



A Review of Footwear

By: R.Saranya, P.Rahothami, G.Rajkumar

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1. Introduction

A shoe is an item of footwear intended to protect and comfort the human foot while doing various activities. Shoes are also used as an item of decoration. The design of shoes has varied enormously through time and from culture to culture, with appearance originally being tied to function. Additionally fashion has often dictated many design elements, such as whether shoes have very high heels or flat ones. Contemporary footwear varies widely in style, complexity and cost.

Basic sandals may consist of only a thin sole and simple strap. High fashion shoes may be made of very expensive materials in complex construction and sell for thousands of dollars a pair. Shoes have traditionally been made from leather, wood or canvas, but are increasingly made from rubber, plastics, and other petrochemical-derived materials.

- The hazards to be expected in condition of heat particularly in are:
- The effect of heat on the body, face and hands; the danger of clothing catching fire;
- the effect on the lungs due to combustion products and vapour used for fire extinction;
- reduced visibility owing to smoke and lighting failure; electric shock;
- falling objects; the effect of high rates of heating by conduction caused in contact with hot surface;
- Falling and slipping.

2. Types of shoes

This section of Standard specifies the minimum requirements for protection of occupational footwear designed primarily to protect the wearer's foot against injuries. Protective footwear introduced in this Standard are:

2.1 Safety footwear (General requirement)

Conductive footwear intended to provide protection to wearer from static electricity accumulated on the body of the wearer. Such shoes are designed primarily to dissipate the static charged.

2.2 Conductive safety footwear

Conductive footwear intended to provide protection to wearer from static electricity accumulated on the body of the wearer. Such shoes are designed primarily to dissipate the static charged.

2.3 Electrical hazard footwear

The electrical hazard footwear construction shall provide an assembly that assures prolonged insulation against electricity. No metal parts shall be present in the sole or heel of the footwear. A protective-toe box shall be incorporated into the shoe during construction and shall be an integral part of the shoe or boot.

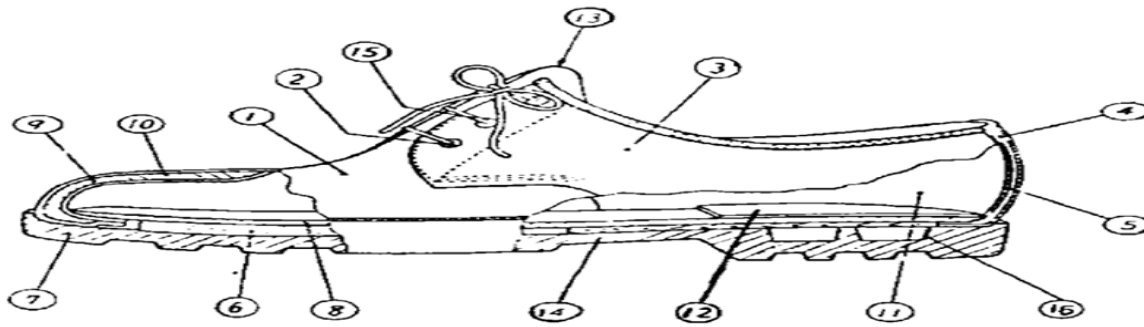
2.4 Rubber safety footwear

The rubber shall be manufactured into uniform composition so that it fits for the purpose of use. Rubber boots are of three types as Ankle Knee and thigh types.

2.4 Puncture resistance.

The purpose of this requirement is to reduce the hazard of puncture wounds caused by sharp objects which could penetrate the sole of footwear. Puncture resistance footwear (protective midsole) shall not be removed from the bottom without the bottom being destroyed.

3. Components of shoes:



No.	ITEM	No.	ITEM
1	Upper leather (VAMP)	9	Steel toe cap
2	Eyelet	10	Vamp lining
3	Quarter	11	Quarter lining
4	Back stay	12	Sock
5	Counter	13	Tongue
6	Bottom filling	14	Shank lining
7	Rubber outsole (Including heel)	15	Lace
8	Insole	16	Heel core

Insole is the inner part of footwear upon which the foot rests and which conforms to the bottom of the last. Last is a solid form in the general shape of a foot around which footwear is constructed. Lining Is an all-inclusive term used to describe all of the various lining parts used for the inside of the upper of footwear. Outsole and heel Is the bottom surface of footwear that is exposed to wear. Quarter Is the complete back part of the footwear upper. Size is the length and breadth measurement of footwear based on the Iranian System of Grading. Toe box Is A stiffener designed to provide toe protection for the wearer as required by this Standard. Upper is the upper parts of footwear including the outside and lining. Vamp is the complete for part of the footwear upper back to the quarter.

4. Standard size chart of shoes

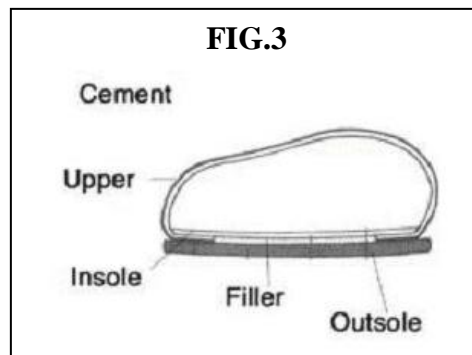
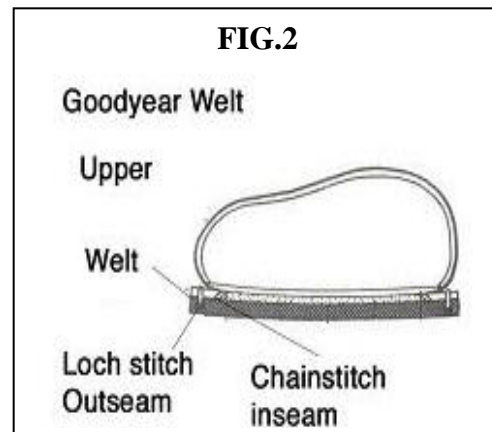
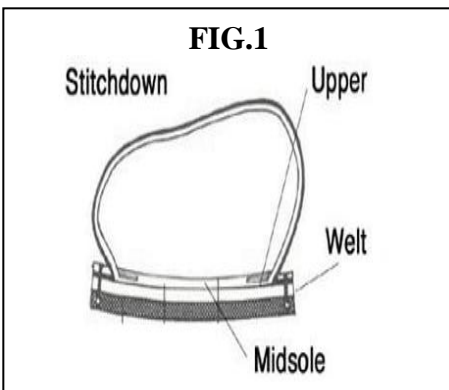
Shoe sizing is based on the length and width of the foot. Determining your proper shoe size is essential to a comfortable fit.

COUNTRY	SIZE IN INCHES						
INDIA	6	7	8	9	10	11	12
US SIZE	7	8	9	10	11	12	13
UK SIZE	6	7	8	9	10	11	12
EU SIZE	39	41	42	43	44	45	46

5. Construction of shoe

Insole, outsole, heel, vamp, toe are the important patterns in the construction of shoes. Normally the shoes are classified into three types based on the method of joining the upper and inner sole of the shoe. They are

- Stitch-down construction
- Goodyear welt and
- Cement-down construction.



5.1 Stitch-down construction

Stitch-down provides a durable platform with a more traditional fit and feel. The boot is secured between the leather insole and midsole, and then the outer leather layer vamp is turned out and stitched to the edge of the sole.(fig.1)

5.2 Goodyear welt

There are a number of ways that an outsole can be attached, one of which is through a Goodyear welt. This construction is different from most others by which the welt and upper are secured to the insole by a strong stitch. The construction increases durability and foot stability.(fig.2)

5.3 Cement-down

For shoes featuring an athletic, lightweight fit, a boot can be attached through a cement-down construction. The boot will have a more cupping fit as opposed to a stitch-down or welt-type attachment.(fig.3)

6. Materials used

Protective footwear shall be constructed of materials suitable for the exposure it is intended to receive and shall provide protection, comfort, and wear ability. The materials are Leather, Plastic, Rubber, Textiles, Wood, Jute, Metal.

7. Special finishes:

The special finishes given for a shoe is based upon the end use and the various finishes are Flame retardant finish, Shock absorption, Resistance to penetration, Electrical insulation, Resistance to flame, Water absorption, etc.

8. Standard test methods:

Testing shall be in accordance with DIN 4843 for footwear type SH or SHH Clause 6 for the following tests or in accordance with N.F.P.A Standard 1974.the various methods are

cut growth resistance outsole, abrasion resistance outsole, effect of fuel outsole, effect of water vapor outsole, thickness of insole, upper/leg material, lining and tongue, abrasion resistance of insole, effect of water on insole, Ph value for insole, upper leg material, lining and tongue, cut growth resistance of upper/leg material lining and tongue, tensile strength and elongation at tear of upper leg material, resistance of upper/leg material to water penetration, water proofness of footwear, moisture flow coefficient of upper/leg material and lining, abrasion resistance of shoe lace, volume resistibility of bottom, energy absorption of bottom in the seat region, resistance to repeated flexing of bottom, nail penetration resistant bottom, heat insulating bottoms, cold insulating bottoms, resistance of footwear forepart to deformation, sole bond peeling strength, effect of calcium chloride on footwear, Tensile strength of counter.

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R.Saranya, P.Rahothami, G.Rajkumar are students of II M.tech Apparel technology & management at Department of fashion technology, Kumaraguru College of technology, Coimbatore.