

Guide to production control —

Part 5: The relationship between production control and other management functions

Committees responsible for this British Standard

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- British Computer Society
- British Production and Inventory Control Society
- Chartered Institute of Management Accountants
- EEA (The Association of Electronics, Telecommunications and Business Equipment Industries)
- Institute of Logistics and Distribution Management
- Ministry of Defence
- Nottingham University
- PERA International (Production Engineering Research Association)
- University of Bradford
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Foreword

This Part of BS 5192 has been prepared under the direction of the Quality, Management and Statistics Standards Policy Committee.

The prime objective of production control is to help a company become more competitive and profitable. An effective production control function endeavours to fulfil this objective by keeping a balance between satisfying sales demand, achieving high plant utilization and maintaining low investment in stocks and work-in-progress. An optimum balance between these often conflicting objectives will only be achieved by a production control system designed to meet the specific needs of the company and run by well trained and dedicated staff.

BS 5192 is published in six Parts and gives comprehensive guidance in those areas that are considered essential for effective production control.

— *Part 1: Introduction:*

Scope of the guide, purpose of production control, relationship to other functions, technological changes, choosing the system to fit the business;

— *Part 2: Production programming:*

Relationship to corporate and business programmes, planning techniques, master production scheduling, capacity planning;

— *Part 3: Ordering methods:*

The various types of ordering and stock control systems, comparing the advantages of each for particular applications;

— *Part 4: Dispatching (shop-floor control)*

The methods of shop-floor production control and documentation involved and the increasing influence of computers;

— *Part 5: The relationship between production control and other management functions:*

The production control information flows in the organization, their generation, presentation, use and maintenance;

— *Part 6: Computer aided production control:*

The application of computer software to the production control function.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 28, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Introduction

Production control (see Figure 1), like other aspects of manufacturing industry, has developed over the years from a simple almost independent function to a complex sphere of influence interacting more widely with other functions. This development and its likely future development can be described in three phases.

- a) The traditional role of production control:
 - production scheduling;
 - materials procurement.
- b) The current role of production control:
 - costing;
 - labour planning;
 - material requirements planning;
 - optimizing production;
 - manufacturing control;
 - quality control
- c) The developing role of production control:
 - direct input into and feedback from computer-controlled machinery, automatic guided vehicles, processes and systems;
 - networking of production control systems via electronic data interchange (EDI);
 - real-time finite scheduling.

The trend inherent in production control systems is a diffusion of the production control function amongst those responsible for managing the business, in order to improve its effectiveness, e.g. a shop supervisor may schedule the optimum work flow and the sales manager may advise delivery dates to customers. The shift in authority away from the production control function to the other business functions will result in a smaller, albeit more crucial, production control function with a wider sphere of influence. Larger and more detailed volumes of information are required, interlinking and used by all departments.

Production control systems are thus becoming more critical to the efficient running of the company. Data processing systems enable the information to be handled effectively, but the flows, details, accuracy, amendments and presentation of this information should be very carefully designed and monitored. This Part of BS 5192 considers these aspects of the production control system.

1 Scope

This Part of BS 5192 gives guidance on the increasing influence of the production control system throughout the manufacturing organization. Information flows between management functions and the ways in which they are used in the control of the organization, are described in some detail.

Formats and methods of transmission, presentation and revision of information are also considered. Emphasis is given to the design of the production control system to meet the control requirements of the organization.

2 References

2.1 Normative references

This Part of BS 5192 incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this Part of BS 5192 only when incorporated in it by updating or revision.

2.2 Informative references

This Part of BS 5192 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest edition.

3 Definitions

For the purposes of this Part of BS 5192, the definitions given in BS 3138:1992, BS 5191:1975 and BS 5192-1:1993 apply.

4 Production control information flows

4.1 Each management function needs a constant flow of basic information in order to be able to operate effectively. The production control system can be used to supply the majority of this information (see Table 1).

4.2 The principal information flows around and between the various management functions are shown in Figure 2. This demonstrates that production planning and control is the centre of the information flows.

4.3 The information flows shown in Figure 2 and Table 1 are not all essential to the operation of the production control system itself, but they are necessary indirectly to enable inputs to the system to be made from other sources.

Other information flows between the management functions exist and can be essential to the overall operation of the organization. This Part of BS 5192 considers only those information flows that are necessary to ensure production of an item to meet required quality, cost and delivery criteria.

Some of the major information flows not considered in this Part of BS 5192 are as follows:

- cost estimates;
- sales analysis;
- production efficiencies;
- credit control;
- market research.

5 Generation and use of production control information flows

5.1 General

In manufacturing companies a high volume of complex production control information circulates between the various departments; the most important of these flows of information are shown in Figure 2. In order to maximize the effectiveness of this information it is essential that the source of each information flow should be understood and its end use be clearly defined. In this way the format and method of information transfer can be effectively designed. It is very easy, particularly with computerized systems, to provide irrelevant or even confusing information to a management function. The information flows shown in Figure 2, their sources and end uses are described in 5.2 to 5.15. Guidance on their formats, with examples, is given in 9.3 and 9.4.

5.2 Senior management

The master production schedule is an overall short, medium and long term production strategy. It is used by the sales department to indicate the availability of products for sale and by the manufacturing and production control departments to enable effective planning of all production resources including plant, labour and materials.

5.3 Marketing

5.3.1 Market requirements information is needed by the senior management of the company in order to assess the suitability of the product range and the level of demand likely in the future. This is an important factor in defining the master production schedule for the long term.

5.3.2 Market forecasts of trends in style, colour or other relatively minor design changes are used by the sales department to establish sales forecasts for the product range and identify the need for updating current models.

5.3.3 Market data on new products are needed by the design department to ensure that any new design meets the practical and aesthetic needs of the market place.

5.4 Sales

5.4.1 Sales forecasts are used by the senior management of the company in the definition of the master production schedule for the short and medium term.

5.4.2 Details of the customer's order including quantity, delivery date, specification/design reference are the major elements in the operation of the production control system. The planning of all production is triggered and determined by these details.

5.4.3 An acknowledgement of order sent to the customer can be used in some cases as a check on the order details if it requests formal approval of the design before manufacture. It always confirms formally to the customer that the order has been received and is included in the production plans.

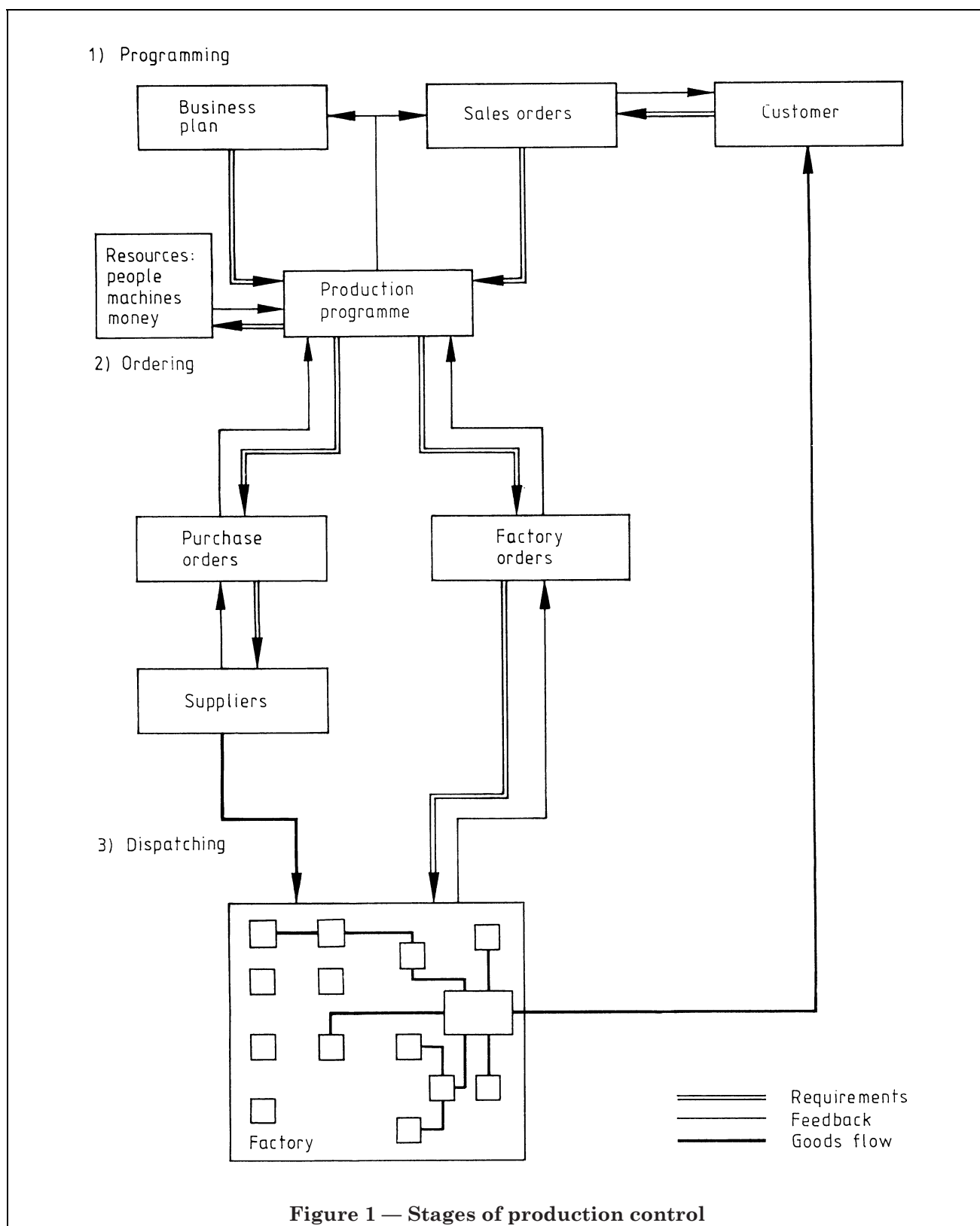
5.5 Design

Based on the requirements for new or modified products, the design department produces detailed drawings and technical specifications. The production engineering department converts these into production specifications and defines plant, tooling, materials and methods specifications. The interrelationship between the research and design department and the production engineering department is particularly important in ensuring that the correct design of product is made within the defined cost and quality parameters. Compromise in the technical specification is often needed to achieve this. Many production control systems, particularly if computerized, require a formal bill of materials to be defined. This is described further in Annex A.

5.6 Production engineering

5.6.1 Material specifications produced by the production engineering department are needed by the purchasing department in order to source and procure materials, by the production control department in order to complete works documentation and by the quality control department in order to define inspection techniques.

5.6.2 Production specifications are used by the production control department in order to complete works documentation, by the quality control department for defining inspection requirements and by the manufacturing department in defining plant and labour requirements.



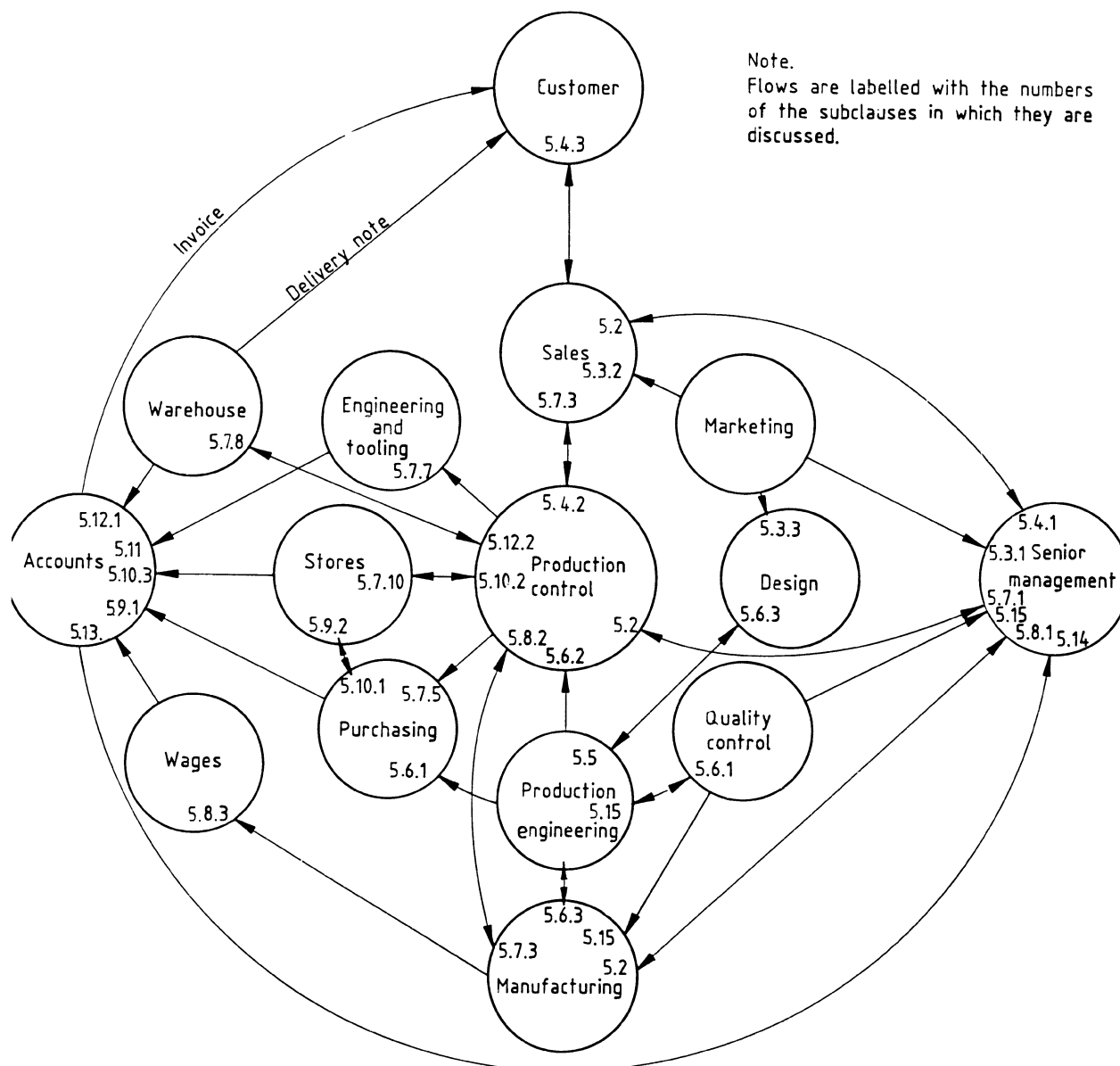


Figure 2 — Principal inter-departmental flows of production control information

Table 1 — Production control information flows

Input information required	⇒	Management function ⇒	Output information
Market needs Sales forecasts Factory loading data Production statistics Output statistics Quality control statistics Turnover, cost and profitability analyses Inventory forecast		Senior managements	Master production schedule
		Marketing	Market requirements Market forecasts New product data
Market forecasts Master production schedule Orders from customers Order status Production schedule		Sales	Sales forecasts Order details Order acknowledgements
New product data Standard minute value (SMV) data		Research and design	Technical specifications
Technical specifications Quality control statistics		Production engineering	Material specifications Production specifications SMV data
Master production schedule Order details Material specifications Production specification SMV data Finished product stocks Plant downtime Goods received Raw material issues Work-in-progress (WIP) reports		Production planning and control	Production schedule Labour requirements Material requirements Plant/tooling requirements Stock allocations Works documentation Dispatch details Factory loading data Production statistics Order status Inventory forecast
Master production schedule Production schedule Labour requirements Works documentation Production specifications SMV data Quality control statistics		Manufacturing	Output statistics Order status Hours worked Incentive performance WIP reports
Raw material stock levels Material requirements Material specifications		Purchasing	Raw material delivery details Purchase orders placed
Stock allocations Raw material delivery details		Stores	Goods received Raw material stock levels
Plant/tooling requirements		Engineering and tooling	Plant downtime Plant/tooling costs

Table 1 — Production control information flows

Input information required	⇒	Management function ⇒	Output information
Dispatch details		Warehouse	Finished product stocks Dispatch notes
Hours worked Incentive performance		Wages	Labour costs
Purchase orders placed Labour costs Goods received notes Raw material issues Plant/tooling costs Dispatch notes		Accounts	Turnover, cost and profitability analyses Invoices
Material specifications Production specifications		Quality control	Quality control statistics

5.6.3 The production engineering department analyses the various specifications, defines the production methods and establishes standard minute values (SMVs) for each operation by any of the available work measurement techniques. These SMVs are used by the design department in future design work where alternative methods of achieving the same design feature require comparison. They are used by the production control department to establish labour requirements and by the manufacturing department for labour allocation, scheduling and efficiency monitoring.

5.7 Production control

5.7.1 Factory loading data summarizing the order book by product type are used by the senior management for updating the master production schedule and indicating where changes to capacity are required.

5.7.2 Production statistics also indicate to the senior management whether the master production schedule is based on achievable production rates and highlight potential capacity imbalances.

5.7.3 The production schedule is the major controlling influence over the day-to-day operation of the manufacturing department. It is therefore essential that it is presented in the best format possible and contains information that enables production to be optimized.

The sales department uses the production schedule to monitor planned progress of orders and available production capacity.

5.7.4 Works documentation is used by manufacturing personnel at all levels to control the production of each specific order. Its clarity and accuracy are therefore of paramount importance.

5.7.5 The production control department uses information on stock levels and order details to establish the material requirements that enable the purchasing department to procure as necessary.

5.7.6 A similar analysis of the order details enables the labour requirements for the production schedule to be defined. The manufacturing department assesses this information to plan and allocate the available labour resources.

5.7.7 Plant and tool requirements are defined in a similar way for use by the engineering and tooling departments.

5.7.8 Dispatch details defining quantities, destination, delivery date, transport method, etc. are used by the warehouse dispatch function in order to plan dispatch of orders at minimum cost.

5.7.9 The production control department provides regular updates of order status to the sales department, often in response to customer requests. A system that can provide fast, accurate response is of great advantage. This is usually most effective in production environments with optimum production flows and minimum work-in-progress.

5.7.10 Stock allocations are provided by manufacturing to the stores to indicate requirements for specific stock items. This enables the stores to ensure availability and acts as a check on material issues.

5.7.11 Production control systems can also provide forecasts of inventory levels at all stages of manufacture to assist senior management in the financial control of the organization, particularly stock valuation and cash flow analysis.

5.8 Manufacturing

5.8.1 Manufacturing output statistics are provided to the senior management to enable detailed monitoring of production performance and identification of problem areas. These data should be in the appropriate format to enable immediate problems and longer term trends to be identified readily.

5.8.2 Regular production reports to the production control department enable the continuous monitoring of order status and the immediate identification of specific problems.

5.8.3 Details of hours worked and bonuses earned are provided to the wages department for payment calculations and the calculation of labour costs and efficiencies.

5.9 Purchasing

5.9.1 Details of orders placed are used by the accounts department to check on raw material invoices and control cash flow.

5.9.2 Raw material delivery details are passed to the stores in order to plan unloading and space allocation.

5.10 Stores

5.10.1 Stock level information is provided for the purchasing department so that material requirements can be converted into purchase orders as necessary.

5.10.2 Details of goods received by the stores are required by production control in order to establish when orders can be commenced and by accounts to monitor material invoices.

5.10.3 Details of materials issued to manufacturing are used by production control to monitor order status and stock levels and by accounts to monitor actual material usage against standard.

5.11 Engineering

Plant and tooling costs are needed by the accounts department for monitoring of product costs and the preparation of cost analyses.

5.12 Warehouse

5.12.1 Dispatch notes are given to the accounts department for invoicing purposes.

5.12.2 Regular updates of product stocks and dispatches are sent to production control for planning purposes. They enable the decision to be made on whether to supply from stock.

5.13 Wages

Labour costs are used by the accounts department to monitor actual labour cost against standard and for the preparation of cost analyses.

5.14 Accounts

Cost analyses, which can be prepared using the information inputs from the other departments on materials, labour, plant and tooling are needed by senior management for monitoring product costs. Turnover and profitability analyses are used to assess the overall performance of the company.

5.15 Quality control

Quality statistics are needed by the manufacturing department for tackling short term quality problems, by the production engineering department for identifying method or plant problems affecting quality and by senior management for longer term evaluation of quality in relation to manufacturing costs and market requirements.

6 Basic parameters and controls

6.1 General

There are several basic parameters that affect the operation of the control system, defining the job to be completed and, in many respects, the way the manufacturing organization operates at any one time. It is essential that these sources of basic control information are well defined and that checks are included to ensure their accuracy. It is vital that errors are not automatically transferred throughout the system.

It should be remembered that the majority of production personnel are trained to follow written instructions. If these instructions are incorrect, particularly if they have been produced as a neat computer printout or on a visual display unit (VDU), then production errors will occur.

6.2 External parameters

6.2.1 Legislation

Product designs are often subject to current legislation and this can vary between different markets, e.g. vehicle lighting or exhaust emission regulations.

6.2.2 Health and safety

Manufacturing methods may be subject to statutory requirements such as the Health and Safety at Work etc. Act [1] and may also be subject to defined procedures and regulations, e.g. boiler plant and lifting tackle inspections.

6.2.3 Standards

British Standards, international standards and standards produced by trade associations may specify requirements for particular products.

6.2.4 Company policy

In larger manufacturing organizations, systems and methods are often defined centrally. In multi-site and international companies, production costs, material costs, exchange rates, interest rates and taxation can each dictate production planning policies for parts, subassemblies and final assemblies.