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A new set of problems

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The shoe buying experience for many of us is to enter a store and ask to try on a size we are familiar with. If the shoes are either too tight or too loose, we try the size above or below, walk up and down and choose the one that feels most comfortable (or least uncomfortable). Purchasing footwear is, however, increasingly becoming an online experience where a customer might order two or three sizes, perform 'the fitting walk' at home and then send back the pairs that do not fit. As well as the inefficiency and impact of returns, there is a chance that any shoes that are kept are not necessarily the best size for the customer's feet. It is in fact estimated that as many as 55% of men and 45% of women in the UK are wearing the wrong sized shoes for their foot length.

Footwear is available in different sizes but that 'size' is often only an indication of the length of the footwear or, more accurately, the length of the foot that should feel comfortable in it. Width fittings are often not mentioned.

In the UK and the US, for example, the increment in length is 8.47mm per size and the joint girth (the circumference around the joint) 6.35mm. When buying footwear there may be an opportunity to use an in-store fitting gauge that measures foot length and converts this to a shoe size. The reliability of such devices, however, depends on their calibration and how they relate to the size labelling in the footwear on sale.

WIDTH FITTING

Width fitting is the second key factor influencing customer choice. The problem here is that most shoes are not marked with a width fitting and few brands offer a choice of width fittings to accommodate wide or narrow feet. The assumption is that the footwear should fit the average foot width. However, perception of the average width varies between brands and global markets. Some fitting gauges may predict a customer's width fitting based on a measurement of foot breadth but once again there may be some variation in

calibration and relationship with actual footwear width fitting properties.

Of UK men, 51% have a wider foot than is typically accommodated by a standard UK width-fitting shoe. As a result, 37% of men are buying shoes that are one size longer than their foot length requires in order to achieve a suitable fit on width and 7% are buying two sizes longer, according to the SATRA Global Foot Dimensions survey 2016. This is quite understandable behaviour where width fittings are not available as customers will try to minimise discomfort.

With narrow feet there is less likelihood of discomfort as a result of the width of footwear. Length will be the main deciding factor and adjustments may be made to fastenings or by adding an insock for a more secure feel. Wide feet have a limited number of options when alternative width fittings are not available. If feet are squeezed into a standard fit where the footwear is tight and uncomfortable then this could potentially lead to foot

damage or injury. With some styles, fastenings can be loosened to allow extra comfort (though rarely in the joint and toe area) or the insock might be exchanged for a thinner version to increase the shoe's internal volume. Some styles and constructions will be more forgiving than others and customers with wider feet may gravitate towards canvas and knitted uppers or trainers, for example, rather than stiff uppers and formal shoes that need to be fitted more accurately. As mentioned previously, however, the most frequent option is to buy the next size up.

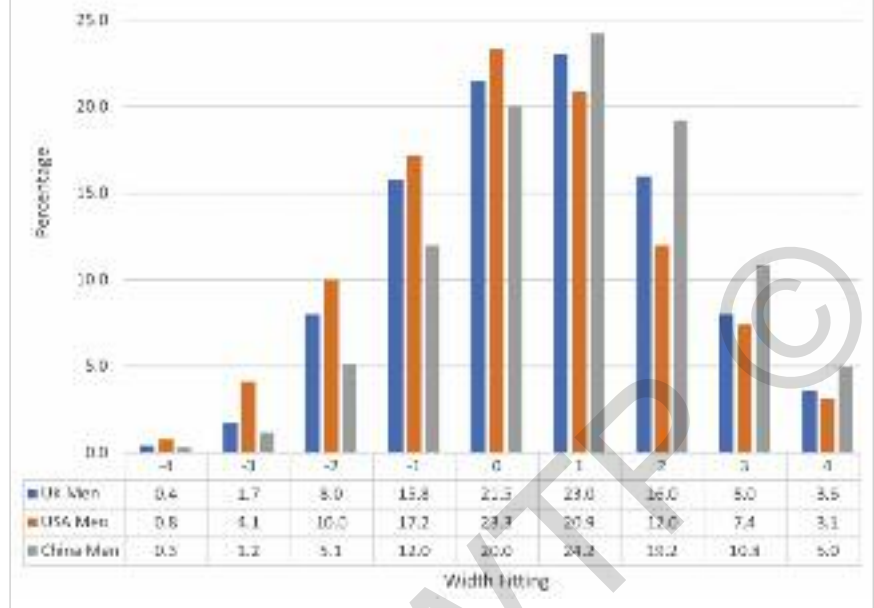
MOVING UP A SIZE

The issue with buying a larger shoe size to accommodate wide feet is the unwanted excess length. Well-fitting shoes should typically have around an 8-10mm toe allowance and enough space to allow the toes to stretch and shift while walking without rubbing against the upper or being cramped together and causing blisters and deformities. Too large a shoe and the toe allowance becomes excessive allowing the foot to slide forward, the proportions of the shoe seem elongated, the footwear flexes in the wrong location and the unaccustomed extra length may cause tripping. Conversely, buying smaller size shoes to fit narrow feet leaves too short a toe allowance, causing rubbing from the upper and cramping of the toes that then deform to match the shape of the shoe.

For example, a run of standard UK graded men's shoe sizes 5-12 is predicted to nominally accommodate only 22% of UK men. Taking the adjustability of fastenings and inherent flexibility in upper materials and the foot into account, up to 41% of men might be comfortably accommodated. For the rest, a compromise must be made between foot length and width. The foot can acclimatise to tight footwear but at the risk of foot conditions such as hallux valgus, bunions, corns and blisters.

Biometric studies of foot dimensions have shown that the range of joint girths for men with a size UK 9 foot and women with a size UK 6 (the most common foot sizes) is 40-45mm, equivalent to approximately seven UK width fittings based on the standard 6.35mm per fitting. Smart use of shoe grading and adjustable fastenings could

Width fitting spread of men's feet in the UK, USA and China.



nevertheless see up to 80% acceptably accommodated using three fittings.

IMPLICATIONS OF MULTIPLE FITTINGS

Stores may have as many as 200 footwear styles, if not more, and the range of foot lengths in adults is equivalent to at least seven UK or US shoe sizes, and 9 EU sizes. The store needs to stock enough of each size and style to have them available to customers to try on and purchase. This already represents a significant stock which would be further complicated by offering a range of width fittings. Nevertheless, by using statistical methods and understanding the distribution of sizes and width fittings in the population, stock numbers can be managed appropriately.

With the growth of online sales, the amount of stock required to offer this range of styles, sizes and fittings becomes less problematical as it can be stored in warehouses and distribution centres. However, the customer no longer has the opportunity to talk to a qualified shoe fitter in-store or try on various sizes before making a single purchase. Instead, multiple sizes will be purchased online and returned at the expense of the free shipping offered by many retailers and with the associated environmental consequences.

DETERMINING SIZE ONLINE

Biometric studies on foot dimensions, such as the SATRA Global

Foot Dimensions report, can assist the industry in developing suitable ranges in size and width, which will lead to increased comfort and foot health. In addition to providing a greater choice in width fittings, the industry needs to find reliable ways for online customers to determine their own shoe size and width fitting to help reduce the number of returns retailers experience from redundant purchases and improve customer satisfaction. Brands are already becoming better at equipping online customers with size guidelines based on foot length and a number of home sizing and fitting guides are being developed. Where brands have good control over the manufacture and sizing of their footwear, guidelines are a useful tool. However, retailers that sell a variety of brands encounter a further complication in helping the customer acquire good fit due to inconsistent size and width labelling between brands.

To continue the previous example, for the 41% of UK men who can find comfort in a standard range of shoe sizes, buying their normal size from their accustomed brand is relatively simple. There is some variability in fit between identical shoes due to slight variations in the manufacturing process. Seam allowances, material direction and lasting forces can differ slightly along the production lines. These variations mean that trying on a different pair of the same style and size may alter the fit slightly, which anyone

on the borderline of a size or width may notice. These variations are even more pronounced when brands source from more than one manufacturer or supplier of the same product.

LACK OF ACCORD ON SIZING

When trying a new brand, any variations in fit due to manufacturing tolerances will be eclipsed by the lack of accord between manufacturers on shoe size dimensions and size labelling. Even when using the same sizing system (US, UK, EU, etc.) there are variations in both the foot length and joint girth corresponding with the labelled size. One of the key issues is in confusing last length and foot length, and the difficulty in determining that relationship for different shoe styles having, for example, different toe shapes. Variation in fit offered or required by different types of footwear, constructions, fastenings and materials will also affect the relationship between last length and marked size. Fit assessment of footwear on real feet and measuring the dimensions of those feet, is the only true way to check size markings.

As stated, shoe size is an indication of the length of foot that should fit. A UK size 9 label infers that a foot length of 271mm ($\pm$ approximately 4mm) should be acceptable. In different styles the length of the shoe itself may change while the marked size remains the same. This is a result of different fashion allowances changing the shape of the forepart, such as pointed toes in dress and fashion shoes. While the fashion, shape and last length may differ between styles, a UK size 9 should still be designed to accommodate a foot of 271mm. This way, a customer with a foot length of about 271mm and buying online would be able to order a UK size 9 football boot, dress shoe or Wellington boot and expect it to fit satisfactorily, subject to width fitting.

FURTHER COMPLICATIONS

Size labelling is further complicated by there being multiple shoe sizing systems. When producing footwear, the lasts and tooling used will have been developed, graded and scaled in accordance with a particular shoe sizing system. Selling footwear made on a set of UK lasts to an international market requires conversions between



Wearing shoes that are too small can cause damage to feet such as distortion of the big toes.

the sizing systems to take place. Again, this only takes into consideration the length of the product and omits the effect of width. To help bring some consistency and provide an independent reference point for the market, ISO/TS19407 was published. This shows the relationship between different sizing systems and how they relate to foot length.

Unfortunately, as yet there is no equivalent to ISO/TS19407 that considers width fitting. The interpretation of standard fitting for joint girth can vary widely between brands. Some deliberately grade wider shoes versus their competitors to gain an alternative slice of the available market. This results in two shoes of the same style and size having drastically different fitting characteristics. Width grading systems do exist that may describe a men's standard shoe as a D, E or F fitting, for example, but these letters are not clearly defined in terms of joint girth of the foot the footwear is intended to fit and each manufacturer is free to form their own interpretation on width. Indeed, brand variation in joint girth of the same marked grade (width fitting) can be as much as 12mm, equivalent to two UK width fittings.

MONDOPOINT

Consumer and industry would benefit from standardising width designation in the same way that size labelling is defined against foot length. There is

already a solution available for the problem of sizing and width fitting labelling. Mondopoint (ISO 9407) was developed in the 1960s with assistance from SATRA in order to address the confusion in the footwear industry regarding conversion between sizing systems and to follow the example of other industries in the UK in moving from the imperial measurement system to adopting the metric one.

Mondopoint is a labelling system that removes the ambiguity of the existing size systems by stating the length of foot for which the footwear is designed. Thus, a Mondopoint size 270 means that the footwear should fit a foot length of 270mm. In this way, a UK 9 would be labelled as 271 and would be immediately apparent for customers if it were suitable to try on. Similarly, an EU 43 would be marked 273 and would be an obvious approximation of the UK 9 or US men's 10. Today, Mondopoint is associated with East Asia manufacturing, particularly China and Japan, where production is based on size increments of 5mm, though ISO 9407 does not specify the actual increment.

The Mondopoint labelling system has a further advantage in that the labelling should include an indication of the width of the foot for which the footwear is designed by stating its joint breadth. In this way, a UK size 9 D fitting might be labelled 271/103. A customer can very quickly identify a suitable size and

width fitting by taking two foot measurements—foot length and joint breadth—both of which are explained in ISO 9407—and make choosing a size and width of footwear as intuitive as measuring a footprint.

Solutions to the problem of fit, a universal sizing system and a range of width fittings, are expensive to implement and, without sufficient inclination or pressure from outside groups, are not considered financially viable by retailers, brands or manufacturers. However, as the public becomes more aware of foot health and comfort needs, the more pioneering retailers that take steps to address the problems stand to gain a larger market share in the short-term. Customers will immediately observe an increase in comfort and competitors will be forced to play catch-up to offer a rival product and service. In the long-term, the pioneering retailers will gain a reputation for good fit and caring for their customers, fostering a loyalty that can lead to sustained market dominance.

Whatever solutions the industry



Joint girth measurement is as important as length in ensuring a good fit.

chooses, it is clear that the current level of dissatisfaction both within the footwear industry itself and with the consumer, needs to be addressed. The footwear industry has a duty to provide footwear that is safe, will cause no

undue damage and that gives all foot shapes the opportunity to experience a reasonable level of comfort and fit. Ultimately, though, the customer will always decide which shoes to buy and at what size. 🚫



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