Footwear Pattern Making and Last Design

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Drawing your pattern on the taped last

For some shoe designs, it may be easier to work in 3D, transferring the design drawing directly to the last contours. Drawing vamp details, toe caps, and mudguard details are much easier when you can follow the break lines of the last. Getting the top line of the toe bumper correct is nearly impossible when working in two dimensions.

With the last in your hands, you can locate and feel the contours. Working in three dimensions also allows you to check your proportions and see exactly how your pattern lines will look in space. This method is very common and can be used on many types of lasts and shoe design styles. Both pattern makers and designers use this technique.

This technique is great for designing complicated uppers with many overlapping layers. Seeing the design in three dimensions will allow you to look for seams falling on flex points and can let you see exactly how the eye stay opening will look.

Required tools:
Shoe last
Pattern paper
½” to ¾” wide masking tape
Steel ruler
Pen & pencil
Penknife
Scissors

Designing patterns on the last
In this example, we will be making the pattern for a classic trainer. Prepare the last with masking tape following the operations described in Chapter 6. We will also be marking the pattern points on the taped last, as described in Chapter 1. Before you tape the last, make sure the tape surface accepts pen and pencil marks without smudging.
Taping and marking the last
1. Apply tape lines on the centerline of the last’s heel and instep.
2. Apply tape layers horizontally and vertically to make a smooth drawing surface.
3. Apply tape to the entire lateral side and the front half of the medial side.
4. Mark the last centerline on the instep and heel with a marked tape line.
5. Mark ball points on the medial and lateral side.
6. Find the vamp point “V” where the center line meets the line connecting the ball points.
7. Mark the counter point “CP;” the height will be 20% of the standard last length (60mm - based on USA men’s size 9). Mark the back height 10mm above the counter point.
8. Draw the guide line from the 50/50 point of the ball girth line to the “CP” counter point.
9. At the half-way point of the guide line, draw a vertical line to find the “I” instep point (see pages 17-18).
Designing on the last
10. With your guide lines complete, you can now draw your new design.
11. Measure 10mm off the instep center line at points “I” and “V” to locate the edge of throat opening.
12. Draw the eyestay edge parallel to the main axis.
13. Start sketching the contour of the eyestay. Draw a guide line 20mm off the center to locate the eyelets.
14. Use your dividers to space the eyelets evenly.
15. The vamp point is the center mark. Sketch in the base of the eye stay and vamp lines following the last.
16. For size 9, the top line should drop to a point about 60mm above the feather edge.
17. Starting at point “I,” connect your collar line to the heel 10 to 15mm above the “CP.”
18. With the collar line complete, sketch in the mustache and heel counter parts.
19. Mark the remaining pattern details and ink in any pencil lines.
   The heel counter starts at point “CP” and meets the feather edge at 25% of the S.S.L.
Flattening the pattern

Follow the same flattening procedure as described in Chapter 6. Start at the toe tip, work toward the heel, and carefully peel the tape from the last. Start with the center of the taped forme contacting the paper. Working toward the heel seat, smooth the tape down, alternating from the feather edge to the back part. You should be able to flatten this section of the pattern without any cuts.

Now, work your way forward, toward the base of the eyestay, flattening as you go. You should be able to flatten the vamp area and work back to the collar line.

The cone area and toe tip along the feather edge will need some special attention. The toe tip will need extra material; this is called springing the pattern. Using scissors, make several cuts. This will allow the forme to expand and lay flat.

The cone area will also require several relief cuts to allow the pattern to lay flat. Depending on the last bottom contours and heel curve, you may need to make a few relief cuts here too. With the pattern flattened, use a penknife to cut the outline. Now the pattern can be divided to create the sectional pattern. When you copy the flat pattern, remember to spring the toe, so the medial and lateral sides join in a straight line (see page 145, step #19).
Pattern parts list:
Before you create the sectional pattern, you will need a list of the parts. In the case of this classic trainer, we will need to make 16 parts. Some of the parts are mirrored from medial to lateral side. The pattern maker will create the internal reinforcements, foam parts, and linings based on the shape of the external parts.

1. Base/lining layer medial side upper split on lateral side
2. Base/lining layer lateral side
3. Toe tip reinforcement
4. Toe tip/mudguard
5. Eyestay reinforcement
6. Quarter underlay lateral and medial sides
7. Quarter medial side
8. Quarter lateral side
9. Heel mustache panel
10. Heel counter cover
11. Internal heel counter reinforcement
12. Heel lining
13. Collar foam
14. Tongue face/tongue lining
15. Tongue foam
16. Strobel bottom

When creating the sectional parts, it is critical that you have a plan for how the parts will fit together. Some parts are overlays, and some are underlays. You need to think about how every part will be attached to the shoe. Will the parts be sewn or glued in place? You will need overlaps and seam allowances for almost every part.

In the case of the classic trainer, we will diagram each pattern part so you can see how they fit together and what allowances are required.
Assembling the classic trainer

To build the pattern parts for the classic trainer, it is important to know how the shoe will be put together.

The typical trainer is assembled piece-by-piece on top of a mesh underlay. Visualizing exactly how the parts will be attached and the stitching sequence will inform the pattern maker where to add seam allowances and overlaps.

The base/lining layer is split on the medial side. The medial side is attached with a zig-zag stitched butt seam. The toe tip reinforcement material is attached by heat fusible coating.

The eyestay reinforcement parts are temporarily attached to the base layer by self-adhesive backing. They will be secured when the eyestay/quarter panels are attached.

The toe tip/mudguard part overlays and secures the toe tip reinforcement. The quarter underlay parts are stitched in place, securing the eyestay reinforcements.

The lateral side quarter panel is joined to the lateral side by a stitch and turn seam on the medial side. After the parts are joined they are sewn in-place overlapping the toe tip/mudguard and the quarter underlays.

The heel mustache panel is attached to the lateral quarter panel. The internal heel counter reinforcement is attached to the heel counter cover by heat fusible glue.
The heel counter cover and internal heel counter reinforcement are attached to the lateral side overlapping the quarter, quarter underlay, and mustache.

With the upper parts attached, the flat upper is “closed” by folding the heel counter to the opposite side and sewing the parts together. When designing an upper, it is critical to plan how the upper will be closed.

With the upper closed, the heel lining is attached to the top line of the closed upper. The heel lining will need 5mm of seam allowance for the stitch and turn seam.

The collar foam is glued in place then secured by folding the lining down into the shoe. The heel lining is secured by stitching along the bottom edge of the upper.

Tongue face and tongue lining have an added seam allowance to allow the parts to be stitched together and turned. The foam is inserted, and then the tongue bottom is closed.

To complete the upper, attach the tongue and sew the Strobel sock to close the bottom of the upper. The bottom, or sock, does not require any seam allowance. The pattern maker may reduce the bottom to increase lasting pressure if the upper is too loose.

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Dividing the forme to make sectional patterns
With your design drawn on the forme, it is time to create the individual pattern parts. From this point, it does not matter if you designed your shoe on the forme or flattened the design from the taped upper. The operation is the same. The finished product is called the sectional pattern. The sectional pattern includes every piece of the shoe. All the overlays, underlays, lining, and tongue parts are included.

When creating the sectional pattern, the pattern maker will add overlaps and seam allowances. The design drawing should have seam types, and edge styles noted so the pattern maker can make the correct adjustments.

To help you create a sectional pattern, we will review some common techniques.

**Reflection**
To create a symmetrical pattern part, you can trace the pattern on a folded piece of pattern paper. Locate your center axis on the folded spine. It’s easy to trace the pattern part and cut a perfectly symmetrical part. Use the technique to create vamps, tongues, heel counters, and mustaches.

**Divider scoring**
Use your adjustable dividers to create lasting margins, overlaps, seam allowances, and straps. Open your dividers to the required spread and lock. Follow the pattern line, scoring the paper pattern to create your new line. Use your dividers to create straps for fashion shoes.
Window cut the pattern
To copy the line art of your shell pattern, use your penknife to cut the pattern line. Now, cut a window outside the line you are tracing. The window allows you to see the line for duplication. This skill will take practice to master. Make sure you have a sharp blade and remember to cut away from your fingers. You can “window” a taped pattern or a pattern drawn on the blank forme.

Here the pattern has been completely windowed and copied by hand. The toe has been sprung and the outside of the vamp added. This forme is now ready to be divided.
Creating the individual parts
Starting with the window cut pattern forme, select one component to draw. In this case, we will start with the heel counter.

1. The heel counter is asymmetrical, so we will need enough pattern paper to reflect the part. Draw a center reflecting line with a straight edge.

2. Align the windowed forme and replicate the pattern line. Trace the line segment in the window.

3. Here is the traced line segment. Make sure the line segment is aligned to the folded line.

4. Use a straight edge and French curve to create a smooth line. With the part drawn, make sure the reflecting line is in the center.

5. Fold the pattern paper.

6. Use a penknife to cut through both layers of the pattern paper.

7. Unfold the paper. Your part is complete!

For parts that require a seam allowance or underlay, simply add to the drawn parts before you cut them out.
Medial side is made by reflection

Butt seam does not require seam allowance

Base/lining layer
Lateral side

Base/lining layer
Medial side
Allowance is added for counter cover underlay

Internal heel counter reinforcement

Medial side is made by reflection

Heel counter cover

Medial side is made by reflection

Heel mustache panel

Allowance is added for counter cover underlay

Quarter underlay lateral

Quarter underlay medial

Allowance is added for counter underlay
Seam allowance for turned out seam

Heel lining

Collar foam

Medial side is made by reflection. Follow the top line to draw the contour.

Medial side is made by reflection.
Allowance is added for quarter underlay.

Medial side is made by reflection.

Allowance is added for counter underlay.

Quarter lateral side.

3mm seam allowance.

Medial side is made by reflection.

Quarter medial side.

Eyestay reinforcement is designed following the eyestay quarter panel.

Allowance is added for counter underlay.

Toe tip/mudguard.

Toe tip reinforcement.
# 1 How to Spot Fake Sneakers
You will never look at shoes the same way again.
See your favorite Nike, Vans, and Adidas shoes in a whole new way. Our guide to sneaker authentication literally cuts deep into the world of counterfeit sneakers. You will learn how to inspect and authenticate sneakers like a professional. You will speak the language of sneakers and you’ll never get burned buying fakes again.

# 2 How Shoes are Made
Launch your professional shoe career here.
Is your career goal to work for a big brand like Nike or Converse? Maybe you have your own brand and designs to produce and sell? You are in the right place. How Shoes are Made is your launching pad - see and learn every step from shoe design to development, manufacturing to exporting, and more from inside a shoe factory.

# 3 Footwear Pattern Making and Last Design
Transform your designs into real shoes.
When you are ready to explore the heart of shoemaking you must understand how the last and pattern work together to create shoe. This book will pull you into the shoemakers world of last design, size grading, and pattern cutting.

# 4 The Shoe Material Design Guide
Materials make it real
Turn your drawings into factory ready footwear specifications. You will learn how to specify a shoe by looking inside the classic styles of modern footwear. This book shows you what materials Nike and Adidas pick to build their iconic shoes.

# 5 How to Start Your Own Shoe Company
Build your brand, your business, and your dreams.
Written for everyone who dreams of starting their own shoe company. You will identify with the brand building challenges and uncover the solutions to the crucial steps such as creating your brand identity, legally setting up your company, registering your trademarks and patents, getting your shoes designed, built, paid for, and finally, marketing and selling your shoes.

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