October 2025

Re_fashion

Designing a more lasting shoe

A practical guide to structure your first steps

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Introduction

Today, the contours of the industry are being redrawn. The durability of footwear is at the heart of environmental, regulatory, and usage expectations.

However, while the concept of durability is widely shared, **its concrete translation into design practices remains unclear**. What levers should be activated? What compromises should be accepted? What priorities should be set?

To address this complexity, the **Collectif Chaussure** (Footwear Collective), coordinated by Refashion, has embarked on a collaborative effort focusing on a specific aspect of durability: **physical durability**. This document is the result of that effort. It does not seek to establish a single standard or method. Instead, it proposes a set of concrete reference points designed to support professionals in their design decisions, helping them to better integrate durability into their practices.

Context and scope of the study

This document is part of the Collectif Chaussure led by Refashion, the French eco-organization for the clothing, household linen, and footwear sector.

The collective, launched for the first time in 2023, is a collaborative initiative bringing together a selection of brands, technical experts, and institutional representatives. It provides a space for work and reflection to develop concrete initiatives, aligned with the challenges facing the sector and Refashion's objectives. Unlike more top-down formats such as webinars, the collective promotes collective intelligence and the sharing of experiences between peers. This second edition brought together nine companies, as well as the Centre Technique du Cuir (CTC, Technical Center for Leather) and the Fédération Française de la Chaussure (French Footwear Federation).

Christian Louboutin | GROUPE ERAM | Besson # I LOVE MY SHOES | DECATHLON
chaussea. | KIABI la mode à petits prix | INTERSPORT
Paraboot | CTC | GROUPE ROYER | FEDERATION FRANÇAISE DE LA CHAUSSURE

For this second edition of the collective, participants chose to focus on the **physical durability of shoes**, with the **aim of facilitating the integration of this criterion** into design practices through the development of a common reference document.

This document thus constitutes an **initial working basis**, structured through co-construction by the members of the collective and enriched by feedback from external experts. It aims to **provide concrete tools to design stakeholders**—stylists, product managers, developers, buyers—so that they can better anticipate and integrate durability issues into their decisions.

It is aimed at a non-specialist audience in eco-design, with the ambition of being **accessible, pragmatic, and actionable**. It is not intended to define a single path to lasting design, nor to set specific targets to be achieved. Nor is it a normative reference framework. It provides a **structured framework for questioning**, to support teams in their reflection at each stage of the design process. This framework considers their **technical, economic, and organizational constraints**.

It is important to remember that reducing the environmental impact of a shoe goes far beyond the single issue of durability. Durability is just one of many factors influencing a product's environmental performance :

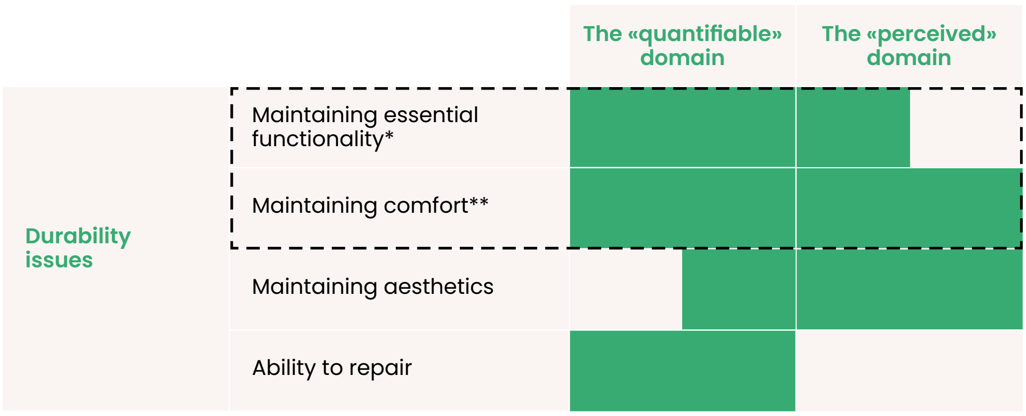
- Economic models,
- Choice of materials,
- Industrial processes,
- Repairability,
- Recyclability...

These are all complementary dimensions, sometimes converging, sometimes in tension.

The purpose of this document is not to cover all of these topics, nor to pit them against each other, but to propose a **common set of best practices specifically dedicated to durability**.

We would like to point out that the broader topic of measuring environmental impact has been extensively worked on at the European level in order to define a methodological framework (PEFCR : Product Environmental Footprint Category Rules) specific to the clothing and footwear industry (latest version published in 2025). This methodological framework can help you arbitrate between the different dimensions mentioned above.

Furthermore, this document deliberately focuses on one aspect of durability that we will refer to as «physical durability». As this concept remains complex to define, we propose below to outline the scope of the issues covered by this concept of physical durability.



* Example of loss of essential functionality: a torn buckle
** Example of loss of comfort: the user feels unevenness in the ground due to worn soles
Scope of physical durability considered in this study

Finally, this version of the document is intended to be an **evolving tool**. It can be tested, challenged, and adapted according to the product contexts, types of use, or industrial realities specific to each company. It represents an important step in structuring a more resilient and committed industry, where durability becomes a central component of product development.

Glossary

Board
A two-dimensional representation corresponding to the footprint of the bottom of the last. The board traces the outline of the shoe and serves as a template for defining the first insole and guiding the creation of the other parts of the shoe.

Eco-modulation
A system of incentives and penalties (mentioned in Article L.541-10-3 of the French Environmental Code) designed to encourage and reward virtuous eco-design initiatives and penalize less virtuous products.

Fit
All the dimensional properties of a shoe that enables it to fit and accommodate the foot correctly and comfortably, and to support it effectively during walking movements.

FMECA: Failure Modes, Effects, and Criticality analysis
A tool for operational safety and quality management that ranks failure modes according to their degree of criticality, thereby preventing or reducing product-related risks.

Good clip
Curvature of the material to wrap around the heel and support the foot.

Goodyear welt
Assembly of the upper and sole using a double stitching system (see more details on manufacturing processes **here**).

KPI: Key Performance Indicator
A key performance indicator is a metric used to evaluate the effectiveness of actions taken to achieve a defined objective.

Last
A piece of wood, plastic, or metal representing the volume of the foot and used in the manufacture of shoes.

Martindale test
The Martindale method is used to test a material's resistance to abrasion. Several standardized test methods exist for performing a Martindale test depending on the materials or components.

Metatarsal
The metatarsals are a group of five long bones located in the middle of the foot. They connect the rear part of the foot to the toes.

Midsole
Sole inserted between two layers of sole or between the foot and the outsole.

Mood board
A trend board created by assembling images, objects, or words. It brings together all the elements that will enable the development of a creative idea (fashion, advertising, design, layout, etc.).

Pattern making
The process of developing a model based on a design (drawing or mock-up), establishing a collection of standard patterns defining the various pieces of a model, and producing a series of patterns graded by size.

PEFCR: Product Environmental Footprint Category Rules
A set of rules and guidelines specific to a product category (e.g., footwear) that provide guidance on how to conduct an environmental assessment (LCA - Life Cycle Assessment) within a common European framework. In 2025, the PEFCR Apparel and Footwear was **published**.

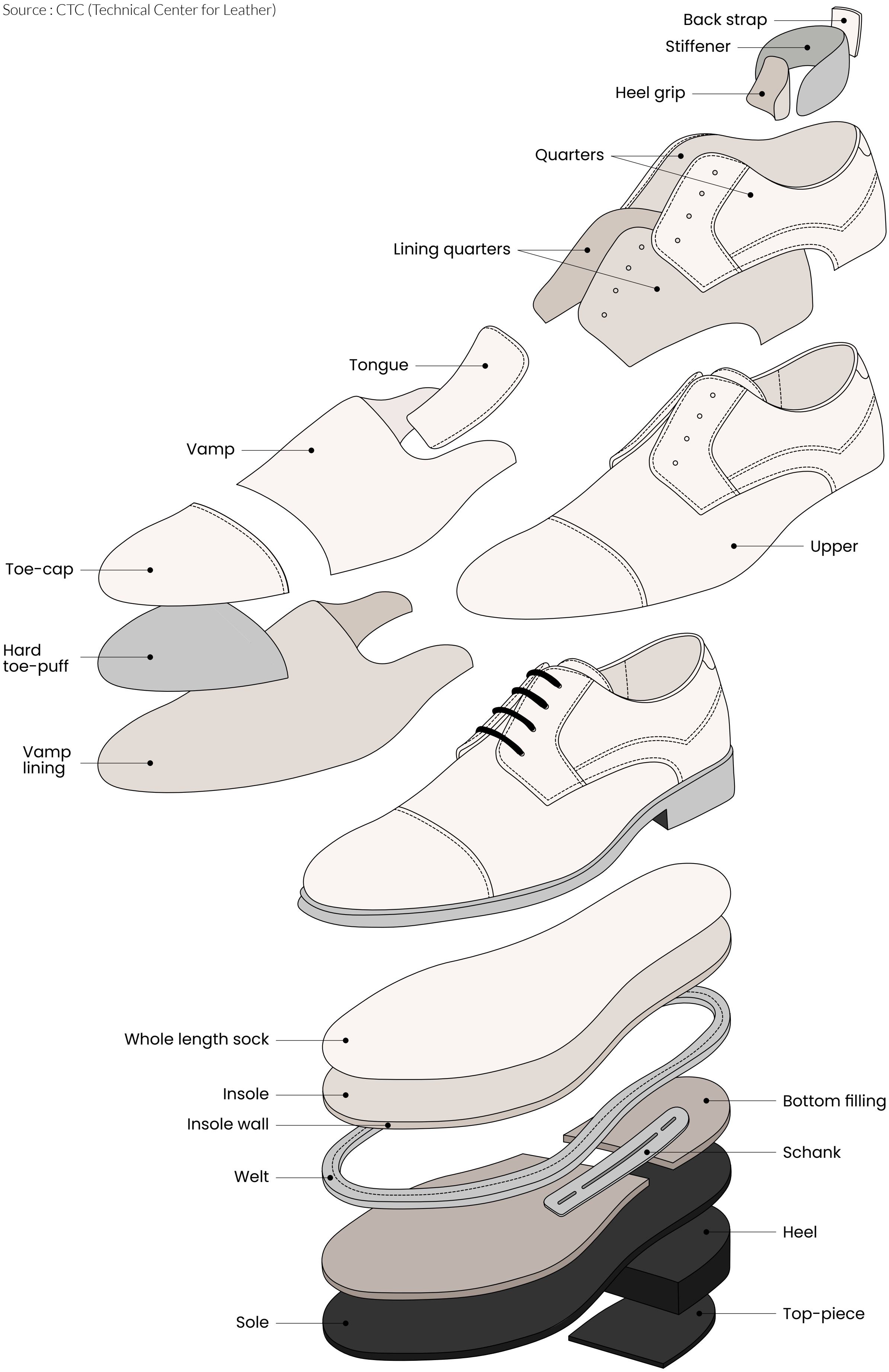
Sole
A resistant part that forms the bottom of the shoe and is in direct contact with the ground, either entirely or at the front.

Upper
As opposed to the sole, the upper part of the shoe, designed to cover and protect the top of the foot. There are high (high-top) and low uppers. The upper is generally made of lined uppers (lining), but there are also unlined items.

Lengthwise, the upper consists of a forefoot (toe, vamp) and a rear (quarters, heel counter). Widthwise, we specify outer or inner upper depending on whether it is for the right or left foot.

Detailed composition of a shoe

Source : CTC (Technical Center for Leather)



1_Durability, a challenge for the entire value chain

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The issue of designing for durability goes beyond choices of assembly, materials, shapes, or design. The internal context of the company and the value chain in which it operates also influence its ability to develop lasting footwear.

So, before diving into the design challenges, we suggest listing below the main stages of the shoe development process, the stakeholders involved, and the areas of focus that need to be worked on to ensure a value chain that promotes durability.

A simplified and linearized view of the value chain for developing a new pair of shoes is presented below. This «typical» value chain does not claim to describe all the organizations within each company but seeks to cover the major stages of development and the expertise mobilized throughout the process. Depending on the organization, this expertise may be grouped into different departments or divisions, or even outsourced to external partners. The following table should therefore be considered as a basic framework to be adapted to the specific organization of each company.

Stage 0 : Business strategy

Objective **Define a clear vision and structural choices to guide the company's resources, actions, and investments in a sustainable manner.**

Expertise mobilized	Commonly implemented actions	Areas for improvement for a lasting shoe
Management	Define the company's strategic priorities and the means to implement them	Promote a **culture of quality and durability** throughout the company: strategic objectives, sharing customer feedback and issues encountered across departments, reporting, etc.
CSR (Corporate Social Responsibility)	Manage the company's CSR commitments	• Integrate and monitor **KPIs related to physical durability** (e.g., customer return rate, test deployment rate) • Integrate physical durability into the **overall eco-design policy** • Train teams on CSR and the importance of physical durability • Train and **support teams on environmental communication**: promoting durability, defining non-misleading environmental claims, etc.
Quality	Define, update, and share product specifications (materials, assembly, finished product) to set requirements for suppliers	• Create an **internal reference document (defect library)** on minimum resistance requirements for physical testing • Define a **minimum number of cycles** (threshold) for physical tests (e.g., x number of flexes, x number of mechanical rubs) • Integrate **requirements for materials, traceability, and production choices** • Raise awareness among all company employees about the content of the specifications and ensure that they are understood
Finance / Management accountant	Conduct an economic analysis in line with the brand strategy to determine price positioning	Integrate **financial issues related to durability**: • Allocate financial resources to teams (R&D, innovation, etc.) to test and implement durability-related actions (physical tests, sampling, etc.) • **Consider the additional costs associated** with certain durability actions, as well as the potential costs avoided by addressing durability issues (e.g., reduction in return rates) in the overall economic equation of the project (measured over time)

Legal	• Monitor and anticipate regulatory obligations • Frame the supplier relationship and monitor compliance	• Monitor **regulations** specific to physical durability • Extend the legal product warranty period
Internal communication	• Ensure the smooth flow of information within the company • Facilitate interaction between departments	Ensure that sensitive information is shared throughout the company: specifications, after-sales service feedback, etc

Step 1 : Ideation & Design

Objective **Define the needs, trends, and design of the product.**

Expertise mobilized	Commonly implemented actions	Areas for improvement for a lasting shoe
Marketing / Brand Management	• Study market trends, analyze the competition • Identify consumer expectations and incorporate any feedback from the field • Define the collection offering plan	• Conduct **extensive monitoring of brands committed** to durability • **Define durability objectives for collections**, such as the percentage of models that meet physical durability criteria
Product offer	• Coordinate product managers from different divisions • Validate collection choices	• Analyze the **performance of past collections** • Develop a culture of integrating customer feedback (e.g., sending surveys • Based on quality feedback from previous seasons, **define areas for improvement** to optimize the design of new products
Purchasing / Sourcing	Select and monitor suppliers	• Monitor technical solutions offered by upstream players • Favor **long-term partnerships with suppliers** to enable continuous improvement, get to know material and accessory suppliers (tier 2 and 3), and commit to **responsible purchasing practices** • Establish durability monitoring indicators (e.g., requirements for certain tests)
Product development	• Create mood boards and define stylistic and functional guidelines (technical specification sheet) • Establish guidelines on preferred materials and treatments • Establish guidelines for the soles	• **Integrate durability and function constraints into the design phase** • Develop product-specific design recommendations based on historical failure analysis to inform internal design guidelines *(see section 5)* • Monitor new lasting materials, techniques, and componentss • **Incorporate quality feedback into the brief for the technical team** (particularly regarding the choice of materials)

Step 2 : Development & Prototyping

Objective **Transform the design into a functional prototype by iteratively validating technical choices.**

Expertise mobilized	Commonly implemented actions	Areas for improvement for a lasting shoe
Product design and development	• Choose the shape • Choose materials • Define the usage requirements to determine the technical specifications (comfort, ergonomics, durability) • Co-create a technical specification sheet with the design and quality departments • Develop initial models and prototypes	• Follow **general design best practices** *(see section 4)* • If available, follow design guidelines *(see example in section 5)*
Product offer	Ensure that the prototype matches the technical specification sheet	Initiate **wear tests** under clearly defined test conditions (e.g., x months, x km, etc.) Note: These tests may be repeated after production begins, as tests on samples may sometimes lack representativeness.
Purchasing / Sourcing	• If in-house production: → Identify and select suppliers of materials, components, and accessories → Negotiate prices/deadlines/ service • If production is outsourced: → Share requirements for materials and components with the finished product manufacturer	Ensure that **partners can meet the requirements** set by the technical team

Step 3 : Model validation & Production launch

Objective **Finalize the design and prepare for production.**

Expertise mobilized	Commonly implemented actions	Areas for improvement for a lasting shoe
Quality	Verify that materials and supplies comply with quality requirements	In the event of a quality issue, **consider corrective actions** with external and internal stakeholders
Manufacturing	Verify the conformity of the first batches (pre-series or pre-production)	• Support the manufacturer in continuously improving the reliability of its processes • **Help define production standards and rules**
Purchasing / Sourcing	Prepare the production line	Review **material technical specification sheets** to validate durability commitments (testing, certification, etc.)

Step 4 : Production & Distribution

Objective **Ensure smooth production for product distribution to markets.**

Expertise mobilized	Commonly implemented actions	Areas for improvement for a lasting shoe
Manufacturing / Production	Supervise manufacturing, adjust production parameters if necessary	Plan **corrective action processes** with the design office and quality department in the event of non-compliance
Quality	• Implement a quality control system (self-monitoring by the manufacturer and/or independent external service provider and/or client) on the production line, before shipment, and upon receipt of products before distribution • Perform quality tests	• Establish processes for receiving and checking test results • Plan **corrective action processes** with the design office and quality department in the event of non-compliance
Purchasing / Sourcing	Select and monitor suppliers	In the event of a change of supplier, check with the purchasing department that the requirements are the same (e.g., carry out durability tests on a particularly sensitive material)
Packaging / Logistics	Manage inventory, organize distribution, and optimize transportation	• **Consider issues related to transport duration and conditions** (e.g., exposure to humidity can cause mold, glue degradation, or material swelling). Significant temperature variations can alter materials and glues • **Use packaging to reduce the risk of product damage** during transport or storage (while optimizing packaging materials and quantities): → Assess issues according to product type (e.g., shoes with hooks can snag and become damaged) → Choose packaging that is the right size for the product to prevent it from moving around → Choose packaging that is suitable for fragile components
Marketing / Sales	Implement product communication, train sales teams and distributors, and raise customer awareness of environmental benefits	• Ensure that **information on the proper use of a shoe is always communicated and available** to the user • **Ensure that durability claims are backed up by concrete tests** (e.g., if the shoe has been tested in a laboratory in comparison with other products, the durability claim cannot be limited to «model that lasts twice as long») • Raise awareness among sales teams and consumers about the use of care products (polish, waterproofing, cleaning foam, etc.) depending on the type of shoe and its use

Step 5 : Monitoring & Improvement

Objective **Analyze product performance and identify areas for improvement.**

Expertise mobilized	Commonly implemented actions	Areas for improvement for a lasting shoe
Customer Service / After-Sales Service	Collect user feedback (comfort, durability, defects), manage complaints and repairs (quantitative and qualitative data)	• **Develop a FMECA** (Failure Mode, Effects, and Criticality Analysis) **culture** in order to implement corrective actions in production or during the development of future products • Work with marketing to **gather user perceptions of shoe durability** beyond the warranty/return period (e.g., customer surveys, customer co-creation, etc.) • In the case of B2B sales, ask distributors for product return rates
Quality	Identify the causes of customer returns	• **Analyze the causes of customer returns** related to a durability issue: detached sole, premature wear of materials, etc. • **Define an action plan** for future production if the product is renewed
Marketing / Sales	Collect and report customer feedback, suggestions, and expectations (comfort, durability, defects) to the quality and/or design team	Participate in **feedback meetings with the quality and purchasing teams** to incorporate their feedback into the specifications for new products

2_ General design best practices

2_General design best practices

Overview of design for durability

Technical **failure issues** should not be approached in isolation but integrated into an **overall vision**. Design choices must meet specifications that consider:

- Requirements (marketing and technical brief),
- Constraints (budget, industrial capacity, etc.).

However, we can highlight a few **recurring issues** that are important to consider when developing a more **lasting shoe**.

Before getting into these specific points, let's review a few general issues:

Style

→ Certain **stylistic choices** may conflict with **durability**. In this case, specific efforts (choice of materials, type of assembly, etc.) will have a limited effect because the **initial constraints** related to style will constitute a **major framework**.

→ Conversely, certain **stylistic choices** can **promote the user's perception of durability** and encourage them to keep the product longer (e.g., **a design that makes cleaning easier**). This is known as **emotional durability**, which is not discussed in detail in this document.

Value chain

The development of a **shoe** generally relies on the support of **expert partners**. It is therefore appropriate to invite these partners to c**hallenge the initial choices** to improve durability.

Example

*A **pattern-making expert** may suggest changing the line to improve comfort or adding a seam to reinforce an assembly.*
*A **sole designer** may suggest a design with better-positioned studs or a shape more suited to the intended use of the shoe.*

Specific insight into key issues for durability

1 The Last

The **last** is the starting point for shoe design. It determines the **distribution of volume** and the **stresses exerted by the foot in motion** (bending, friction, pressure). A suitable last makes it easier to anticipate **sensitive areas** and limit the risk of **premature wear**.

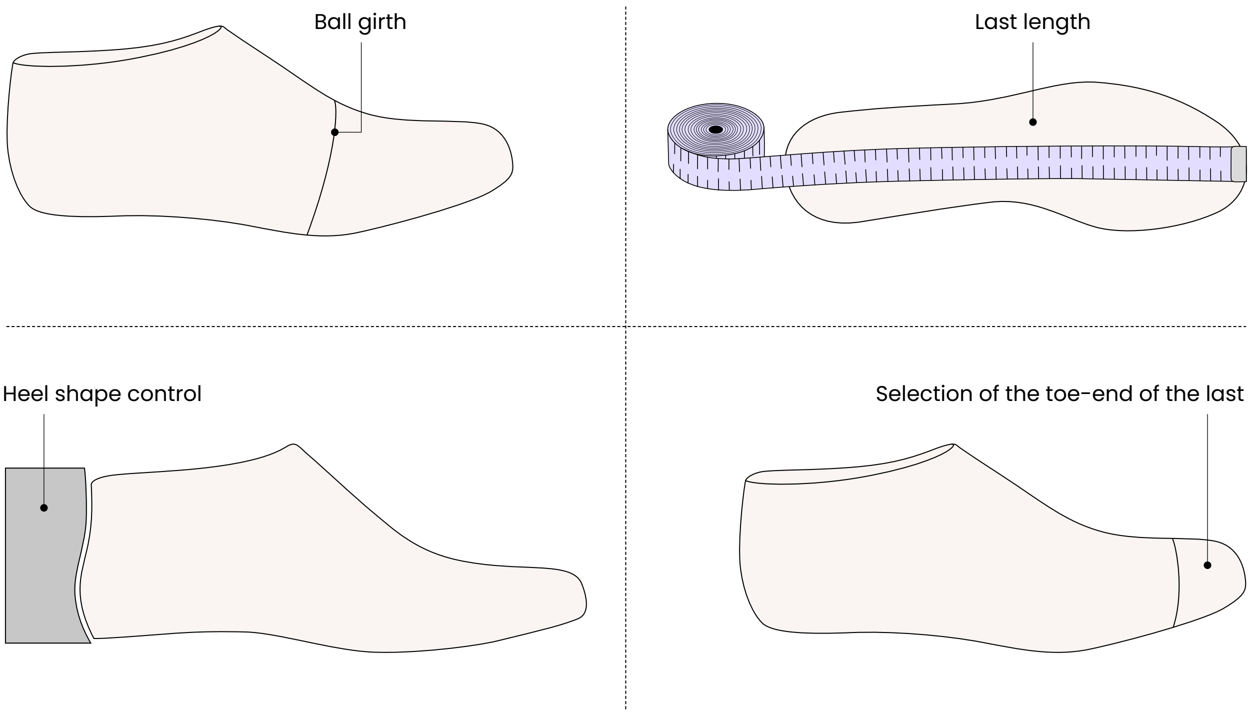
The last must be defined **according to the intended use**:

- A **running shoe** must leave enough space for the toes to avoid friction,
- A **support shoe** (sports, safety) will require a tighter fit,
- A **city shoe** may prioritize a different type of comfort (e.g., non-slip sole).

It is also necessary to consider the **morphological characteristics of the target markets** (width, arch, foot volume). In some cases, offering **different lasts** may be relevant, but be careful not to increase the number of references.

Finally, certain **stylistic choices** can compromise durability: very pointed toes, excessively high or thin heels. These choices must be evaluated carefully as they can weaken the shoe.

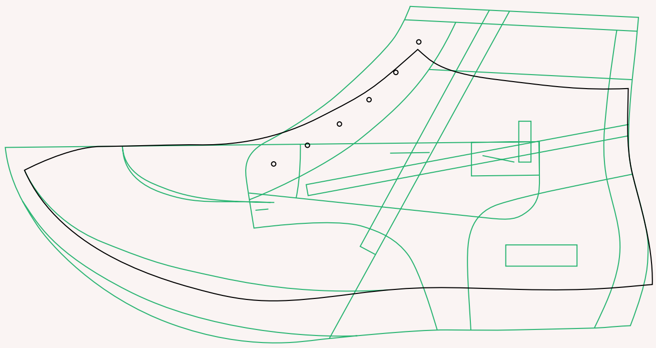
Illustration of the choice of certain shape parameters and measurement control



2 Pattern making

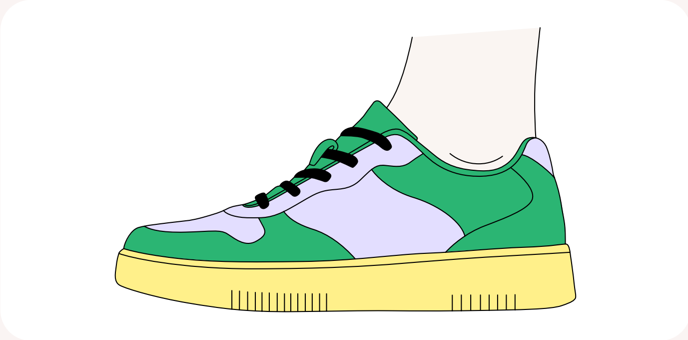
Pattern making plays a decisive role in the **durability** of a shoe. It determines the **layout of the pieces**, the **positioning of the seams**, and the **distribution of tension** across the entire model.

Illustration of a model pattern



At this stage, it is essential to consider the **location of seams and reinforcements** to limit areas of **structural weakness** or **discomfort** during use.

Example 1 | *The height of the shoe's edge at the malleolus must be below the malleolus (or above it, as in ankle boots, boots, etc.) to avoid pain.*



Example 2 | *At the heel, the pattern must allow for a certain amount of good clip to hold the foot in place (curvature of the material to wrap around the heel) without digging into the heel and causing pain.*

Example 3 | *At the toe, reinforcement stitches must be added to avoid weak spots.*

Often delegated to a manufacturer or **specialized partner**, pattern making requires **close collaboration** between **designers** and **pattern makers**. **Technical dialogue** is particularly important in certain **critical areas**—such as the **metatarsal** or **heel**—which are subject to high stress and likely to become points of failure if the pattern is not optimized.

Special attention must also be paid to the **mechanical behavior of materials once** they are mounted on the last (deformation, tension, stretching). These phenomena can weaken the shoe if the **cutting** and **assembly lines** are not properly anticipated.

3 Sole geometry

The **geometry of the sole** is a key factor in the **physical durability** of a shoe. It influences **wear resistance**, **comfort** during use, and the **long-term performance** of the various areas subject to stress (**heel, metatarsal, toe**).

It is essential to test soles under **representative conditions**:

- In the **laboratory** (flex, abrasion, upper-sole bond tests, etc.),
- In **actual use** (wear tests) to identify areas of weakness and adjust design choices accordingly.

Certain areas, such as the **sole of the foot**, which are less stressed, can tolerate lower resistance. Conversely, areas such as the **heel** or **toe** require **special attention**.

No **thresholds** are set in this document as the criteria vary according to **use, materials, and shoe types**. However, brands can refer to existing methodologies, such as those in Appendix 5 of the PEFCR Apparel and Footwear or eco-modulation for useful benchmarks.

For information purposes, here are the standards proposed within the PEFCR framework for category RP12 Closed-toed shoes / Non sport, Adult multipurpose

Test	Testing Area	Test Protocol	Weighting	Basic Level	Moderate Level	Aspirational Level
Whole Shoe Flexion	• Outsole/upperunbonding • Breakage of the upper in flexion area • Outsole breakage	ISO 24266 A	12%	50,000 cycles	75,000 cycles	100,000 cycles
Martindale Abrasion	Upper	ISO 17704	6%	6,400 cycles	18,000 cysles	25,600 cycles
Outsole Abrasion	Tread loss	ISO 20871:2018	12%	d ≥ 0.9 then ≤ 350 mm^3 d < 0.9 then ≤ 250 mg	d ≥ 0.9 then ≤ 250 mm^3 d < 0.9 then ≤ 200 mg	d ≥ 0.9 then ≤ 200 mm^3 d < 0.9 then ≤ 150 mg
Zipper Failure	Zipper	EN 16732	12%	500 cycles	750 cycles	1,000 cycles
Accessories Attachment	Buckle	ISO 24263	12%	≥ 150 N	≥ 200 N	≥ 250 N
	Straps		12%	≥ 150 N	≥ 200 N	≥ 250 N
Bond Strength	Outsole Separation	ISO 17708	17%	≥ 2.5 N/mm If failure ≥ 80% outsole/upper	≥ 3 N/mm If failure ≥ 80% outsole/upper	≥ 3.5 N/mm If failure ≥ 80% outsole/upper
	Midsole Separation		17%	delamination ≥ 1.5 N/mm ≥ 2.5 N/mm If ≥ 80% material failure ≥ 1.5 N/mm	delamination ≥ 2 N/mm ≥ 3 N/mm If ≥ 80% material failure ≥ 2 N/mm	delamination ≥ 2.5 N/mm ≥ 3.5 N/mm If ≥ 80% material failure ≥ 2.5 N/mm

It is also important to ensure that the **geometry of the sole** does not itself create any **weak points**:

- Poorly positioned studs,
- Excessively sharp edges,
- Stress concentrated on a specific area.

These risks can be limited by using a **«zoning»** approach, which involves adapting **shapes, thicknesses**, or **materials** according to the a**reas of stress**.

Finally, the sole must be designed to be perfectly **consistent with the shape**: heel height, suitability for assembly, etc. A poor fit can lead to **structural defects** (premature detachment, excessive stress on the materials).

4 Choice of materials

The **choice of materials** is a decisive step in ensuring the **physical durability** of a shoe. It must meet two requirements:

- Satisfy the **technical requirements** of the product,
- Ensure **long-term durability** appropriate for the intended use.

The first step is to check the **physical properties** of the materials against the **specifications**: resistance to abrasion, bending, tearing, etc. The materials must be suitable for their **location** in the shoe. Areas subject to heavy wear (metatarsal, heel, toe) require more robust materials, sometimes reinforced or oriented in a specific direction (e.g., warp and weft).

It is also important to ensure a certain degree of homogeneity between the materials used to avoid junctions between components with overly different rigidities, which could create areas of weakness. When this is not possible, **transition areas** (overlapping or stacking of layers) can be considered to cushion these breaks while maintaining comfort.

The compatibility of materials with the industrial processes must also be verified.

Example

In the case of injection molding, choosing a material for the stem with a melting point (transition temperature between the liquid and solid states) that is too low can cause problems during injection because the temperature inside the mold can approach this melting point and degrade the properties of the stem.

If the material is unsuitable, either the choice and/or finish of the material must be adjusted, or the processes must be adapted to remain within the material's tolerance range. This work must be carried out in close collaboration with suppliers, in the idea of technical partnership.

For animal materials such as leather, particular attention must be paid to the area of the skin used: the more fragile flanks must be avoided for use in areas subject to heavy wear.

In addition to these points, it is recommended that materials be tested for key parameters (flexibility, abrasion, waterproofing, thermal or UV resistance, etc.). Laboratory tests—carried out by specialized textile, leather, and other institutes—must be supplemented by wear tests, which are essential for validating actual performance under conditions of use. The relevance of the tests depends on the type of material and any coatings or other finishes applied to the materials.

These considerations must also apply to **accessories** (Velcro, buckles, zippers, etc.), which can also be a source of reduced durability.

Example | *A Martindale test may be very suitable for assessing abrasion on textiles, but not very representative for leather.*

Finally, it is important to remain mindful of the **trade-offs between durability and comfort**: some flexible, lightweight, or highly shock-absorbent materials may be less resistant to wear and tear or deformation over time.

5 Assembly

Assembly is a critical step in ensuring the durability of a shoe. Even with high-quality materials and careful design, poor assembly can seriously compromise the product's durability.

There is a wide variety of assembly techniques (the Fédération Française de la Chaussure (French Footwear Federation) provides an **overview** of these techniques , based on the book *La Chaussure sous toutes ses Coutures* published in May 2008 by the CTC). While certain techniques are recognized for their robustness—such as **Goodyear welting**, renowned for its solidity—it is important to emphasize that durability depends not only on the type of assembly used, but also on how effectively it is **implemented**.

Example | *In the case of a glued sole, adding a side seam in addition to the gluing (glued + stitched) generally provides greater durability than gluing alone.*

The durability of the assembly therefore depends largely on the **control of industrial processes**, whether manual or automated. The **precision of the movement**, the **stability of the machine parameters**, the **quality of the consumables** (glues, threads, etc.) and compliance with the application conditions are decisive for the final strength of the product.

It is essential to test critical assemblies, both in the laboratory and in the field. These tests must be carried out on:
- **Major joints** (upper-sole interface),
- **Intermediate assemblies** (midsole-midsole or midsole-outsole).

Example | *In the case of bonding, the chemical compatibility between the materials and the choice of adhesive must be anticipated from the development stage in order to avoid any risk of delamination or embrittlement.*

Wear tests remain essential to supplement the results in real conditions, considering the mechanical, thermal, and humidity stresses encountered by the shoe during its life cycle.

In conclusion, there is currently **no label or certification** system for assessing the **durability of footwear**. Only **laboratory tests** and **wear tests** can guarantee a **level of durability that meets the manufacturer's specifications**.

3_Proposal for a continuous improvement approach to shoe durability

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This section proposes a **structured approach** that each company can adopt and adapt to its own needs. It was developed by the Collectif Chaussure (Footwear Collective) to help companies continuously improve the physical durability of their products.

The method is based on **collaborative work** carried out on several pairs of adult **sneakers worn in the city**, provided by members of the collective, with a view to conducting a concrete analysis of the causes of premature end of use.

The aim is to provide a **framework that can be adapted** to each company's different **products**, **processes**, and **field feedback**. This approach makes it possible to:

- **Objectively** assess the failures observed,
- **Analyze their causes**,
- Identify **areas for improvement in design**,
- Integrate **verification elements** to monitor the effects.

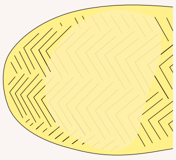
Each case analyzed may include:

→ The identified cause of end-of-use
→ A visual representation of the defect (photo of the product concerned)
→ A detailed description of the failure
→ An analysis of its impact on physical durability
→ Areas for improvement
→ Related verification elements

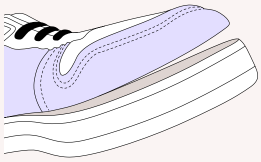
Please note that improvement proposals:

- must not be implemented without first being tested with your partners: assessment of technical, industrial, and economic feasibility.
- must be tested comparatively in the laboratory and/or in the field to validate the relative gain in durability.

1 Sole wear (mainly on the forefoot (metatarsals) or heel)

Description of defect	Consequences	Proposed improvement	Verification elements
Some areas show significant deterioration (loss of thickness, worn-out tread pattern) 	Abraded sole making the product slippery, uncomfortable, or permeable to water (in the case of holes)	• Check that the **material is suitable** for the intended use • Modify the **design of the sole** to avoid overuse (e.g., shape and position of the lugs) • Partially or entirely replace the material with a **more suitable material** (e.g., reinforcement in sensitive areas)	• Wear test • Laboratory testing (abrasion, flexion) according to specifications • Analysis of the sole design on a 2D/3D plan

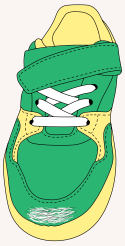
2 Separation of upper/sole

Description of defect	Consequences	Proposed improvement	Verification elements
The sole separates from the upper (or midsole) 	Product becomes non-functional because the upper and sole are no longer attached	• Analyze the cause: problem with the **adhesive** (faulty bonding) or the **material** (upper or sole deteriorating) • In the event of an adhesive problem: work with the **supplier** to choose the **best adhesive and primer** • If there is a material problem: replace with a **more resistant material**	• Test by wearing or in the laboratory (upper/sole separation) • Traceability of adhesives used

3 Eyelet tearing

Description of defect	Consequences	Proposed improvement	Verification elements
The upper right lace hole is broken 	It is no longer possible to lace the product correctly	• **Add reinforcement** between the upper and the lining • Add a **plastic or metal eyelet** or improve the quality of the eyelets used • Create an **embroidered eyelet** • Change the **shape of the hole** (e.g., round hole = less stress concentration)) • **Slightly shift the hole** to increase the distance between its edge and that of the piece • Use an **upper material that is more resistant** to shear/ tension	• Comparative tear or shear strength test • Wear test • Tensile test

4 Abrasion of the toe of the shoe (especially in children)

Description of defect	Consequences	Proposed improvement	Verification elements
The material at the toe of the shoe wears out due to friction 	If the wear is too significant, a hole will form	• Add a protective **cap**  • Select **sturdy materials**	Laboratory testing

Conclusion

This document is a **first step** in establishing a common language around the physical durability of footwear. It is the result of a **collective effort** involving **brands**, **experts**, and **professionals in the field**, and reflects a shared vision of the **key principles** to consider, the **points to watch out for**, and the **essential questions** to ask from the earliest stages of development.

As the collective's work progressed, a strong conviction emerged: **designing a more lasting shoe is not solely the responsibility of designers or product developers**. Durability is a **systemic issue** that cuts across the entire value chain. To become a tangible reality, it requires a **clear strategy** and the **coordinated involvement** of many different departments: **sourcing, purchasing, quality, marketing, logistics, after-sales service**, and, of course, **general management**. The decisions made at each stage directly influence the overall performance of the product over time.

This work also highlighted an essential reality: **designing a lasting shoe** does not rely on a single method or ready-made solutions. Each project is subject to **specific constraints**—related to the type of product, its use, materials, and brand objectives—which require a **tailor-made approach**.

These guidelines should therefore be considered an **initial version**, designed to be appropriate, adaptable, and open to discussion. They provide a **framework** for each company to build its own processes, based on its realities and ambitions.

By laying out this foundation, we hope to **encourage a collective dynamic of learning and progress**. This document is intended to evolve and be enriched by feedback, testing, and iterations. It is through the diversity of practices, expertise, and perspectives that a more sustainable, demanding, and committed industry will gradually be built.

Acknowledgments

We would like to extend our warmest thanks to all those who contributed to this guide, «Designing a more lasting shoe: A practical guide to structure your first steps.»

A big thank you to the participating brands for their commitment and valuable feedback, which has enriched our thinking and informed this collective work.

Our thanks also go to the CTC and the Fédération Française de la Chaussure (French Footwear Federation), whose expertise and cross-sector knowledge were essential to the structure and content of this guide.

Special thanks to Maobi for framing and facilitating the Collective, as well as to the Refashion experts who contributed their expertise, whose contributions enriched and structured this work.

Thanks to this collective effort, we hope that this guide will provide initial guidance for companies wishing to consider how to design lasting footwear.

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