

Guide to production control —

Part 1: Introduction

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
- University of Manchester Institute of Science and Technology

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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. The Parts are as follows:

— *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.

Throughout this standard use of the pronouns he, him and his is intended to be non-gender-specific.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 18, 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.

0 Introduction

The six Parts of BS 5192 provide an overview of production control principles and good practice applied to manufacturing industry. It explains the relationship between production control and other functions of the business and the role of production control in implementing corporate and business plans at the manufacturing level.

A number of techniques are described for planning, directing and regulating manufacture and provisioning material. Each technique is covered in sufficient detail to enable the reader to obtain a general understanding of how the technique functions, its purpose, applications, advantages and disadvantages.

It is not feasible within the scope of these documents to describe techniques in detail. Readers are therefore advised to ensure that their staff have the relevant expertise or receive thorough training in the technique before proceeding to implement it. Expertise may be acquired by attending courses on production control subjects which range from one day to a week or more in duration. Knowledge can also be acquired by referring to books and professional journals on the subject. Of standards on, or related to, production control NF X 50-310 [1] published by AFNOR deserves mention, not least for its extensive bibliography of other standards. In certain instances, particularly where there is a lack of in-house expertise, it will be advisable to obtain professional assistance from an external consultant. Advice can also be obtained from professional organizations such as those listed on the inside front cover.

Manufacturing operations take many different forms, so it is essential to choose the right technique to suit the needs of the particular business. Although it is not possible to cover every situation, the guide explains in broad terms the suitability of each technique for particular types of manufacturing operation.

1 Scope

This Part of BS 5192 provides an introduction to the objectives and concepts of production control. In addition, it provides introductions to the other Parts of BS 5192.

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 editions.

3 Definitions

For the purposes of this Part of BS 5192, the definitions given in BS 3138 and BS 5191 apply, together with the following.

NOTE Since the publication of BS 5191:1975 many new terms have been introduced in the field of production planning and control as a result of the significant developments in this area. It is envisaged that the terms defined in this clause will be incorporated in a revision of BS 5191, to be published in due course.

3.1

activity based costing (ABC)

cost attribution to cost units on the basis of benefit received from indirect activities, e.g. ordering, setting-up, assuring quality

3.2

architecture

the design of the computer's hardware, system software and communication systems on which the application software functions

3.3

assembly schedule

the detailed schedule of time and sequence planned for the assembly of a product

3.4

base stock system

an ordering method in which a fixed (or base) stock is established for every item. Any issue from stock is immediately followed by issuing a new order for the same quantity to the preceding processing stage; this in turn causes orders to be issued to all previous stages and finally to the material supplier

NOTE Base stock control is a stock base, pull method of ordering.

3.5

big bang

expression denoting an abrupt change from one system to another without overlap or parallel running

3.6

batch quantity

the number of components in a batch

NOTE Another term for batch quantity is run quantity.

3.7

call-off schedule

a schedule which shows by period, e.g. week or month, the quantity to be delivered of goods listed in a blanket purchase order

NOTE A typical call-off schedule would show the next four weeks as firm requirements and the following eight weeks as estimates.

3.8

capacity bill of material

a bill of material which shows for each manufactured item the amount of capacity and type of resource needed to manufacture the quantity required to make one unit of the product

NOTE A capacity bill of material that contains only details of capacity for key or critical resources is called a rough-cut capacity bill of material (see 3.64).

3.9

capacity requirements planning (CRP)

a system that calculates time-phased capacity requirements by resource type in order to execute the production programme

NOTE 1 Where CRP is linked to a material requirements planning (MRP) system, information about open and planned orders is input from the MRP system to the CRP system and limitations in capacity reported to the MRP system. More sophisticated versions of CRP take account of information about part completed open orders, provided from a shop order system.

NOTE 2 Another term for CRP is capacity planning.

3.10

closed loop material requirements planning

an overall system in which MRP is linked to other systems to provide feedback of information between the planning and executing functions, thus closing the information loop

NOTE Production programmes are developed through the master production scheduling and CRP systems, and the programmes input to the MRP system which generates time-phased manufacturing and buying instructions. Purchasing and shop order systems feed back information about performance to the MRP system to enable corrective action to be taken, if necessary. (See also 3.48.)

3.11

closed loop system

a control system in which the planning and execution phases are linked so that information about performance compared to plan is fed back to the planning phase to enable corrective action to be taken, if necessary

NOTE Another term for closed loop system is feedback control system.

3.12

complete-to-order

a type of manufacturing that, completes or configures lower-level items to customer order upon receipt of the order

3.13

computer aided design (CAD)

the application of computers in the interactive mode for design, draughting and storing designs

3.14

computer aided manufacture (CAM)

manufacture in which computers are used to instruct and control production plant and equipment

3.15

computer aided process planning (CAPP)

the application of computers in the interactive mode for the planning of manufacturing processes and operations and for the storing of process planning information

3.16

computer aided production management (CAPM)

a collective term for production control software packages

NOTE Another term for CAPM is computer aided production control (CAPC).

3.17

computer integrated manufacture (CIM)

manufacture in which various computerized systems are linked to provide an integrated manufacturing system

NOTE Degrees of integration are possible, from simple links (e.g. between CAD and CAPP and between MRP and CAM) to a totally integrated factory.

3.18

database

a data structure for accepting, storing and providing on demand data for multiple independent users

NOTE The database may be distributed across various storage media such as paper, magnetic tape, etc.

3.19**dependent demand**

a demand directly related to, or derived from, the demand for other items or end products. Dependent demands are therefore calculated and not forecast

3.20**dispatching**

the detailed allocation and subsequent control of production resources to individual work orders, necessary to complete orders in accordance with the production programme

3.21**electronic data interchange**

- 1) General. The transfer of structured data in electronic form between computer systems in separate organizations.
- 2) In business. The transfer of structured business data by agreed message standards in electronic form between computer systems in separate organizations.

3.22**engineering change control**

a procedure for planning and executing the introduction of a new bill of material, routing or process. It may be done by late, batch, on run out of old component (machine), or as soon as a new component is available

3.23**expert system¹⁾**

a computer program that uses the programming techniques of artificial intelligence, especially those techniques developed for problem solving, to interrogate data and deduce results within parameters programmed into it

3.24**explosion**

a breakdown of a bill of material into the total of each of the components required to manufacture a given quantity of a higher assembly or sub-assembly

3.25**finite production modelling**

a finite scheduling technique operating at a level of planning detail below MRP to assist in the scheduling/rebalancing of the shop floor in which computer based techniques are usually applied

3.26**flexible machine centre (FMC)**

usually an automated system, usually comprised of computerized numerical control machines with robots loading and unloading parts conveyed into and through the system

NOTE The purpose of an FMC is to provide quicker throughput, changeovers, setups, etc., to manufacture multiple products.

3.27**flexible manufacturing system (FMS)**

a manufacturing process designed so that the production line may be rebalanced often, rapidly matching output to changes in demand

NOTE FMC involves mixed-model scheduling, multi-skilled operators, standardization of equipment for quick changeover items, and design of the production line to allow workers to do more than one job and to cut down on transportation time between lines.

3.28**flexible programming**

a method of programming in which the year is divided into equal short time periods and new short term sales and production programmes are prepared at the beginning of each period

NOTE Flexible programming makes it possible for production to follow changes in the market with minimum stocks.

3.29**flow control**

a term used to describe a specific production control system that is based primarily on setting production rates and feeding work into production to meet these planned rates, then following it through production to make sure that it is moving

NOTE Flow control has its most successful application in repetitive production.

3.30**fourth-generation language**

a high-level, near-English computer language which produces lower-level computer code

3.31**functional requirements specification**

the requirements specification for the computer software systems that are needed to meet the business requirements

3.32**Gantt chart**

a bar chart used as a means of control on which work planned and work done are represented, showing their relation to each other and to time

NOTE 1 This type of chart is named after its inventor, Henry L Gantt.

NOTE 2 This definition is similar to 21030 of BS 3138:1992.

¹⁾ Repeated from BS 3138:1992

3.33**group technology**

in production control, the classification of related items into families in order to gain efficiencies of operation

for example:

- a) coding of parts on the basis of similarities of the parts;
- b) grouping of parts into production families based on similarities in their production so that the parts in a particular family could then be processed together;
- c) grouping of diverse machines together to produce a particular family of parts.

3.34**implosion**

compression of detailed data into a summary-level record or report. The term is also used for the tracing of a usage and/or cost impact from the bottom to the top (end product) of a bill of material, employing where-used logic

3.35**independent demand**

demand which is unrelated to demand for other products. Demand for finished goods, parts required for destructive testing and service parts requirements are examples of independent demand

3.36**inter-process stock**

stock held between processes

3.37**just-in-time (JIT)**

- 1) General. An approach to achieving excellence based on the continuing elimination of waste (waste being considered as those things which do not add value to the product).
- 2) In production control. The movement of material at the necessary place at the necessary time; the implication is that each operation is closely synchronized with the subsequent ones to make this possible.

3.38**kanban**

a method of JIT (see 3.37) production which uses standard containers or lot sizes with a single card attached to each. It is a pull system in which work centres signal with a card that they wish to withdraw parts from feeding operations or from vendors

NOTE Loosely translated from Japanese the word kanban means card. Literally it means billboard or sign. The term is often used synonymously for the specific scheduling system developed in Japan.

3.39**kit**

the components of an assembly that have been drawn from stock and made ready for movement to the assembly area

3.40**kit list**

the list of components that are to be pulled from stock and made ready for movement to the assembly area

3.41**kitting**

the act of withdrawing parts from stock using a kit list

3.42**line of balance**

a manual, graphical technique for planning, scheduling and monitoring progress against key milestones of repetitive batches

3.43**linear programming (LP)²⁾**

a method for determining the numerical values of a group of variables, which interact through a given set of linear constraints, such that a given linear function of these variables is optimized

3.44**lot-for-lot**

a lot-sizing technique that generates planned orders in quantities equal to the individual net requirements in each period

3.45**machining centre**

a machine capable of performing a variety of material removal operations on a part, usually under numerical control

3.46**make-to-stock**

a type of manufacturing that converts lower-level components and raw materials all the way to saleable end items (sales products) in anticipation of a customer order

²⁾ Repeated from BS 3138:1992