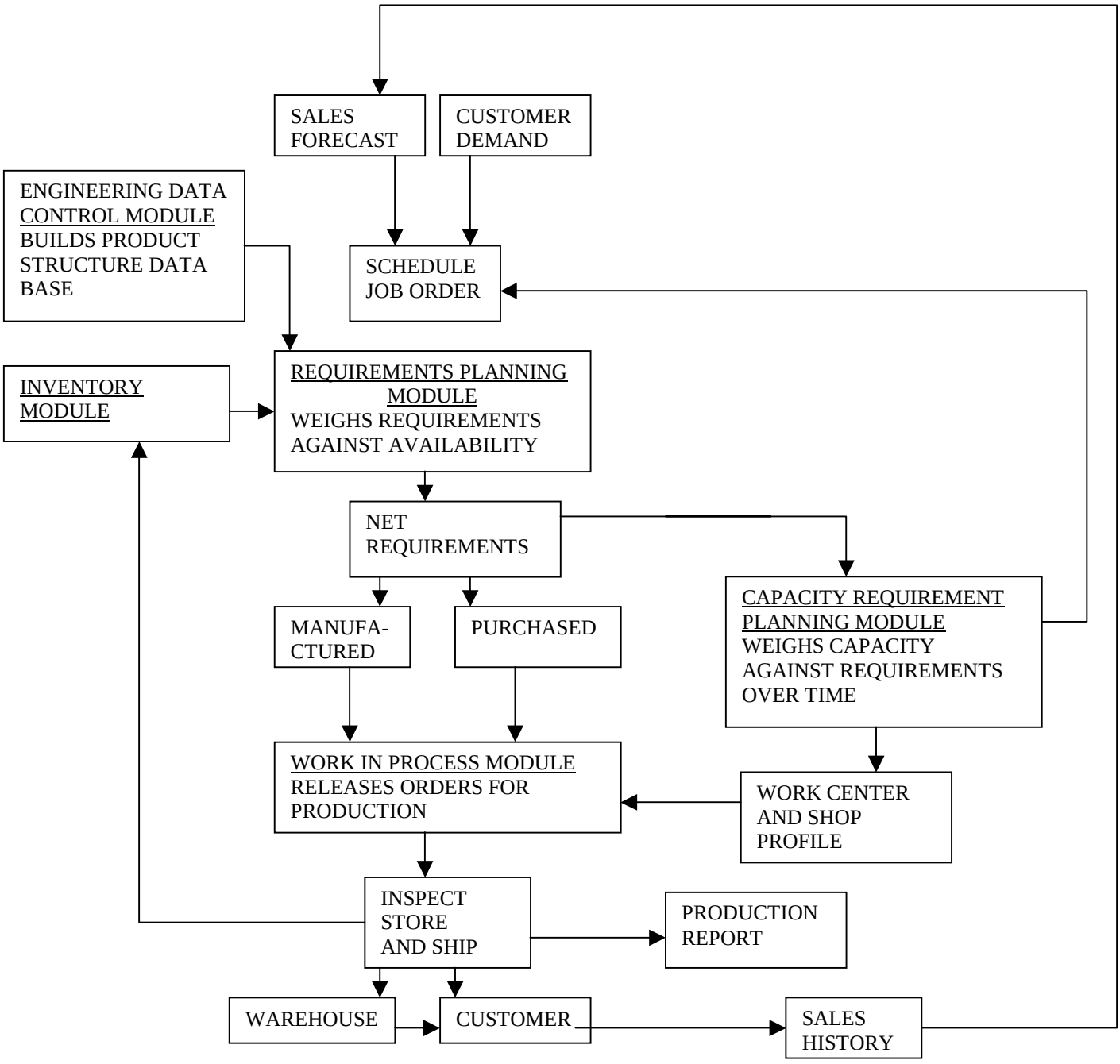
INTRODUCTION : SYSTEM MODULES

The Objective of a production control system is to optimise the production so as to be able to produce a given product in the shortest time at the lowest cost possible. The trade-off between cost and speed is a factor to be determined by market demand conditions and constraints of physical resources (human + equipment). In order to achieve this goal two major disciplines are called upon :

A- **The technical and engineering** knowhow to quantify the demand for a product and the manufacturing requirements for that product and put them in an orderly manner to allow us to obtain its standard cost and the time and resources required to produce it.

1. Demand Forecasting
2. Inventory Management
3. Product Data Management
   - Bill of materials
   - Standard cost
4. Material Requirements Planning
5. Resource Loading & Capacity Requirements
6. Standard Costing & Cost Control

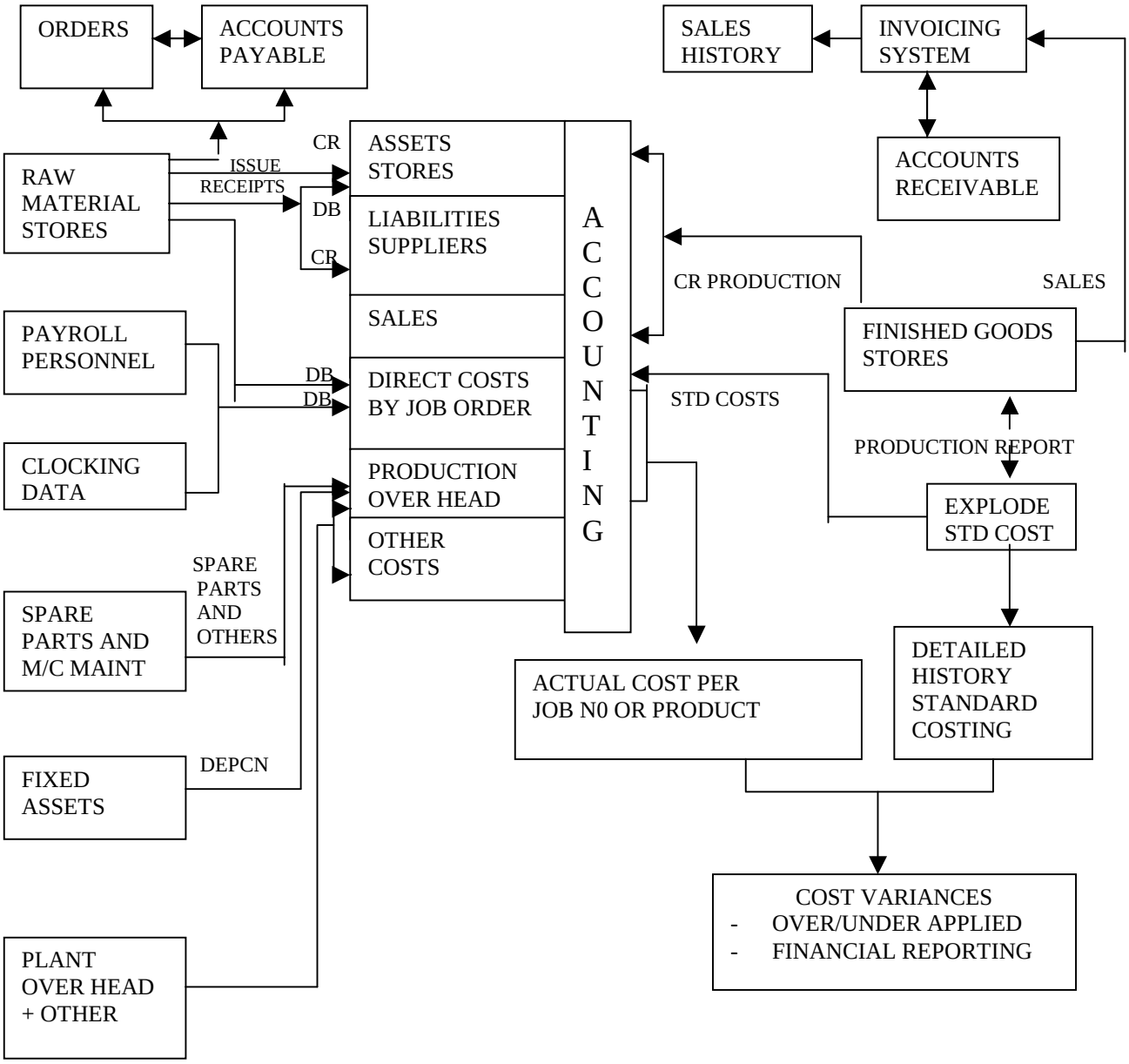


PRODUCTION CONTROL SYSTEM

B- **The Accounting** function around which all the sales cost/profit related activities are centered to produce a company level budgeting , forecasting reporting and control.

Here a combination of integrated computer modules can be introduced depending on the particular requirements :

7. Invoicing, Stock Control, accounts Receivable & Sales Reporting.
8. Payroll/Personnel
9. Time Sheet Recording & Costing
10. Purchasing
11. Accounts Payable
12. Fixed Assets
13. General Accounting
14. Financial Reporting and Cost Accounting.



ACCOUNTING SYSTEM MODULES
FOR AN INDUSTRIAL ENVIRONMENT

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TECHNICAL PHASE OF PRODUCTION CONTROL

1- DEMAND FORECASTING

The optimisation of the quantities to be produced so as to minimize the quantities on hand without hitting stockouts situations depends to a great extent on being able to forecast the demand for a finished product.

The demand forecasting computation depends on 2 major inputs

- Backlog of outstanding orders
- Forecast of item demand

The quantities required from existing orders can be easily computed and scheduled as per contractual delivery terms.

The sales forecast will require the introduction of some form of statistical analysis of the sales historical data available.

The sales data – base available in the system provides for monthly sales figures by item over the past 2 years.

Using this data the sales forecasting model can produce sales forecasts based on one or several computational algorithms :

1- Using the simple average of the past 12 months to forecast for the coming months. (well behaved items).

2- Using a weighted system whereby the most recent months are given a higher weight in predicting the future demand . Here the degree of the weight can be tuned to the customer's demand.
This method can be used for items with a possible sales trend
(up or down) but not for seasonal items.

Using statistical methods such as determining the sales trend.

For each item one of these methods can be used and when the goods demand is calculated the other factors are put in including : quantity on and , quantity on order, safety quantity. The net requirement is arrived at and quantity may be subject to a last minute management intervention before the final production requirements are determined.

INVENTORY MANAGEMENT AND PRODUCT DATA MANAGEMENT

INTRODUCTION

The first step in the setup of a production control system is to establish the theoretical and technical information pertaining to the planning and execution of a given manufacturing process needed to produce a finished goods item.

The formalisation of the production information will require a thorough knowledge of the various steps (operations) required to manufacture the product (s) , the ingredients or component/sub-component makeup and the various manpower , machinery and economic factors which have to be taken into consideration.

In formal terms this will mean the setup of the following data files.

2- INVENTORY MANAGEMENT

This will require the setup of one or more of the following modules :

- Raw Materials required to produce & package the item.
- Finished goods product management linked to an Invoicing & Sales reporting system.
- Work in process stock control module to keep track of semifinished items which may get sold directly or go into the manufacture of other finished products.

- A Spare parts and maintenance consumables module will also be setup as part of the accounting environment.

3- PRODUCT DATA MANAGEMENT

This includes the following modules :

- Bill of materials (item composition or recipe). This module itemises the various raw ingredients (items) which make up a product including the quantity required, machines used, manpower and skill.

- Manufacturing routing which details the various manufacturing steps required and their sequence.

- Work center information which describes the machines used in the manufacturing process.

BILL OF MATERIALS MODEL (BOM)

A prime requirement in production control is to be able to analyse the processes required to manufacture the Finished product and break it into :

- The elementary materials which go into manufacturing the finished product (item No., quantity, unit cost, currency).

- The manpower and skills required to complete a given step in the manufacturing process (skill, No. of hours).

- The equipment resource requirement during the various steps of the production. (eqpt. No., No. Of Hrs/unit of production).

- The other share of allocation from plant, marketing & other overheads.

Once this data has been setup for a given product (based on previous production data as well as some estimates) the model can be used to obtain :

- **Standard cost per unit of finished product**

- **Explosion of bill of materials** requirement to manufacture a given quantity of finished product.

- **Resource loading** schedule including.

Manpower loading requirements
Machinery loading requirements

4 – EXPLOSION – IMPLOSION BILL OF MATERIALS AND MATERIAL REQUIREMENTS PLANNING

Whenever a product is to be manufactured, the required quantity is fed into the Bill of Material Model and the required quantities from each item are generated.

The generated list can be for single level product structure of for indented product structure (detailed to the most elementary item).

The generated (Explosion BOM list) is then compared to the actual quantities on hand and on order, taking into consideration any reservations made for other items. Any shortages are pointed out to assist the production personnel in planning and possibly ordering the required quantities.

Whenever needed an implosion list is produced. This is effectively a where used list showing for every raw ingredient item all the places (semifinished and finished products) where it is used and the quantity required per unit of finished product.

5 – RESOURCE LOADING

This module maintains data about the various work centers (machines and their capacities, numbers & availability). It also maintains a list of all the skills required in the manufacturing process plus the total manpower availability in each skill category.

While generating the explosion Bill of materials the system will also generate the corresponding requirements for the manpower and equipment loading. The system will produce reports detailing the total load per machine and equipment center and the total required manpower per skill. This data is necessary to complete the planning phase of the production.

6 – STANDARD COSTING AND COST CONTROL

The BOM model is used by the technical (production) as well as the marketing and cost accounting departments.

- The technical people use it as a control yardstick to compare the actual material usage, manpower utilisation and equipment usage against the standard computed figures in the model. Any deviations from the standard will then have to be attributed to either production irregularities or an actual poorly estimated figure in the model.

- The cost accounting department uses this model to compute the standard cost of the product, feed it into the accounts. The actual cost figures collected from the job orders material consumption and manpower and equipment utilisation are also compared to the computed standard cost and any variations are again examined for causes and are posted into the over/under applied accounts.

The cost accounting department can use this model to make what if simulations by varying certain factors such as effect of cost of labour, or cost of a given Raw Material item or effect of foreign currency x'change rate. This simulation is extremely useful especially when new or variations of existing finished products are being considered for introduction into the market. This last application comes in handy for the marketing department personnel whenever they need to make quotations for new items.

THE ACCOUNTING FUNCTIONS AND MODULES

In parallel with the production control process the actual accounting document flow and procedures will have to be provided for in order to feed the inputs which are processed to provide the analysis of the real and detailed costs which go into the manufacture of a given product.

The system assumes that proper coding, job order sheets with associated system and procedures are implemented to allow for the accurate and timely availability of the input data. The outline provided shows the various modules which feed the input to the central cost accounting system. However and depending on the particular industry under consideration some of these modules may be of less significance than others and their output may be prepared manually and input to the overall system in the form of journal voucher.

Most of the modules being presented here come in free standing form and can be integrated together whenever the other modules are implemented. A brief description of the modules is provided :

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7 – INTEGRATED INVOICING,STOCK CONTROL,ACCOUNTS RECEIVABLE AND SALES REPORTING SYSTEM (D-MACC)

This system maintains important files which are used by the production control system as well as the General & Cost accounting departments.

The system has the following functions :

- Issues invoices which can be according to a preset price list and discounting system or as specified in contracts/agreements with individual customers.
- Updates the Finished goods master stock file with all movements including receipts (production reports) , issues (invoices) , return & adjustments.
- Maintains the customer Master and movements files to allow for the followup of the A/R aging reports, detailed statements and other analysis.
- Maintains a sales statistics data base over any period (usually 2 years). This data base is used to generate all the sales reporting required to analyse the sales trends by customer, area, salesman, company totals and to forecast future demand to schedule production accordingly.

A detailed description of the system is provided in a separate document.

8- PAYROLL / PERSONNEL

After the Raw materials the labor cost is usually the most important to quantify and monitor in a production control system. This system will maintain an up-to-date file which contains all the constant payroll information and personnel records.

Once the changes to the master file and the monthly variables are fed in (including absences/overtime etc…). Then the detailed payroll Journal is produced. The link with the cost accounting system consists of analysing the Journal details and generating a Journal Voucher that will debit the various production sections where each employee has worked. Overhead costs such as the social insurance charges are also computed and allocated.

Moreover the system computes monthly accruals for end of service bonus and charges it to each employee's respective work center.

The personnel part of the system maintains all the legal and historical data of the employees including annual leaves , absences and the legal register data such as passports, Iqamas, family etc…

9- TIME SHEET

In certain production environments where more detailed payroll cost analysis is required because a given employee may work over several job numbers during a pay period then the time sheet module is required to input the detailed daily time sheet data for each employee. The detailed input specifies the job number/or cost center worked on , the duration and the type of work done (regular/overtime). The input is controlled against the reported monthly totals by employee and when the payroll journal is produced the time sheet data is used to split the direct payroll costs (regular/overtime) over the time sheet job numbers. The payroll journal voucher which is generated will debit the itemised jobs.

In addition to this detailing the system will maintain the time sheet data for any specified period to allow for job analysis & employee work analysis.

10- PURCHASING

This system does not affect the product costs directly but its availability becomes important to monitor the goods on order (Raw materials , packing materials & spare parts).

The system tracks the orders from the time a purchase requisition is raised through ordering with the supplier(s) and shipment of goods , and receipt into the company warehouses. The system is linked with the stocks systems (Raw materials & spare parts) and any inquiry in those systems will link with this system to provide the quantities on order.

11- ACCOUNTS PAYABLE

Again this module does not affect the production control functions directly but may form an important tool in the financial reporting and cash flow management. The system tracks the A/P commitments by supplier invoice and expected maturity of payment, bank, currency etc… From this data base a series of reports can be produced including expected cash flow requirements by currency/supplier & date.

12- FIXED ASSETS

In most industries the capital investment in Fixed Assets can be a high ratio compared with the total investment. As a result the followup of the details of the assets and their subsequent depreciation costs is quite important. The fixed Assets system provides the facility to maintain records of all Fixed Assets available, their condition, supplier, ratings, etc… Plus the financial information including purchase value, net book value & cost of replacement.

The straight line depreciation method is applied monthly and the amounts charged to the specified cost centers/departments.

The journal voucher is generated reflecting these costs and is automatically integrated with the accounting systems.

13- GENERAL ACCOUNTING

The General Accounting system is the central structure which is fed from all the other accounting modules. In addition to receiving the automatic vouchers generated from the other modules the system receives daily inputs including miscellaneous expenses, bank movements etc… The balance sheet items do not vary much from one company & the other except at the detail level. The profit and loss items however can see some significant variances from one company and the other depending on each company's nature of products and detail level required in the production cost analysis.

The chart is thus designed to satisfy the customer's specific requirements.

The accounting system files maintain both summarised historical data over the past 13 months as well as detailed accounting movements for the current year.

This level of data is designed to meet most of the accounting reporting requirements.

14- FINANCIAL REPORTING AND COST ACCOUNTING

Given the detailed data available from the accounting data base the following data is required before proceeding with the costing computational procedures:

A- Work in progress data (semifinished goods)

B- Reallocation percentages to distribute the common production overhead costs etc… over the various production lines.

C- It is assumed here that all related modules feed in their respective data before the final costing procedures including accruals , depreciations , provisions , finished goods situations and any stock & sales adjustments.

D- If a budgeting system is applied the relevant period budget/forecast is to be fed into the budget files.

When all the end of accounting period procedures are completed the system produces both :

- Financial reports reflecting the overall company performance (profit & loss , balance sheet, analysis of income & expenses etc…).

- Cost accounting reports which detail the actual and standard period and year-to-date analysis of costs per division , section , product or job number (the level of detail being as specified in the chart allocations).

If the standard costing procedure is used to compute and credit the costs of the finished goods produced/sold then the period accounting will show a variance between the actual costs per product and the standard cost applied. The difference is allocated to over/under applied accounts which are opened for the various sections/items.

COMPUTER SOLUTIONS FROM COMPUTEC

INTEGRATED SYSTEMS

P-MACC	- Production Management And Cost Control
D-MACC	- Customer Invoicing,Accounting And Sales Management
C-MACC	- Construction Management and Accounting system.
I-MACC	- Integrated General Insurance System.
R-MACC	- Retail (POS) and Backoffice Systems

FREE STANDING OR INTEGRATED MODULES

Bi-lingual Accounting system
Payroll Personnel (Bi-lingual)
Stock control
Fixed Assets
Accounts Payable
Accounts Receivable
Purchase Orders
Budget And Financial Reporting
Human Resources
Other Applications (standard or tailored)

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