## CONSTRUCTION

Construction is the foundation of clothing and fashion design. As this chapter demonstrates, it is both a technical and a design issue; garments need seams and darts in order to render a two-dimensional fabric into a three-dimensional piece of clothing, but how and where a designer chooses to construct these lines also affects the proportion and style of a garment. The use of different types of seam is often dictated by the choice of fabric, but can also be design-led; for example, because welt seams (see page 94) are commonly used on denim clothes, they give a garment a workwear feel. A 'deconstructed' seam (a seam shown on the outside) or a raw edge, where appropriate, gives a purposefully 'unfinished' look.

It is important that every fashion designer knows and understands how garments are made. A designer must know, for example, the various possibilities of pocket or collar construction, or where a seam can go. It is only when you know the rules that the rules can be broken to innovative effect.

This chapter introduces you to the basics of construction, taking you through the different types of tools and machinery required and their function in the construction process. It will also look at different sewing techniques, and techniques such as pleating and gathering that are employed to give form, volume and structure in clothing.



# **Tools and machinery**

Before we can talk about the methods for constructing garments, we must look at the array of tools and heavy duty machinery involved in the process of construction. The items that follow are some of the key tools.

#### Tools

### Pattern master (1)

This is used for creating lines, curves and for checking angles.

## Tracing wheel (2)

This is used to trace a line from one piece of paper or pattern on to another directly underneath.

#### Tape measure (3)

You can't begin work as a designer without one of these. It is used for taking measurements of the body. It is also used to measure around curves on a pattern if a pattern master is not available or is too short.

## Tailor's chalk (4)

Using tailor's chalk is one way of making lines or transferring a pattern on to cloth.

#### Pins (5)

Pins are used to temporarily fix pieces of cloth together before they are stitched.

#### Shears (6)

Large scissors for cutting cloth are referred to as shears. Never use shears to cut paper as this will blunt the blades.

#### Rotary cutting knife (7)

This circular blade is used to cut fabric. Some people find it easier to cut around a pattern piece with one of these than with shears.

## Small pair of scissors, or snips (8)

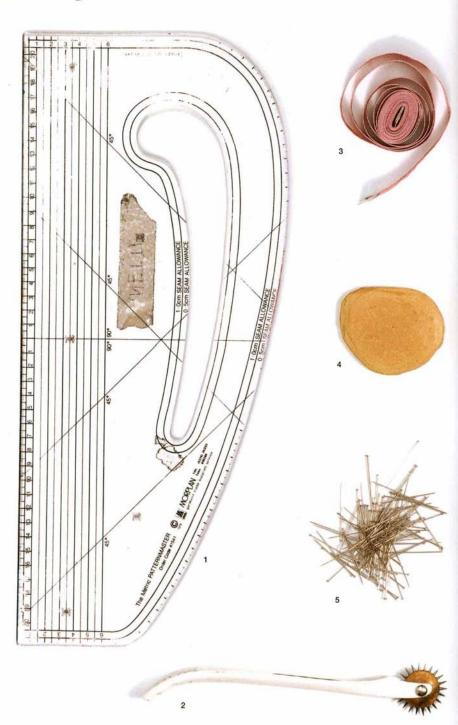
A pair of these is useful for cutting threads or notches.

#### Set square (9)

A right-angled triangular plate for drawing lines, particularly at 90 degrees and 45 degrees.

#### Metre rule (10)

A 100cm ruler useful for drawing long, straight lines.





## Machinery

#### Industrial flat bed machine

This machine does the basic straight stitch used to construct most types of seam. It can sew anything from chiffon to leather, but different types of fabric often require different fittings for the machine and a change in the width of the needle. For example, finer fabrics need finer needles.

#### Overlocker

An overlocking stitch is a series of threads that combine to create a stitch that literally 'locks' the fabric along its edge, preventing the fabric from fraying. A blade runs along the edge of the fabric, chopping off excess material and threads. Overlocking stitches can be made up of three, four or five threads and the type of fabric dictates which to use.

Overlocking stitch is used in three instances:

- 1 On woven fabrics to prevent fraying.
- 2 On knitted stretch fabrics as a method of creating a seam. The overlocking stretches with the fabric and therefore does not break, unlike a running stitch from a flatbed machine, which has no give.
- A superlock stitch is a dense version of an overlocking stitch and is used on fine fabrics such as chiffon.

#### Coverstitch

A coverstitch machine is used primarily in the construction and finishing of jersey fabrics and for lingerie. Twin needles create two rows of stitching on the right side of the fabric and an overlocking stitch on the wrong side of the fabric. A variation of this stitch creates an overlocking stitch on both sides of the fabric. Unlike an overlocking machine, this machine does not cut off excess fabric.





- Industrial flat bed machine.
- 2 Overlocker.
- 3 Industrial iron.
- 4 Fusing press. (Images 1–4 Photographs © J. Braithwaite & Co. Sewing Machines Ltd.)
- 5 A keyhole buttonhole on a Levi denim jacket.







#### **Buttonhole machine**

This machine creates two kinds of buttonhole: a 'keyhole' and a 'shirt' buttonhole. Shirt buttonholes are the most common type and are used in most instances where a machine-made buttonhole is desirable. Keyhole buttonholes are mainly used on tailored garments, such as coats and suit jackets.

#### Industrial iron and vacuum table

An industrial iron, as opposed to a domestic iron, is heavier, more durable and the steam has a higher pressure. It can be used with a vacuum table, which is shaped like an ironing board and often has a smaller board for ironing sleeves attached. A pedal underneath the machine allows the user to create a vacuum while ironing; the air and steam are sucked through the fabric into the bed of the machine. This reduces the steam in the atmosphere and also holds the fabric to the ironing board, allowing for easier pressing.

Pressing is essential to a garment; fabric will crease and rumple as it is handled and manipulated under a machine. Unpressed seams do not lie flat and the garment will look unfinished if it is not ironed.

#### Fusing press

Fabrics sometimes need more substance and support; for example, cuffs and collars need more body and support than the rest of a shirt.

A fusing press is the industrial machine used to attach (melt) iron-on interfacing to fabric and is more efficient and durable than using an industrial iron.

# **Construction techniques**

#### Seams

Making a seam is one of the most fundamental skills you will learn as you begin to study construction. A seam is created when two or more pieces of fabric are joined together. 'Seam allowance' is the border around a piece of cloth beyond the stitch line. This extra fabric is allowed in order to create a seam. There are various types of seam and each has a specific use and purpose.

## Running seam

This is the most common: two pieces of cloth are joined together using a flat bed machine. The seam allowance is either pressed open or to one side (seam allowance: 10mm+).

#### French seam

This is so-called because it originated in Paris, the home of haute couture ('high sewing'). This type of seam is used on fine and transparent fabrics to create a neat finish. It involves two rows of stitching; the first is completed on the right side of the fabric and the second line 'traps' the first on the wrong side (inside) of the fabric (seam allowance: 13mm+).

#### Welt seam

This is the seam commonly used on jeans, jean jackets and other types of denim garments. Two pieces of fabric interlock to form a strong and durable seam. Because of the way the seam is constructed, one side of the fabric will have two rows of stitching and the other side one row (seam allowance: one side 7mm+, the other side 17mm+).















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- 1 A Levi's denim jacket 3 French seam and constructed using welt seams and topstitching.
- Running seam with overlocked edges.
- pin hem.
- 4 Welt seam and topstitching.
- 5 The inside of a Basso & Brooke jacket showing the facing and lining.
- 6 Ordinary hem.
- Binding.
- 8 A Fila sweatshirt screen-printed over with artwork by Dutch designer Bas Kosters. Shows ribbing around the cuffs, collar and hem.
- Section of a tailored jacket using hand-stitching for construction purposes.



Once the seams of a garment have been constructed, the question of how to 'finish' the garment must be addressed. The finish of the garment is exactly that: the completion and tidying of raw edges, necklines, hems and cuffs, and whether to use topstitching or not. How one finishes the garment affects the overall style of the garment and the choice of the finish is an important element of its design.

#### Topstitching

Any stitching visible on the right side of a garment is referred to as top stitching. It can be decorative, but its main function is to reinforce a seam.

#### Ordinary hem

An ordinary hem is an allowance of fabric that enables the hem to turn up either once or twice to finish a garment (for example, a hem with a finished depth of 1cm will have 2cm fabric allowance if it is turned up twice). Hems at the bottom of trousers, skirts, dresses and coats are deeper (at least 3cm finished depth).

#### Pin hem

A pin hem is a very short turned-up hem used to finish fine fabrics, such as chiffon or silk. These are either sewn by machine or by hand.

#### Facings

A facing is used to finish edges, such as necklines or front/back openings. It looks better than turning the fabric in on itself and stitching it down and allows the finish of a garment to be without topstitching. A facing is usually cut from the same cloth as the outside layer.

#### Hand sewing

There are various techniques and stitches used in hand sewing. Both tailoring and haute couture employ a wide range of hand stitching in the construction and completion of garments. Each type of stitch has a specific role, whether it is used for hems or attaching canvas to a jacket front.

## Binding

A binding is a bias strip of fabric or jersey used to neaten a raw edge. It can be used at necklines, cuffs and hems, but also as a method of neatening the raw edges of an internal seam when overlocking would be unattractive. It is considered to be a finer way of finishing a seam in this way, but it is more time consuming, thus ultimately more expensive.



#### Ribbing

Ribbing is a knitted band used to finish necks, cuffs and hems of jersey garments, such as T-shirts and sweatshirts. Ribbing can also be found on garments such as bomber jackets, where it is used to insulate the wearer from the weather.

#### Lining

A lining is used when it is uncomfortable for exposed seams to be next to the wearer's skin. Many outerwear garments also need to be lined. This is often to 'hide' the internal construction from view: interfacings, hand stitching, canvas, etc. With lining, it is not necessary to overlock seams.





A distressed vintage Levi-Strauss jacket. A new collar and back yolk have been stitched in to replace the originals.

## Raw edges and deconstruction

In the 1970s, Japanese designers Yohji Yamamoto and Rei Kawakubo of Comme des Garçons were the first designers to show 'deconstructed' garments on the catwalk. Their clothes revealed the seams of the garment on the outside rather than hidden on the inside. The concept was to show exactly how the garments had been put together. Raw, unfinished hems and edges can also be employed. There is no practical reason for doing so; it is purely aesthetic.

## Distressing

The premature ageing of fabric is called distressing. This type of garment finish has been used in theatrical costume for a long time, but recently, so-called 'aged' garments have become fashionable. Distressing a new garment can make it look vintage or it can take away the box-fresh crispness of some clothes, such as jeans.

Garments are usually distressed after they have been made. This way, the area of distress can be controlled and look more realistic – for example, on the knees or elbows. One of the techniques used to distress clothing is to machine-wash it with stones. The easiest way to distress clothing is to wear it (and not be too careful) or to wash or boil it a few times. The fabric can be worn by applying sandpaper or a wire brush to the surface. The garment can be left outside or in a window for other 'weathered' effects. Designer Hussein Chalayan buried his graduate collection in his garden covered in iron filings to achieve a distressed effect.

#### **Tailoring**

Bespoke tailoring is the male equivalent of haute couture; clothes are made to fit the individual rather than mass-produced to fit a standard size.

Tailoring is a term that generally refers to a method of making clothes that requires a more handcrafted approach. A good suit requires that much of its work be done by hand instead of, or in addition to, solely by machine. The fabric is manipulated and shaped through the use of hand stitching, canvas and subtle padding to create structure and form; the fabric is 'moulded' to fit the form of the human figure.



5 Semi-constructed tailored jacket, showing shoulder pads and the hand-stitching and tacking stitches that a tailor uses to mark out important lines on

the garment while it is being made. The pockets are tacked closed to prevent them from sagging.

#### **Darts**

One of the basic concepts of pattern cutting is how to render something essentially flat (paper, fabric) into something three-dimensional.

Darts create fit. They are triangular, tapered or diamond shapes that once folded out of a paper pattern or fabric, convert a two-dimensional shape into a three-dimensional form. Imagine a circle; by cutting out a triangle and folding, the two-dimensional circle becomes a three-dimensional cone. By suppressing fabric in, the dart helps to shape or mould fabric to the form of the body. Darts commonly point towards the bust and from the waist towards either hips or bottom.

The placement of darts (and seams) on the body is very important; not only do they create fit, but they can add to the style and design of the garments.



- Black pleated dress with hood by Issey Miyake.
- 2 The Meret Lurex shirt by Boudicca. Autumn/Winter 2005.
- 3 The 'Simulation' skirt by Boudicca uses a series of seams that flare to create a 'tail'.
- 4 Junya Watanabe Autumn/Winter 2000.

#### **Creating volume**

In clothing terms, volume refers to excess fabric. Creating volume in a garment means that, strictly speaking, it no longer follows the human form and alters the silhouette to some degree.

## Using seams and darts to create volume

We create fit with seams and darts, but they can also be used to create volume. The easiest way to imagine how seams or darts for volume are used is to visualise an image of the world as it appears in an atlas, in which it is illustrated flat like the skin of a carefully peeled orange. Where the curved lines of each section join, they form a three-dimensional globe. The triangular spaces between each section behave a little like darts. If we were to cut through the darts and separate each section, seams (rather than darts) would be required to rejoin them (this is how seams can replace darts). Employing the use of seams or darts to create volume in this way offers endless possibilities for creating form.

## Pleats and gathers

There are various ways that fabric can be pleated, gathered or folded. Box pleats, found in the back of shirts, are two folds facing each other; scissor pleats all face the same way. Sunray pleats and the style of pleating exemplified by designer Issey Miyake are more like permanent creases.

Gathering is a technique for bunching up the fabric either systematically or irregularly. Where pleating is linear in nature, gathering can be more irregular.

Volume is created using these methods when gathers or pleats go into a seam or are stitched down, therefore suppressing the fabric at that point and releasing it at the point where it is not held down. Another technique similar to this is smocking; fabric is folded and then stitched at regular points to create a honeycomb effect.

#### Flare

To flare means to 'widen gradually'. The cut of a skirt can be flared to the extent that it becomes a full circle when laid flat. Flaring the panel of a garment gives it additional volume at either the top or bottom.









When volume has been created, it can be left to drape or it may require support and structure to achieve its full shape. If, for example, a skirt has been flared into a circle, without any support it will hang, only exhibiting its fullness during movement. Supporting the skirt from underneath will force the skirt outwards and show more of its volume. Various techniques and materials can be used, generally hidden within the garment, to add body or support.



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#### Netting

Netting is a light, stiff fabric used under a garment to bulk out or lift the outer garment. It offers the best support when gathered or 'ruffled'. Traditionally used to make ballet tutus and underskirts, netting supports the classic bell shape of a skirt. Without it, a skirt collapses and the volume deflates. It can also be used in sleeveheads to support gathering/pleating, or if the sleeve has an extremely voluminous shape, such as a 'leg of mutton' sleeve.

#### Padding

Padding can be used to emphasise part of the body and adds support to create volume. Dior's post-war (1947) 'New Look' collection used specially created pads for the hips to emphasise a strong feminine silhouette (see page 111). This look was scandalous to begin with – the use of excessive amounts of fabric was frowned upon in post-war Europe – but the look became hugely influential in the 1950s. More recently, Comme des Garçons challenged conventional silhouettes by padding the body asymmetrically and then stretching and draping fabric over the top.

#### Raglan sleeve

A sleeve where the armhole seam has been replaced by seams from under the arm to the neckline, is called a raglan.

- 1 Leather motorcycle jacket showing the quilting technique.
- 2 Netting can give a garment support. This is an underskirt.
- 3 'Atomic Bomb' Tuxedo by Viktor & Rolf from the Autumn/Winter

The outfit is constructed to fit over a 'pillow' of padding. The garments drape loosely 1998-1999 collection. without the padding, but still work as an outfit.

(Collection Groninger Museum; Photographer: Peter Tahl)

4 An example of a regular shoulder pad (top), and a raglan shoulder pad (bottom).



#### Shoulder pads

A shoulder pad gives more definition and form to a garment and creates a smoother appearance over the shoulder and collarbone. Shoulder pads can be bought ready-made, often from foam, but the better ones are made from layers of wadding sandwiched between felt or non-fusible interfacing. If a shoulder line differs from the norm, it is best to create a specific shoulder pad from the actual pattern of the garment so that the fit and form are perfect.

Although rarely used in tailoring, shoulder pads for ragian sleeves are also available. A shoulder pad for a set-in sleeve will not work for a raglan sleeve as they are very different in nature.

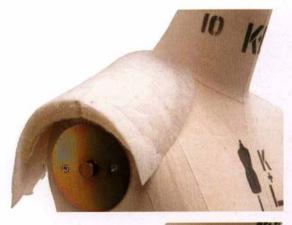
In the late 1980s and 1990s shoulder pads became guite extreme (hence the term 'power dressing'), before shrinking back to a respectable size, which enabled fabric to simply smooth over the shape of the shoulder and to hang well.

## Quilting

Quilting is the technique whereby a thick, fibrous material called wadding is placed between two pieces of fabric and stitched through. Traditionally, the pattern of the stitching is diagonal, forming diamonds, but the stitching can also add a decorative effect. Fabric that is quilted is thicker and can be used to insulate a garment. This is usually added to a garment as a lining. Quilting is also used as a means of protection; for example, on a motorcycle jacket.

Another use of quilting is to create structure. An example might be Jean-Paul Gaultier's iconic bra top as worn by Madonna on her Blonde Ambition tour of 1990. The top references the conical bras of the 1950s, whereby the bra gives a totally false, idealised shape to the breasts.







## **Boning**

Boning is so-called because it was traditionally made from whalebone. It also reflects the idea of internal structure and support, like a skeleton. Today there are two types of boning: one made of metal and the other, more common, is made of fine polyester rods and is called Rigilene®.

Boning is used to give support to a garment, generally from the waist up to and over the bust. It can also be used to constrict the waist in the form of a corset. Strapless evening gowns, which give the wearer so much shape, and, apparently miraculously, stay up, are supported internally by a corset. Vivienne Westwood's signature corset, based on a 19th-century style, gives the wearer instant cleavage.

As well as the corset, boning was historically used to create 'cages' suspended from the waist: a 'farthingale', worn in various incarnations between the 15th and 16th centuries, was flat on the front and back, but hugely exaggerated the hips; a 'crinoline', worn later in the mid-1800s, was floor-length and bell-shaped; and a 'cul de Paris' or bustle, fashionable during the late 1800s, was much smaller, but emphasised the bottom. More recently, Vivienne Westwood designed the 'Mini-Crini', which successfully married the floor-length crinolines of the mid-1800s and the risqué mini skirt of the 1960s.

Historically, boning was used to provide volume to the garment, but today it is mostly used to suppress the figure, but the technique and the material used endures and is likely to continue to be used in new ways.





This is the section of the canvas and interfacing that is underneath a tailored jacket.

- 2 The collar on this shirt has been deconstructed to reveal the use of interfacing in the collar stand.
- 3/4 A Vivienne Westwood corset.
- 5 Fine polyester rods woven together called Rigilene®, are used for boning.

## Interfacing

There are two types of interfacing: fusible (iron-on) and non-fusible (sewn-in). Interfacing is used to support and add substance to fabrics.

Interfacing is commonly used in cuffs and collars, facings and waistbands. It comes in various weights, from light to heavy and can also be fabric-specific; there are interfacings especially for jerseys (retaining the stretch that an ordinary interfacing would prevent) and for leather (with a lower melting point).

Interfacing should be used anywhere that the natural body of the fabric is not enough to support what it is being used for.

#### Canvas

Like interfacing, canvas is used to give substance to fabrics. Generally heavier than interfacing and sewn in by hand, canvas is most commonly used in tailoring, to give form to the front of a jacket or coat, but canvas can be used in other types of garment where the fabric requires more body.





# Draping on the mannequin

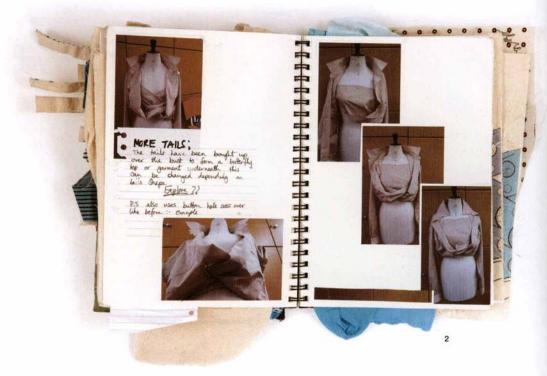
Learning through action. 9

Vivienne Westwood, Claire Wilcox, V&A Publishing

Some clothes are too complicated or innovative to be designed in two dimensions; these ideas need to be worked out physically in three dimensions by manipulating and draping fabric on a mannequin (also called a stand). Some designers prefer to work in this manner; draping on the stand allows the designer to really push forms. The possibilities of drape are arguably endless, limited only by the imagination. Understanding fabric and its properties is essential to the success of an idea worked through in this way – and vice versa. Some fabrics drape better than others and the weight of a fabric affects the way it will hang.

When draping on the stand, after the initial interesting voluminous forms are created, you must think about how the fabric relates to the body. Does it flatter the form? Will it move well? How do the proportions work with the body? Working in this manner can be rewarding, but is also a discipline. It's easy to create forms on the stand, but can they be converted into interesting and contemporary garments?





/2 Existing garments can be experimented with on a mannequin to create new garment

same way as using a length of cloth.

## Pattern cutting

One of the basic concepts of pattern cutting is how to render something essentially flat (paper, fabric) into something three-dimensional.

A paper pattern of a garment is developed ('cut') and cut into pieces so that when seamed together they create the garment. Good pattern cutting must be precise so that the pieces fit together accurately otherwise the garment will look poorly made and will fit badly. An inaccurate pattern will also create problems for the person sewing the garment together. Each pattern contains 'notches', or points on a pattern that correspond to a point on the adjoining pattern piece. These are cut into the seam allowance of a piece of fabric and help whoever is making the garment to join the seam together accurately.

There are basic rules of pattern cutting that need to be learnt before the designer or pattern cutter can become more adventurous and experimental. Changing one element of a pattern can have a knock-on effect on another piece of the pattern and a pattern cutter must be aware of this. For example, changing the armhole of a garment means that the sleeve must also change accordingly.

#### **Pattern Block**

All garment patterns start life as pattern blocks. A pattern block is a basic form - for instance, a bodice shape or a fitted skirt that can be modified into a more elaborate design. A designer/pattern cutter will develop their own blocks that they know and trust. Books on pattern cutting supply instructions on how to 'draft' certain pattern blocks from scratch using a list of measurements that relate to measurements of a standard (human) size. Patterns can also be taken from fabric that has been draped on a stand in order to develop a design.



### **Dart manipulation**

The dart can be moved around the body to create different lines, but in the example of a bust dart, it must always point towards the 'bust point' as this is where the fit and form is required.

Darts can also be incorporated into seams; the seam will become shaped and curved to create fit. The placement of darts (and seams) on the body is very important; not only do they create fit, but they add to the style and design of the garment. The following text relates to image 1 below:

- This basic pattern block for a bodice has two darts, one from the waist and one from the shoulder.
- The shoulder dart has been closed and a new dart has opened in the side seam. When these darts are sewn up in fabric they will suppress the same amount of volume and create the same form as the darts in a. Only the line has changed.

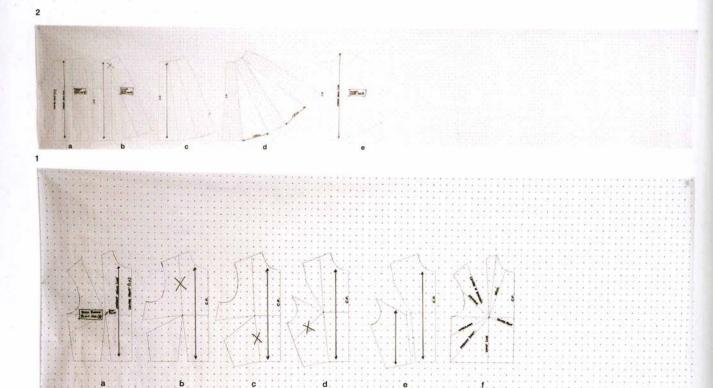
- g By closing the waist dart, the size of the side seam dart has increased. This new larger dart will create the same form as the two smaller darts in b.
- <u>d</u> Darts can be moved around the bodice to any position as long as they point towards the bust point. In <u>d</u> the dart has been closed at the side seam and reopened in the armhole.
- Darts can be transformed into seams by dividing the pattern into sections through the dart. When the two sections are sewn back together in fabric they create a seam, A seam that starts in the armhole and travels down the body in this way is called a 'Princess' line.
- f Same as d.

#### Slash and spread

This term refers to cutting a pattern at a strategic point or along a line, opening it up and adding in extra volume. Flare is often created using this method.

The technique of 'slash and spread' can be used to convert a straight skirt pattern into a flared skirt. The following text relates to image 2 below:

- a A basic pattern block for a straight skirt.
- b A line is cut up from the hem to the dart. When the dart is closed the pattern opens up and becomes A-line.
- The pattern is divided into three sections.
- These are cut along, from hem to waist, and opened up (spread). In this case 20cm is added into each 'slash'. This creates a more flared skirt.
- e The final pattern for the new flared skirt.



- A basic pattern block 2 for a bodice with two darts. Darts can be displaced around the pattern block.
- Using the technique of 'slash and spread' to convert a straight skirt pattern into a flared skirt.
- 3 An example of a toile or mock-up made in calico and painted with a spot pattern.



#### **Toiles**

A garment can look very different when converted from a two-dimensional drawing into a three-dimensional garment; proportions, details and fit may need to change and this is an opportunity to make modifications before the final garment or outfit is made.

'Toile' is French for 'cloth'. The term has been appropriated to mean a mock-up of an actual garment. It is made in a cheaper fabric – often calico (an unbleached cotton fabric, in French known as toile de cotton) – to check fit and make.

As the purpose of making a toile, or 'toile-ing' as it is known, is to simulate the final garment, it is necessary to toile in a similar fabric; for example, if the garment being 'toiled' will ultimately be made in a stretch fabric it must first be toiled in jersey. It is essential to use similar weight fabric for the toile as a design cannot always be realised with certain weights of fabric.

Producing good toiles saves time later on when the garment is made in final fabrics, but it isn't necessary to make real pockets or put a lining in a toile. Try to resolve all issues to do with construction so that if you are making the garment you'll make fewer mistakes in the real fabric. A good toile helps a sample machinist to make up your garment exactly as you want it.

## Sample sizes

The first version of a garment made in real fabrics is called the 'sample'. It is this garment that goes on the catwalk or is shown to the press. Samples are generally made to a standard size 8 to 10 to fit the models.

