Supply Chain: Capacity Planning and Production Operations

HIGHER NATIONAL DIPLOMA

物流业：能力规划与产品操作

【英】苏格兰学历管理委员会（SQA）

英文原版

Unit Student Guide

SUPPLY CHAIN

中国时代经济出版社

SCOTTISH QUALIFICATIONS AUTHORITY

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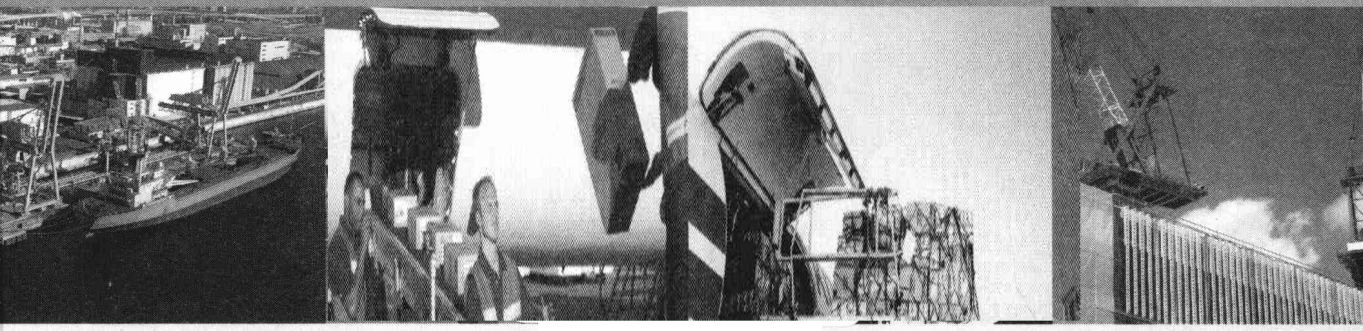

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Supply Chain: Capacity Planning and Production Operations

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Contents

1 Introduction to the Scottish Qualifications Authority

This Unit, **Supply Chain: Capacity Planning and Production Operations** has been devised and developed by the Scottish Qualifications Authority (SQA). Here is an explanation of the SQA and its work:

The SQA is the national body in Scotland responsible for the development, accreditation, assessment, and certification of qualifications other than degrees.

Its website can be viewed on: www.sqa.org.uk

SQA's functions are to:

- devise, develop and validate qualifications, and keep them under review
- accredit qualifications
- approve education and training establishments as being suitable for entering people for these qualifications
- arrange for, assist in, and carry out, the assessment

of people taking SQA qualifications

- quality assure education and training establishments which offer SQA qualifications

- issue certificates to candidates.

In order to pass SQA units, students must complete prescribed assessments. These assessments must meet certain standards.

The Unit Specification outlines the **three** Outcomes that students must complete in order to achieve this unit. The Specification also details the knowledge and/or skills required to achieve the outcome or outcomes. The Evidence Requirements prescribe the type, standard and amount of evidence required for each outcome or outcomes.

2 Introduction to the Unit

2.1 Introduction to the Unit

This unit has been developed to introduce you to the concept Capacity Planning in a manufacturing environment and the need to forecast, manage and control capacity. Associated with capacity management are the need for Production Operations, the principles of Shop Floor Control, scheduling, prioritising and allocating, and the need for production information feedback.

It is primarily intended for candidates who aspire to take up a management position in a manufacturing environment. It would also be appropriate for those involved in the various functions associated with manufacturing, inventory, stores, production, and distribution planning, demand management and purchasing.

There are 3 Outcomes:

1. Determine and manage the capacity of various work centres based on manufacturing orders.

2. Schedule, prioritise and manage individual works' orders to meet customer requirements.

3. Ensure that the process design meets the performance objectives of the production operations.

2.2 Learning Material Required for this Unit

Many of the principles demonstrated in Capacity Management involve elementary calculation techniques; as a result ability with numbers and use of a calculator is desirable.

Most of the techniques can be applied using spreadsheets and access to a Personal Computer equipped with a Spreadsheet program will be beneficial.

2.3 Using the Learning Resource Pack

The Learning Resource Pack is designed to lead you through a series of learning activities that will allow you to consolidate your understanding on the topic areas included in the pack **Capacity Planning and Production Operations**.

The Learning Materials (Section 3) are designed to lead you through a series of activities that will allow you to consolidate your learning and check on your own progress.

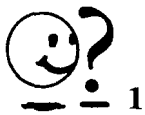
It is likely that you will need to spend around 40 hours working your way through the learning materials in this

Pack.

As you work through the Pack there will be considerable scope for discussion and you are encouraged to contribute fully from your own knowledge and experience. When participating in a group activity you should give full and free rein to your imagination concerning different types of supply chain. Knowledge of the operating environment of the company you work for, or a business you have some experience of, will be useful when participating in some of the Self-Assessed Question and discussions.

As you work through the Pack you will encounter the following symbol which indicates that you should answer a Self-Assessed Question.

Self-Assessment Question



Usually, Self-Assessed Questions are used to improve or consolidate your understanding of the subject in general or a particular feature of it. Where suggested responses to Self-Assessed Questions are provided in the Learning Resource Pack, **students are strongly discouraged from looking at these before attempting the Self-Assessed Question.** The Self-Assessed Questions throughout the Learning Resource Pack will help you to prepare yourself for the formal assessments, and to identify topic areas in which you

will require clarification. The Self-Assessed Questions will not serve this purpose if you look at the answers before trying them!

2.4 What Do I Have to Do to Achieve this Unit?

Review of the contents of these notes and answering of the Self-Assessment Questions in a satisfactory manner will greatly assist the candidate in preparing the final assessment. Completion of the final assessment outcomes in a full and satisfactory manner is mandatory for awarding of the credit for this unit.

The assessment for Outcome 1 will consist of case study material that you will be required to analyse and the assessment evidence will be carried out under supervised conditions. The Outcome of analysis will consist of calculation which will then be described in a written format.

Part of the assessment for Outcome 2 will utilise the same case study materials and you will be required to respond to different situations. This part of the assessment evidence will be carried out under supervised conditions. The second part of the assessment will be a report completed in open book conditions and should be approximately 500–600 words in length. This will look at managing the shop floor processes. The outcome from the first part of the assessment can be used for illustration purposes in the report.

The assessment for Outcome 3 will be a report completed in open book conditions and should be approximately 1000 –1200 words in length. It will examine the process design.

3 Learning Material

3.1 Introduction, Terminology and Definitions

3.1.1 Introduction

Materials requirement planning (MRP) uses a master production schedule (MPS) of end items to determine the quantity and timing of component part production. MRP is capacity insensitive; it implicitly assumes that sufficient capacity is always available to produce components at the required time.

The Role of Capacity Planning

An overview of the entire production planning and control process, used under MRP based systems, is shown in Figure 1 overleaf. The various Capacity management techniques usually are separated into four categories:

- *Resource Requirements Planning* *(RRP)* * Long range
- *Rough Cut Capacity Planning* *(RCCP)* * Long range
- *Capacity Requirements Planning* *(CRP)* * Medium range
- *Input/Output Control* * Short range

(* the time frames to be considered)

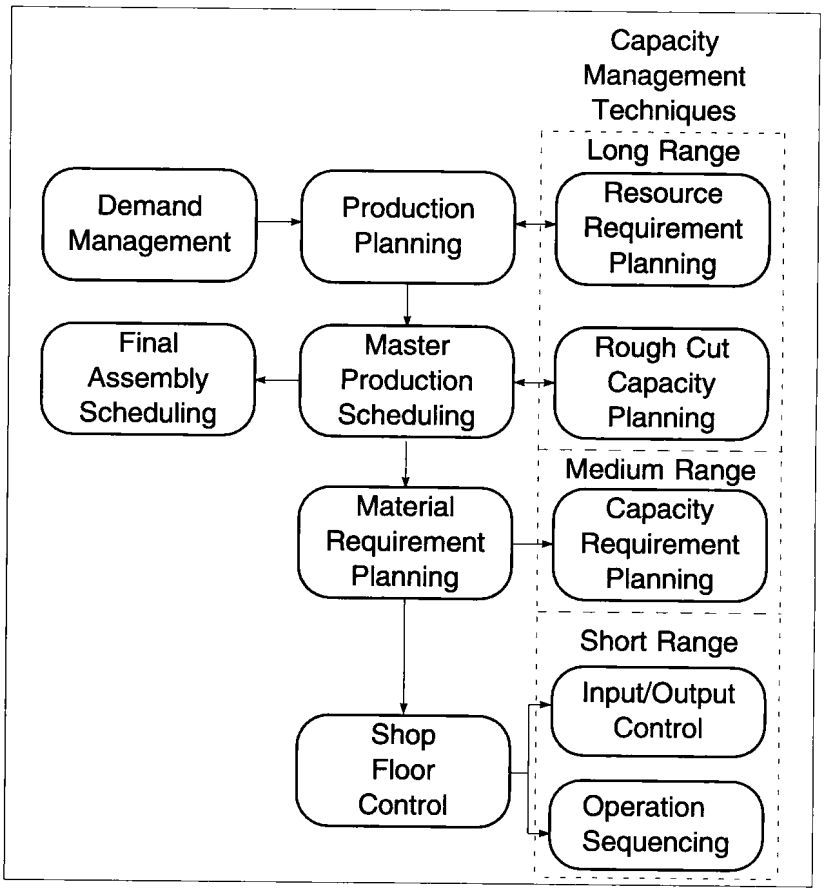


Figure 1: Overview of Capacity Management

3.1.2 Definitions

The study of Capacity management requires a clear distinction between:

- *Load*
- *Output*
- *Capacity*

Load Load is the amount of scheduled work, or queue, ahead of a manufacturing facility usually expressed in terms of hours of work or units of production.

Output Output is the rate at which work is completed by, or withdrawn from, a resource (system, department or work-centre) in terms of hours of work or units of production.

Capacity Capacity is the rate of output a resource (system, department or work-centre) is capable of achieving under normal operating conditions.

Capacity Planning Capacity Planning is the task of determining how much output is needed from the internal plant facilities and from the external suppliers. If less than adequate capacity is available, the problem must be resolved.

Capacity Control Capacity Control is the comparison between planned levels and actual output levels achieved and the identification of significant variances above or below plan. Corrective action must be initiated promptly if control is to be maintained, this usually means adjusting capacity, which is preferable in most cases to the alternative of adjusting the master production schedule.

Priority Planning Priority Planning is the process of specifying batch quantities and their start and finish dates for all items where procurement and manufacture are involved.

Priority Control

Priority Control is making the right things at the right time. It is completely dependent on maintaining a balance between MPS needs and actual output rates. If the plant and/or its vendors do not produce enough then they will be unable to hold a schedule for the right items. In an MRP system, the functions of capacity planning and control are separated from the functions of priority planning and control.

Other Elements of Capacity Management

Capacity Control

Capacity Control is usually performed by means of Input/ output control.

Priority Planning

Priority Planning is the task of the MRP system. Priority control is determined on the shop floor by the use of a dispatching technique to prioritise the sequence of specific tasks on specific machines.

The Water Tank Model

The Water Tank Model is another way of explaining Load, Output and Capacity (sometimes called the 'Bathtub model') illustrated in Figure 2 on the next page.