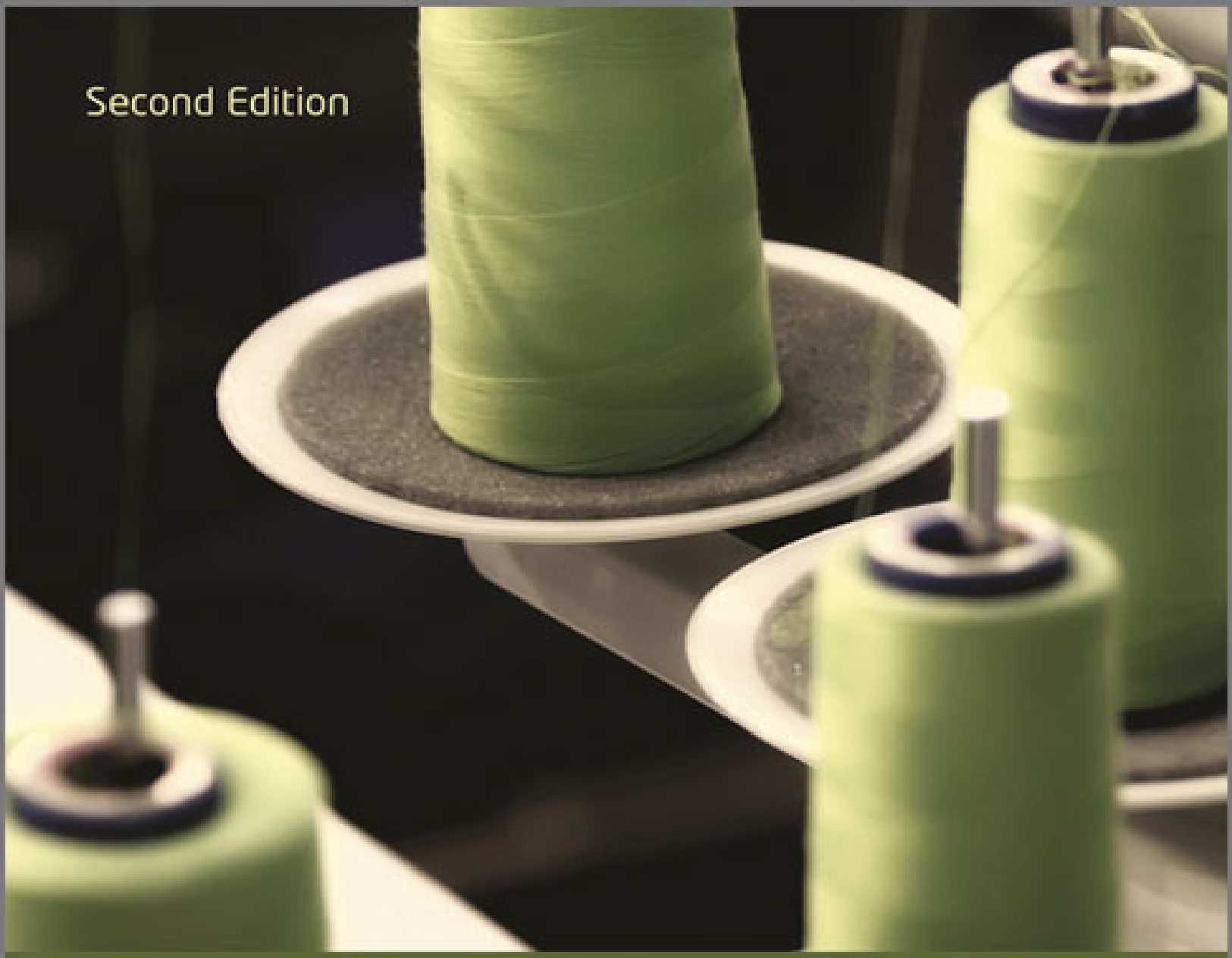


Second Edition

Cooklin's Garment Technology for Fashion Designers

Steven Hayes, John McLoughlin and Dorothy Fairclough

Cooklin's Garment Technology for Fashion Designers

Steven Hayes, John McLoughlin
and Dorothy Fairclough

Contents

Cooklin's Garment Technology for Fashion Designers

2nd Edition

Steve Hayes,
John McLoughlin and
Dorothy Fairclough

WILEY
A John Wiley and Sons, Ltd., Publication

This edition first published 2012

The first edition published 1997

Registered office
John Wiley & Sons Ltd, The Atrium, Southern Gate,
Chichester, West Sussex, PO19 8SQ, United Kingdom

Editorial office
John Wiley & Sons Ltd, The Atrium, Southern Gate,
Chichester, West Sussex, PO19 8SQ, United Kingdom

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com.

Library of Congress Cataloging-in-Publication Data

Hayes, Steve, Dr.
Cooklin's garment technology for fashion designers/Steve Hayes, John McLoughlin and Dorothy Fairclough. – 2nd ed.
p. cm.
Rev. ed. of: Garment technology for fashion designers/Gerry Cooklin.
Includes bibliographical references and index.
ISBN 9781405199742.

A catalogue record for this book is available from the British Library.

ISBN 9781405199742 (pbk); ISBN 9781119952466 (ebk); ISBN 9781119952473 (ebk); ISBN 9781119952480 (ebk)

PREFACE – ABOUT THIS REVISED EDITION

John and I revised *Introduction to Clothing Manufacture* on behalf of Gerry's estate and his publisher a few years ago and we are privileged to be asked to again provide a revised and updated version of his work with our 2nd edition of *Garment Technology for Fashion Designers*. To do this we needed to expand the team with the addition of ‘Ms Garment Technology' herself, Dorothy Fairclough, thus allowing us to present a book which sticks to Gerry's original style but gives the fashion design student in the 21st century a useful overview of the technical aspects to fashion product development. Whilst it is true to say that the globalisation of the fashion industry has had a major impact on the distribution of roles between manufacturer and retailer many of the fundamentals of garment technology applicable to the design and development of fashion products have remained constant. The need for the designer to understand the impact of design decisions on production lead times and overall product costs is in fact of greater importance the more the marketing and design operations are decoupled from those of manufacturing and distribution. What we hope to provide with this edition is the technical knowhow to enhance the design, development and creation of fashion products and to minimise the disruptive impact of unsuitable, ill-conceived and poorly managed ideas fixed at the design stage but -realised – and accounted for – during the creation phase. Three of the central themes covered in this edition are direct materials utilisation and labour costs, garment and textile technology and the operation of the product development department. These are all necessary areas for the designer/product developer to understand if

they are to deliver product to the right price, to the right quality, at the right time and right for the targeted consumer.

Steven Hayes

ACKNOWLEDGEMENTS

Much of the original material from the 1st edition is still applicable today and has been re-used, therefore our thanks are extended to the machinery manufacturers, their agents and other organisations who provided the technical material and permission to reproduce illustrations of their products and exhibits for the 1st edition and also to those who have helped by providing technical images and details specifically for this revised version. Thanks especially to:

Paula Wren, Manchester Metropolitan University for the creation of the design specifications used in Chapter 14.

Caroline Hertz, Manchester Metropolitan University for her help in understanding the Product Development Process.

David Mellett, Matalan Ltd, UK for his advice on all aspects of garment -manufacture.

PART 1

THE COMMERCIAL DESIGNER

1 The Designer's Role within Product Development and Manufacture

2 The Designer and Garment Costs – The Commercial Designer

3 Pattern Cutting and Materials Utilisation

4 Garment Trimmings

5 Designing for Manufacture

Chapter 1

The Designer's Role within Product Development and Manufacture

The title “Fashion Designer” includes not only those who work at couture level, but also those involved in mass production at all price levels of the market. The well known named designers who design at couture level are of course in the minority; their garments are produced in small numbers in workrooms. Many of these designers will also be involved in creating diffusion ranges which although still exclusive will be more widely available and therefore will be considered to be mass produced. The vast majority of designers are involved in the creation of designs at all the other levels of the market: for the many high street stores, labels and other outlets. These garments are produced in even greater number.

All designers, including those operating at couture level, should understand the market, and the consumer, be aware of sizing, quality and costs relating to fabrics, trimmings and production. In addition those designing for the mass market need to be aware of catwalk trends and be able to adapt them for the high street. This book is aimed at the majority of designers creating styles at all levels of mass production.

The role of the designer may vary significantly depending on the requirements of the company but may operate thus: the designer is employed by the company producing the garments and will work closely with the buyer and merchandising team from the retail company from whom

the merchandise will ultimately be sold, and as such is closely linked with the sales team. Both the buyer and the designer will be researching the same fashion forecasting sites and other sources of inspiration in order to put together a range of garments. Trends will be identified and utilised to suit the target market of that particular company. The buyer will often give the designer a brief which defines the types of garment which are to be included in the range and this will be influenced by previous seasons' sales.

In addition to researching key trends including garment shapes, colours and fabrics the designer should also have an awareness of market trends and competitors. A design pack is often produced to feed through to the product development team. This – and other types of visual communication – has become increasingly important as manufacturing is likely to be taking place in an overseas location and the product development team may be UK based or they too may be based overseas. It is the product developer's role to interpret and develop designs.

The buyer may initially select designs from an image. Then samples will be produced – this may take place in the UK or in the country where large scale production is to take place. Very detailed specifications are necessary to ensure that samples are correctly produced and to avoid costly mistakes. These include technical sketches, size charts, making details, fabric details and production details.

The role can vary depending on the level of the market, but also between companies. How the designer fits into the process of producing garments will depend on company size. In larger companies the designer will work in conjunction with a product development team whereas in a smaller company the role can encompass at least some of the product development role. The designer may produce the first pattern for the garment but often there is a pattern cutter who will perform this task. The designer manages the

range construction to ensure that the samples are produced in line with the original concept. In some cases it is expected that the design of the fabric print is included in the remit. Multi-skilling has become increasingly important.

The designer cannot ignore the technical aspects of garment production even if there are others who are responsible for these areas. Many production problems can be avoided if these factors are taken into account during the design process.

GARMENT TECHNOLOGY

Technology has been defined as a technical method of achieving a practical purpose, but its original Greek root meaning is the systematic treatment of an art. This latter meaning is apt for the clothing industry because garment design is a goal oriented art form which requires technology to convert it into a finished product.

Clothing technology is a broad based subject because it combines a number of individual technologies, with each making a specialised contribution to the production of clothing. For the designer and pattern cutter, these technologies can be divided into two groups:

1. Need to know: These are the technologies which are directly related to the work of designers and pattern cutters, and it is imperative that they have a practical understanding of the essentials of each particular subject.

2. Good to know: This group covers the other technologies which are part of a modern clothing factory but are not of direct concern for designing and pattern cutting. However, the senior members of the design team should have some understanding of these technologies because it will improve their orientation within the working environment.

FOR THE DESIGNER AND PATTERN CUTTER

All clothing factories have a specific technological capability which has been built around the production of a particular category of garments. The levels of technology vary from factory to factory, even between those producing the same garment at similar time standards. Irrespective of the levels of operation, it is essential that the designer and pattern cutter both work according to the given framework and when possible, exploit it to its fullest extent.

With regard to the applications of technology, for the designer it is mainly a question of what the factory can do and knowing the extent of the permissible variations. The pattern cutter also has to know what the factory can do, but also to know how it is done and what is required to do it. These factors have to be incorporated into the garment pattern, plus all the standard technological processes which the average garment undergoes during making up.

Where does the interaction of the designer and pattern cutter with the factory's technology start? It starts with both of them learning and understanding the factory's technological resources and capabilities. This is vital for a full and efficient involvement on their part. It is inefficient to invest time in developing a design and pattern and then discovering that the factory is not equipped to perform one or more of the operations required.

Whether the company is prepared to invest in a new item of machinery or equipment is a commercial decision based on whether the acquisition will have a restricted use during one season only or whether it has a range of other possible applications. If the item is going to be limited to an unknown number of garments during one season only, it is back to the drawing board for the designer and pattern cutter.

The sample room is usually equipped with machinery which covers regular operations only, because it is costly to have high-tech machines which are only used occasionally in the sample room. When there are new samples which require operations beyond the scope of the sample room machinery, these operations should be performed in the factory and not “mocked up” in the sample section. The factory is where the garments will be produced and special operations should be validated there. It is important that the sample room produces garments which incorporate the relevant technology, and this means working closely with the factory. It is possible to improvise many special operations in the sample room with time and skilled labour, but this is not the situation in the factory. So the people responsible have to ensure that sample garments can be mass produced by utilising as much as possible of the available technology.

Chapter 2

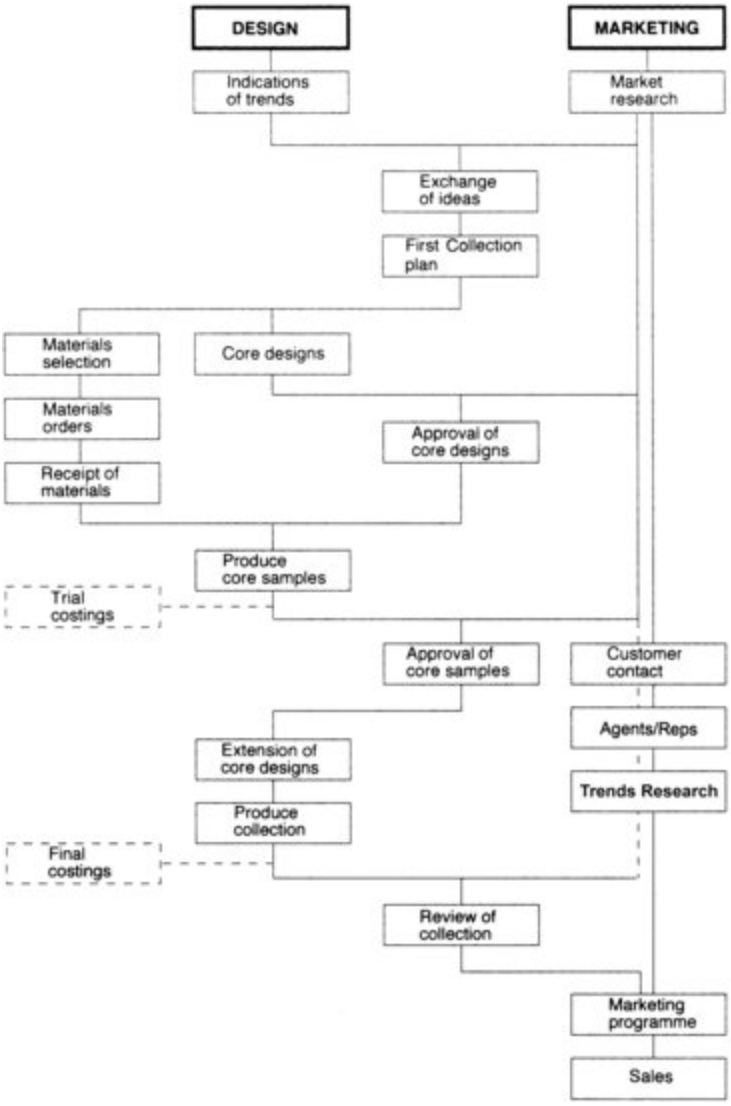
The Designer and Garment Costs—The Commercial Designer

A garment design does not exist in a vacuum but is the end product of a chain of activities which can be said to start with the production of textile fibres. Various authorities have estimated that the time span between fibre production and the garment sampling stage can be as long as between six to eight months but as short as six to eight weeks for “fast fashion” items. For the clothing manufacturer, the internal chain of activities starts some time before the forthcoming season's materials are available because the company has to have some firmed-up ideas of what it intends doing before selecting materials.

The internal chain usually starts with the marketing/sales department doing some formal evaluation of historical sales performance to evaluate what the market sector served by the company could be looking for and at what prices. Parallel to this, the design team has researched trends in both fabric and garment styles through such channels as online trend bureaux, trade shows and street trends (along with some comparative shopping). Marketing and design put their heads together and start formulating the framework of the sample collection. Fabrics and trimmings are selected and pre-ordered, the designer starts to prepare the core designs, which will represent the central theme of the collection with a clear market orientation and brand identity if needed. Core designs, when approved, will be the basis

for developing planned groups of variations. The pre-sales design room processes are shown in Figure 2.1.

Figure 2.1



In this context, garment design tends more toward a goal directed planning process because apart from developing the appeal factors of each design, the designer also has to take into account the many technical and commercial factors involved – this process is then often referred to as product development. So when designs have been approved and materials delivered, the design team has to become involved with the production of sample garments.

THE DESIGNER AND GARMENT COSTS

Under a free enterprise system it is accepted by the business world that money is the name of the game, and the clothing industry is no exception. The success of designs produced by a manufacturer can only be judged by the colour printed on the company's bank statement at the end of a season: red or black. There are many factors which can influence profitability, but in normal circumstances profitability originates to a large extent in the design section.

The Framework

Where does it all start for the designer? The answer is a combination of two factors:

- Market specialisation, and
- The average garment concept.

This linking of these two factors provides the designer with a reasonably accurate basis for initial cost estimates.

Market Specialisation

The clothing industry is divided into sectors according to garment types, and within each sector there are subdivisions or sections based primarily on price. For example, one sector could be women's separates, with the sections having prices ranging from very cheap to highly expensive. The prices reflect not only the manufacturing costs and fashion content of the products but the brand equity associated with them.

The majority of clothing manufacturers concentrate on serving and expanding their share of a specific section within a sector. As a result, they accumulate a great deal of expertise regarding the suitability of products, prices and

production demands. Knowing this, the company is able to break down its average ex-factory price into the main components, such as materials, labour, overheads and profit. The results of this analysis provide the designer with an accurate indication of what can be invested in an average garment in terms of materials and labour. The proportions between these two cost factors can vary from style to style, but their total has to be on, or very close to, the target in order that a new sample will be able to slot into the correct price bracket.

The Average Garment Concept

Most production units, irrespective of the production system employed, are built around the average garment concept where this term refers to a typical garment produced by the unit. This typical garment has an acceptable work content and the balance between the various groups of operations is reflected in the staffing and equipment of the unit. This type of factory would have the capability to handle a reasonable range of cloth and/or styling variations without serious modifications regarding staff, machinery and layout. However, in order to be more responsive to the market factories can be arranged with several independent production lines, which can be modified to cope with higher degrees of change in fabric and style with minimal disruption to the overall running of the factory.

The average garment concept is very widely used because of the production commonalities which exist between garments of the same type. In practice this means that regardless of individual styling, nearly every garment produced goes through the same standard operations. For example, the common operations for a unit producing skirts could be: overlocking, dart-sewing, closing side seams, zip setting, preparing and setting waistbands, top and under-pressing operations, finishing and inspection procedures.

It is important that production people communicate with the designer regarding the times for each group of operations in an average garment produced by the factory. With knowledge of these times and the average garment concept, the designer and technical staff can make amendments to the original garment design without detracting from original design concept. This ensures operations required will fit into the production balance of the factory.

Whilst nobody expects a fashion designer to be an expert in garment costing, designers must be aware of their influence on costs. Garments have to be evaluated for costs at the sampling stage because making samples without regard to price is often futile. So when necessary, the designer and pattern cutter have to modify designs and patterns so as to bring a new sample into the correct price framework.

THE GARMENT COSTING

Also known as the bill of materials, the garment costing details the costs of every item attributable to the production of a particular garment. The sum of these costs plus the profit margin is the selling price which the company will quote to customers. Alternatively, the reverse is true, where a customer is only prepared to pay a certain amount for a product. The manufacturer must reverse engineer the product from here to ensure they set production costs that allow them to achieve their desired profit margin. Whilst each company has its own method of preparing costings, generally the components of a costing are grouped under four headings: direct materials, direct labour, factory overhead and general overhead.

Direct Materials

Direct materials are all the materials and trimmings which go into the construction and finish of the garment. Typically, these materials could include fabric, lining, interlining, buttons, zips, pads, tapes, labels, tickets, hangers and packaging materials, etc.

Direct Labour

This covers the cost of all the labour directly involved in producing the garment and could include cutting, fusing, sewing operation, special machine operations, pressing, finishing, inspection and packing. Labour of all types and grades has a direct overhead which includes holiday pay, sick pay, fringe benefits, etc, and the statutory payments made by the employer for each employee. This is usually expressed as a percentage of salary and when this percentage is added to the employee's wage, it becomes the basis for calculating direct labour costs.

Factory Overhead

There are different methods of calculating the factory overhead, but most of them use a combination of the following three elements:

1. **Indirect labour:** This covers every person in the factory who does not directly perform a production operation, such as managers, supervisors, engineers, store personnel, clerks, maintenance staff, porters, canteen staff, security and cleaners, etc.
2. **Expenses:** Included in this element is every fixed and variable expense incurred in operating the factory, such as rent, rates, utilities, insurance, depreciation, maintenance and the various types of energy consumption/generation required by a clothing factory.
3. **Indirect materials:** Also known as consumables, this element contains all the materials not directly connected

to the make-up of a garment. Some of the typical items involved are office materials, spare parts, marker paper and maintenance materials.

The total of these three elements is the factory overhead and because it cannot be conveniently applied to specific cost units, it is generally expressed as a percentage of the direct labour costs. For example, using the arbitrary figures below, the costs for a given period are:

Direct labour	£38 000 (including direct overhead)
Factory overhead	£45 600

The factory overhead is 120% of the cost of direct labour. From this, it is simple to calculate the cost of one minute's work for every production operator:

Labour rate per hour	£5.93 (UK minimum wage for over 21s as of October 2010)
Factory overhead at 120%	£7.12
Total cost	£13.05
Cost per work minute	£0.22

Therefore the price of an operation is the rate per minute multiplied by the time allowed for the operation.

General Overhead

The general overhead comprises all the labour costs and expenses which are incurred in running the company, such as management, marketing, finance, insurance, warehousing, rent and utilities. The design department costs are usually allocated to this component.

Again, because of the practical difficulties of apportioning this component to specific cost units, it is expressed as a percentage of the total for direct labour, factory overhead

and direct materials, as in this example, where all the costs are for the same period:

Direct materials	£114 000
Direct labour	£38 000
Factory overheads at 120%	£45 600
Total	£197 600
General overhead	£88 920

Therefore, conveniently, the general overhead is 45% of all the other costs. So the framework of a garment costing would be the sum total of these four components.

An example of a garment costing is shown in Figure 2.2; the figures are for demonstration purposes only. Whilst the method of computation, detail, terminology and format can vary from company to company, the primary objectives of the costing are always the same: how much does the garment cost to produce?

Figure 2.2

Garment Costing

Style #	Comp. #			Market	Description
6114	HC 20 664			Domestic	Straight Coat
Season	**Phase**			**Size range**	**Unit**
Winter	2			36-42	A1

Item	Description	Supplier	Quan.	Price	Unit cost
Fabric	100%wool - 4608	Star mills	2.6	9.4	24.44
Lining	Satin - 856	Lintex	2.4	3.8	9.12
Interlining	w311-a	Fusemat	0.9	2.9	2.61
Buttons	1142-#40	Fladon	6	0.2	1.20
Pads	Raglan - 16 (pair)	A Slek	1	0.65	0.65
Thread	120's pp	Gutterman	200	0.0015	0.30
Label	brand	stock	1	0.08	0.08
Size label	UK	stock	1	0.07	0.07
Care label	100% wool/ dry clean	stock	1	0.1	0.10
Ticket	brand - fine	stock	1	0.12	0.12
Hanger	T6	Hangetti	1	0.4	0.40
Packaging	coat bag - 8	Plast pac	1	0.25	0.25

Production	Min.	Price	Cost	Materials	39.34
Cutting	6	0.26	1.56	**Production**	**22.54**
Fusing	2	0.22	0.44	**Gen. o/ heads**	**29.87**
Sewing	55	0.24	13.2	**Total cost**	**91.75**
Specials	6	0.22	1.32	**Profit**	**15.00**
Under pressing	6	0.22	1.32	**Commission**	**3.50**
Top pressing	11	0.22	2.42	**Total cost**	**110.25**
Finishing	4	0.22	0.88	**Selling Price**	**110.00**
Inspection	4	0.24	0.96	**Prepared by**	sgh
Packing	2	0.22	0.44		
Total	**96**	Total	**22.54**	**Date**	24th Nov

The Designer's Role

The preparation of a garment costing is usually the work of a costing clerk who collates all the relevant information and calculates money values. Before the costing process starts, the design needs to be checked and approved as to the basic viability, within cost, for production by the design team and production/technical personnel. Skilled marker planners can reduce materials requirements, and production engineers can accurately analyse work content, but if the sample garment is carrying excessive costs of materials and/or labour, there is very little that these people can do to make the garment an acceptable proposition without the input and collaboration of the designer. So the designer should never be designing in isolation and is a key member of the product development team.

Chapter 3

Pattern Cutting and Materials Utilisation

This chapter examines the critical influence of the garment pattern on the pivotal activities in a clothing factory. There is no doubt that pattern cutting, whether performed manually or with a CAD system, is the most important technical process in the production of clothing. Apart from effective design interpretation, the pattern cutter has a major responsibility to provide the basis for the most efficient usage of materials.

MATERIALS UTILISATION

Various research projects have established that approximately 85% of the materials purchased for garment production are in the finished garment, with the remainder for one reason or another ending up as waste. This figure is called the materials utilisation percentage and it is a crucial cost factor in the price of a garment. Materials generally comprise about 50% of the cost price of a garment with labour representing approximately 20%. So an improvement of, say, 5% in materials utilisation is worth far more than a 5% reduction in production time. Whilst the pattern cutter cannot personally prevent excess materials usage in the cutting room, there are a number of procedures which can be employed to ensure that the garment pattern makes the minimum possible demands on materials requirements.

These procedures are grouped together under the heading of pattern engineering.

Pattern Engineering

The overall objectives of pattern engineering are to improve the utilisation factor of a garment pattern through prudent modifications which do not degrade the design integrity. A line has to be drawn between the enhancement of materials utilisation and the maintenance of the design objectives. If the sweep of a fully flared dress is reduced by four to five centimetres or the depth of a skirt waist band is decreased by two or three millimetres, would these modifications make any material difference to the final appearance and fit of the garment? If pattern modifications are planned, they should be considered with a large measure of common sense.

The central procedures of pattern engineering are pattern accuracy, major modifications and making-up allowances.

Pattern Accuracy

Pattern accuracy is a fundamental subject. It is said, with justification, that apart from cutting mistakes, the accuracy of a pattern cutter can be judged by the amount and size of the cuttings found on the sewing room floor. Production operators are not supposed to be cutters. If they have to remove surpluses from components because of incorrect pattern alignments or erroneous allowances, then only the pattern cutter is responsible. Apart from the wasted materials, the production operators are to some extent prevented from doing the work they are engaged to do, so this situation is a twofold loss for the company. It can be eliminated to a large extent by greater precision on the part of the pattern cutter.

Major Modifications