



# Attachable Protective Skate Shoe Toecap

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# Introduction

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## Product Description

An attachable, protective toecap for skateboarding shoes lengthens the short lifetime of skate shoes. The toecap extends from the outer side of shoe toes and stops just before hitting the laces. It follows the contours of the foxing tape. The foxing tape is the rubber strip connecting the sole to the upper part of shoes. The toecap is 0.4cm thick, 3.5cm wide, and 11.1cm long. It is a skinny strip of rubber adding extra protection to areas more susceptible to wear and tear from skateboarding. The toecap is essentially a generic, attachable extension of skate shoe soles to improve the lifespan of skateboarding shoes.

***“The toecap is essentially a generic, attachable, extension of skate shoe soles”***

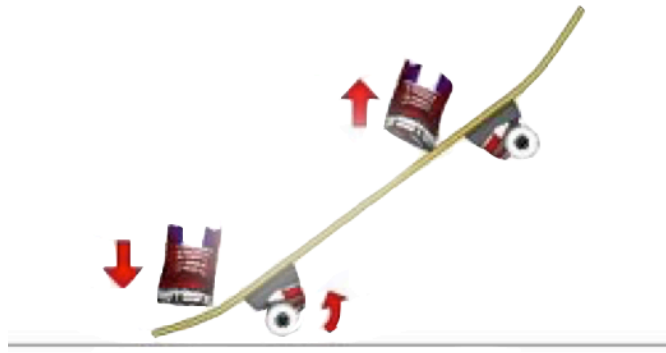


Black left-shoe toecap

The toecap attaches with glue, however it will ideally attach with an adhesive strip on the inside. The product delivers an aesthetic solution to an age-old problem in skateboarding, and makes application easy as possible on the user. The toecap improves the lifetime of shoes at a cheap cost. The skateboarding community needs an inexpensive, effective solution to protecting expensive skateboarding shoes.

## Problem Product Solves

Virtually every skateboarder rips his or her shoes. It is an inevitable result of skateboarding. The problem arises from how skaters perform all their tricks. The fundamental trick, and one that is present in all derivative tricks, is the ollie. The ollie allows skaters to jump off the ground and bring their board



with them. When a skater ollies, he must aggressively slide his shoe against the griptape. When his shoe is sliding, it is at an angle exposing the outside canvas to the rough surface of the griptape, as seen in the diagram. Nearly every time a skater does a trick, he has to slide his exposed shoe against the griptape. In a typical skateboarding session, a skater

may do upwards of 200 tricks.  
Mechanics of an Ollie

Repeatedly sliding against the griptape causes wear and tear in skateboarding shoes. The wear is usually isolated to the outside portion of the shoes because the motion is fundamental to almost all skateboarding tricks. Shoes can wear out very quickly for advanced skaters, however they all eventually wear out for skaters of all skill levels.



skateboarders, however they

Ripped shoes

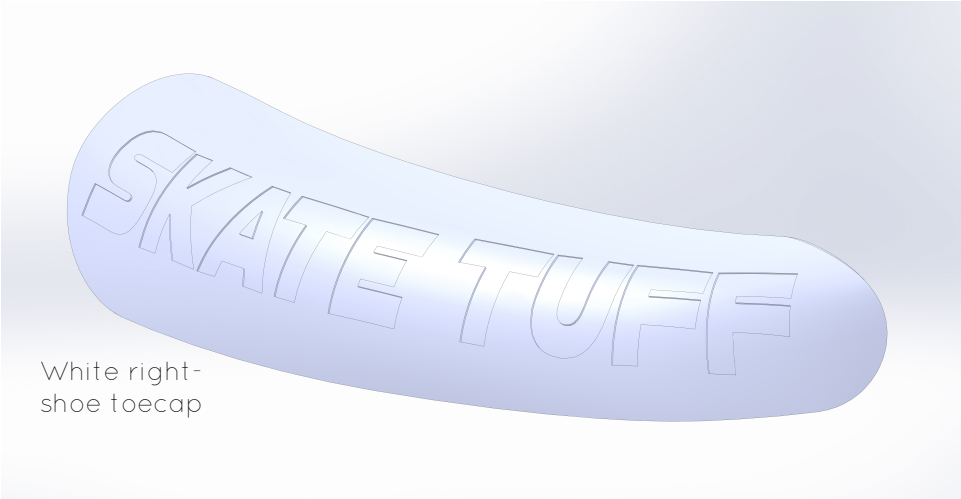


# Product Viability

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## Quality of Solution

The toecap provides an elegant, simple solution to a problem continually troubling skaters. The toecap is elegant because of its simple, aesthetically pleasing design. It seamlessly fits the contours of shoes. The design protects vulnerable areas only, contributing to its sleek and seamless aesthetic. The result is a beautiful product lengthening the lifetime of skateboarding shoes.



***“The toecap seamlessly fits contours of skate shoes”***

Other fixes to wear and tear lack the simple attachment method the toecap does. A common solution is “Shoe Goo”. Shoe Goo is glue made for shoes. Applying Shoe Goo is a messy, time-consuming process. A skater must squeeze it out of the bottle and then push it around with his hands. After a messy, time-consuming application, all Shoe Goo can offer is an unsightly quick fix. Skaters tend to apply Shoe Goo several times throughout the lifetime of a shoe, as it is just a temporary solution.

## Novelty

Among other strengths, the toecap also offers novelty. Skateboarding has never seen something like this. An attachable protective toecap catches the skateboarder’s eye. When buying a pair of skate shoes, a skater may not

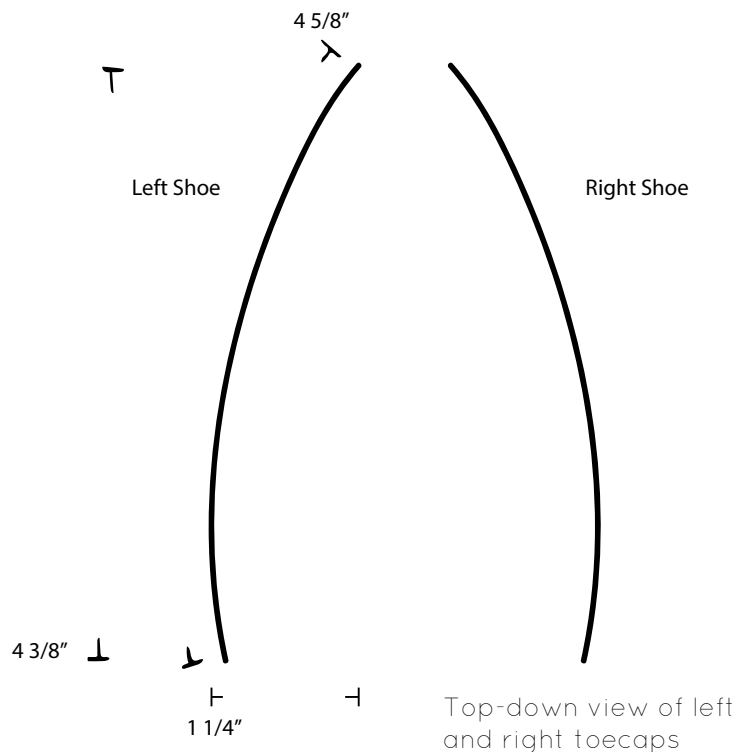
be inclined to buy a tube of Shoe Goo along with her purchase. She has probably used Shoe Goo before, understands its messy, time-consuming application, and knows Shoe Goo will not last long anyways. An attachable, protective, toecap in the same price range as Shoe Goo will grab her attention. She has never seen anything like this. It is novel.

## Shape Considerations

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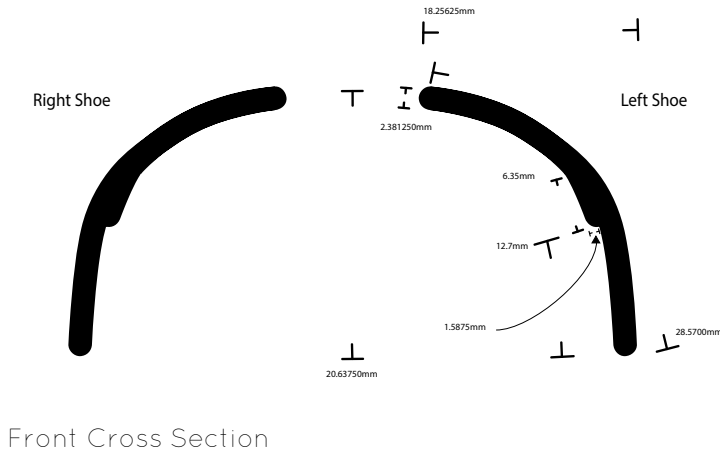
### Initial Design

In the early brainstorming stages, designing a toecap following the contours of foxing tape was the first logical step. Pulling from the curves of the most generic looking skate shoes, the diagram to the right indicates the curves of the left and right toecaps from a top down view. The curves start just before the end of the toes and stop after  $4\frac{3}{8}$  inches.

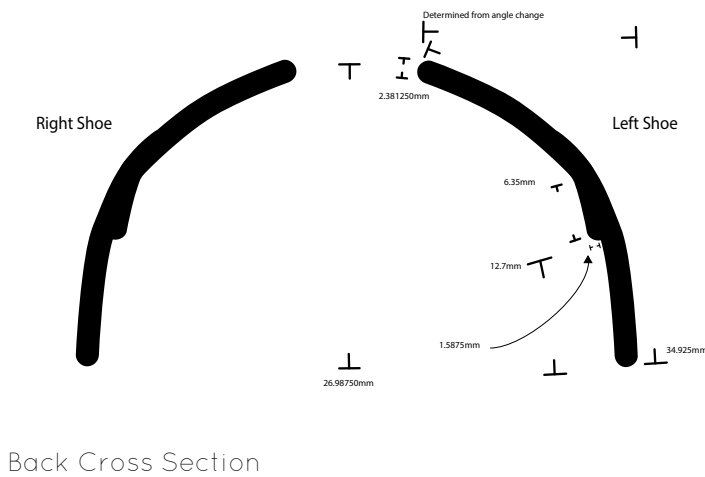


***“Designing a toecap that follows the contours of foxing tape was the first logical step”***

Next was determining the vertical curve. The vertical curve is the bend from the shoe sole to the flat canvas directly on top of the skater’s foot. This curve is harder to model because it gradually changes. The curve is sharper near the front and more gradual at the end of the toecap. This makes sense because feet are flat at the toes and more curved at the ankle.



The diagrams to the left depict the difference in curvature. The curvature linearly changes from the front end to the back end of the toecap. The diagrams also indicate the rounded edges. They are rounded so they will not catch on anything.



The final consideration for the initial design was to add a lip on the inside. It protrudes for the entire length of the toecap to utilize structural support provided by the foxing tape. Securely attaching the toecap is critical. The lip allows the toecap to rest on the foxing tape found in skate shoes.

## Design Adjustments

After 3D printing the initial design, the toecap underwent adjustments. From attempting to fasten the toecap to multiple shoes, it became obvious the front needed to curve more to securely latch on to the very end of shoes. Thus, the first change was increasing the curve at the front of the toecap. The toecap also appeared thick. The second adjustment was a slight reduction in the thickness in an effort to make the toecap blend in more. Lastly, the toecap looked so different and novel, engraving the name was a way to identify it. By engraving the name, the question “What is this?” is answered just by looking at the toecap.

# Material Considerations

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## Properties

### 1. Flexible

A critical concern for the toecap is flexibility. When performing tricks, skate shoes change shape in a quick, drastic way. A rigid material would fall off shoes because it would not adapt to changes in the shoe. However, a flexible material can change shape when under stress,

### 2. Non-deformable

In addition to a flexible toecap, it must also retain its shape when shoes return to their normal shape. Flexibility and non-deformability are complementary. The toecap must change shape when skaters perform tricks and snap back to its original form once skaters complete their tricks.

### 3. Durable

The most important property concerning the toecap is durability. If the toecap is not durable enough to withstand the griptape, then there is no need for it. The toecap must be hard to not deteriorate from the griptape, but it must also have a high coefficient of friction so skaters' feet will not slip when performing tricks.

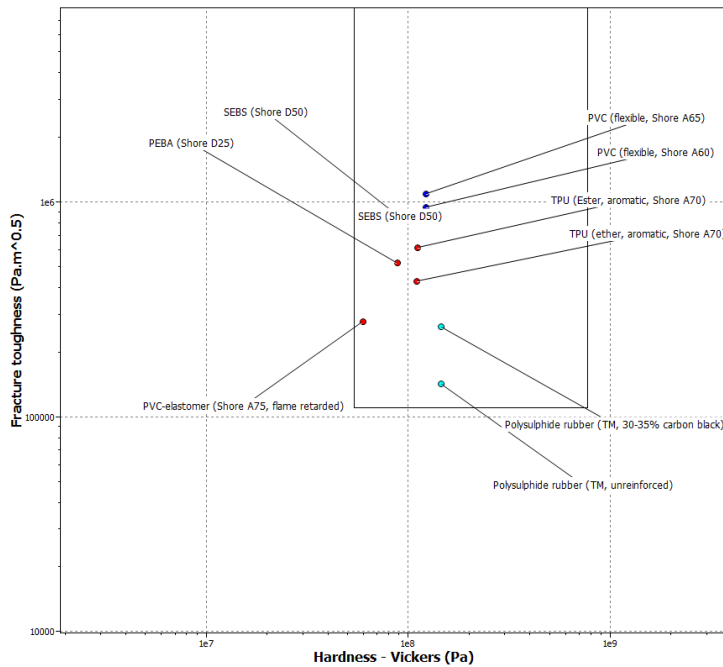
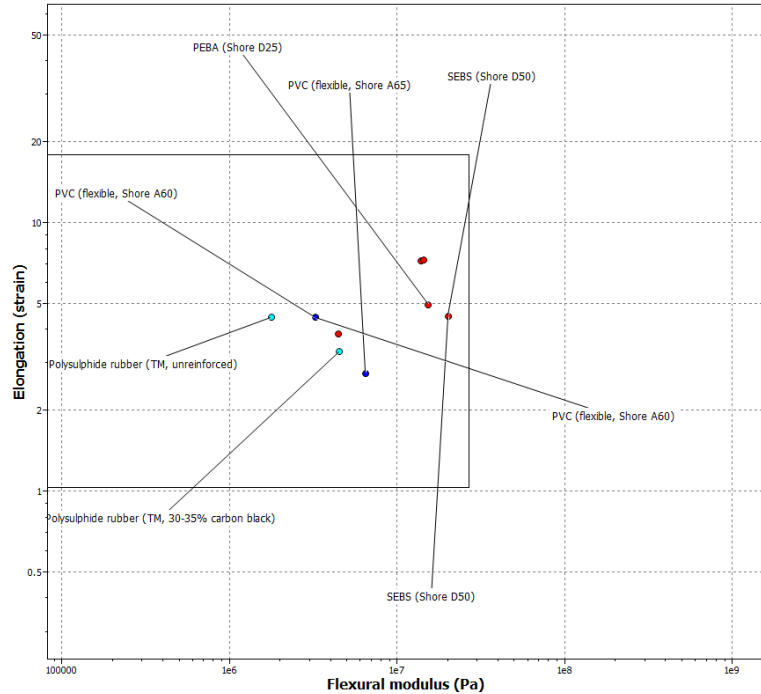
### 4. Inexpensive

Finally, if the toecap is not cheap, skaters will not buy it. Cost is always a factor and is no exception for this product. Skate shoes are expensive, the toecap delivers an inexpensive solution to protecting expensive skate shoes. If the toecap were expensive, skaters would buy new skate shoes instead.

## Selection Process

The selection process involved finding materials that exhibit all the above-mentioned properties. To find these materials, CES Selector, a material selector software, compared quantifiable material properties against each other. For each comparison, only the materials located inside the user-set "bounding box" passed. Thus, any materials located inside all the bounding boxes are the ones that satisfied all the restraints.

The graph to the right compares Elongation versus Flexural modulus and includes a bounding box. Flexural modulus is just the tendency of a material to bend. Elongation refers to the amount a material can stretch. In terms of the toecap, the material needs to stretch and bend a lot. Some of the materials in the bounding box include thermoplastics, Polysulfide rubber, and synthesized rubbers.



Another important concern is durability. The chart to the left measures Hardness versus Fracture Toughness. Hardness refers to the resistance of a material to indentation. Fracture Toughness refers to the resistance of a material to the propagation of a crack. The harder the material and less likely it is to crack the better it can withstand griptape. The materials indicated in the bounding box are the same as the ones mentioned above.

Other properties such as price and density were compared to form a robust restraint criterion. The materials satisfying all the properties were in some form or another, rubbers. Besides natural rubber, elastomers passed all the restraints.

## Tested Materials

The two materials tested were urethane rubbers. One had a Shore 80A hardness and the other had a Shore 60A hardness. The Shore 80A rubber was durable, yet lacked the grip necessary for performing tricks. The Shore 60A rubber was not as hard, but did grab the griptape better. A Shore hardness around 60-70A may be a suitable medium.

## Attachment

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### Initial Attachment

For prototyping purposes, using Shoe Glue to attach the toecaps seemed like an apt solution. Skaters use it for protecting their shoes, so they are already familiar with it. They would just use it to apply a toecap instead. Using a solution (Shoe Goo) to protecting skate shoes as a way to attach another solution to protecting skate shoes was redundant, but the focus was on the design and material, not how it attached.

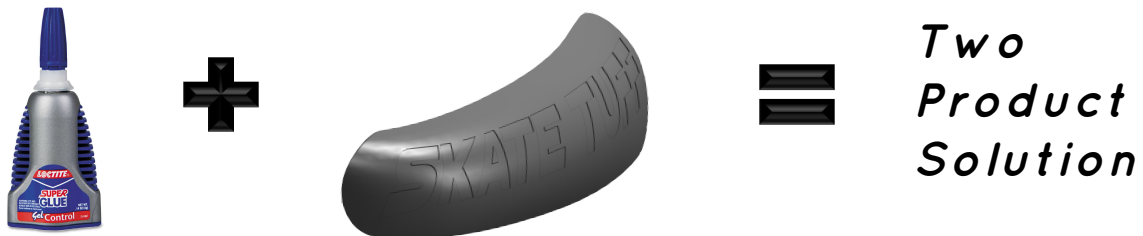


Shoe Goo

During the first testing stage, Shoe Goo did not bond to the rubber toecaps. For productive testing, the toecap needed another simple attachment method. Instead of Shoe Goo, Super glue worked well. Skaters testing the toecap generally had no problems attaching the toecap and subsequently were able to judge the toecap based on its shape and material.

Although Super glue was an effective solution to attaching the toecaps, the problem with Super glue is that it makes the toecap a two-product solution. Skaters are familiar with using glue to protect their shoes. Using glue, which does protect skate shoes, to attach a toecap that protects their shoes is

again, redundant. Even if the toecap does a better job of protecting shoes, using glue to attach it in sense defeats the purpose of the toecap.



## Ideal Attachment

Double-sided adhesive tape covering the inside portion of the toecap would make for the simplest and most effective attachment method. All the consumer would have to do is peel off the liner, then press the inside adhesive onto the vulnerable area of their shoes. Designing the adhesive into the toecap makes the method for attachment self-contained. It turns the toecap into a one-product solution.

## Product Testing

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### Testing Methodology

To assess toecap viability, twelve skaters tested out toecaps over the span of about two weeks. They picked a toecap from a small sample, attached it using Super glue, and received a survey to complete after skating 1-2 weeks. Once each skater had an impression of the product, he or she completed a general survey. The survey asked for general impressions of the product, how it affected their ability, how well it protected their shoes, and what they thought about the attachment method.

### Results

The surveys indicated largely positive results. In the free response section, one participant said the toecap is “a great idea for the skate industry”. Another participant exclaimed, “Overall I was very impressed with how well it performed and held up against the griptape”.

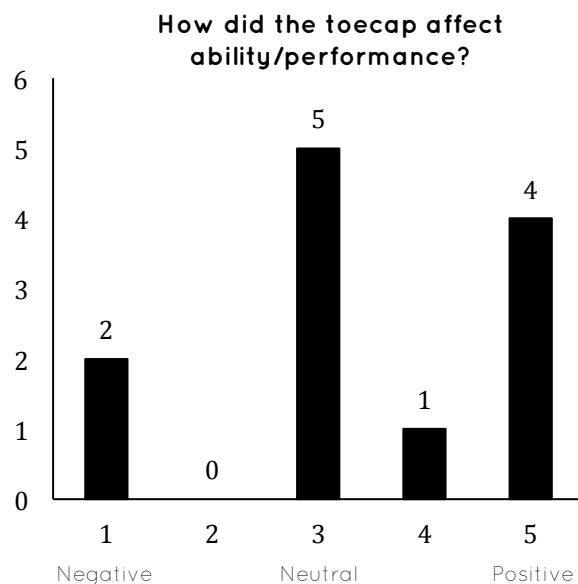


## Attachment method

None of the twelve skaters said attaching the toecap was difficult. Eleven said it was easy to attach and one skater was neutral. However, in the free response section, five participants indicated they would prefer adhesive tape to Super glue. One skater succinctly answered, “would be faster and easier to attach and replace”. Although the sample size is small, skaters are comfortable using glue, so they may not consider how much easier using adhesive tape could be.

## Performance/Ability Impact

As indicated in the chart to the right, ten of twelve participants were neutral or said the toecap positively affected their ability. A positive affect on ability was an unforeseen benefit to the toecap. Three participants tested the harder rubber (Shore 80A hardness) toecaps. Two of those three participants said the toecap had a negative impact on ability. These participants probably thought the toecap made sliding their feet against the griptape too slippery because the toecap’s hardness made the coefficient of friction lower than what they are used to.



## Protection

Those surveyed thought the toecap did an excellent job of protecting their shoes. One participant said the toecap did a good job and eleven said the toecap did a great job protecting vulnerable areas. No one indicated the toecap did poorly protecting their shoes. When asked if the toecap was a better alternative to other techniques for protecting skate shoes, every participant exclaimed it was a better alternative. Half of the participants said the toecap was a great alternative to other solutions.

***“No one indicated the toecap did poorly protecting their shoes”***

# Market Climate

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## Skate Shoe Companies

With non-traditional skate shoe companies entering the skateboarding industry, profits greatly outweigh skateboarder's interests. Corporations such as Nike SB are not interested in making a durable shoe because a durable shoe limits profit. They are content with the status quo and skateboarders do not demand a better shoe. Shoe companies sometimes advertise shoes as durable, but in most cases, they are not.



## Customer Archetypes

### Lifer

The lifer is the most important customer archetype. This person could be in his early teens or 30s. What matters, is that they are committed to skateboarding. This person cannot imagine themselves without skateboarding, and do not know what they would be doing with out it. They understand holes in shoes will happen and have tried multiple ways to fix the problem. They view any real solution to protecting skate shoes as a valuable fix to a problem robbing them of countless dollars. They will gladly spend money on a toecap if it makes their shoes last longer, and will buy successive toecaps for their shoes. Since they are likely to buy multiple toecaps throughout their skating careers, they are the most important customer archetype.

***“Lifers will gladly spend money on a toecap if it makes their shoes last longer”***

### Teenage Skater

The teenage skater is the second most important customer archetype. His mean age is 15 years old. He identifies as a skater, hangs out with skaters, and skates with his friends most days after school. He enjoys skateboarding, put in

the effort to learn how to skateboard, and understands the problem of wearing down skate shoes. His Mom is often annoyed at how quickly he ruins his shoes. Sometimes he will use Shoe Goo to prevent his shoes from ripping and sometimes he will not. He has not critically thought about how much money he loses from ripping his shoes, but hates when they rip. This person will buy a toecap because he sees the value in it and views it as something cool and novel. His Mom is happy to buy him something that will protect his expensive shoes.

There are more teenage skaters than lifers, however all lifers were once teenager skaters. The importance and value in the teenage skater is that he may turn into a lifetime customer if he turns into a lifetime skateboarder.

## **Mom**

The last customer archetype, but still important is the Mom of a skater. This skater is younger, in his preteen to early teen years. He does not yet fully shop for himself. The Mom tends to buy his clothes and shoes, or at least have the final say in what her son wears. Her kid is similar to the teenager skater, but younger. This Mom is also involved in her son's interests. She supports skateboarding, but also realizes how costly her son's shoes are. Whether her son shows her a toecap, or she comes across one on her own, she sees the value of the toecap in protecting her son's skate shoes. She will buy a toecap for her son without considering her son's opinion. The prospect of saving money overpowers her son's opinions and she usually has the final say on what her son wears.

An important distinction between the teenager skater using his Mom's money to buy a toecap and the Mom buying her son a toecap is that in the Mom customer archetype buys her son a toecap without consulting her son.

## **Final Considerations**

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### **Cost Estimation**

The survey asked participants what they would pay for a toecap. Their answers were insightful. First, they would not want to buy a pair right and left shoe toecaps. This is because skaters tend to stand one way on their boards, called a stance. A skater has either a "regular" or "goofy" stance, according to what feels natural to them. Since they tend to stand one way, only one of

their shoes wears out. Buying a toecap for both shoes would be unnecessary. Participants also indicated they would rather buy a pack of toecaps as opposed to just one. Participant's answers to how much they would pay for one toecap ranged from \$2.50 to \$20. The mean however, was \$7.50 for one toecap. For a pack of two toecaps, a realistic price point is \$14. In terms of profitability, this is a satisfactory price point as a prototyping company, Proto Labs, quoted them at \$3.50 each to manufacture.

## Final Product

The final product will include a succinctly packaged set of two left-shoe or right-shoe toecaps in black or white with instructions for application. There are no sizes, and no extra baggage. The only extra item up for consideration is adding a sticker inside, since stickers are a tradition in skateboarding products. A skater will easily understand what the product is by the simple and readable packaging. The potential consumer will notice the novelty, confidence, and service the toecap offers from the packaging and product aesthetic.

