

Materials and Physics of a Football boot

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Football Boots have certain requirements not only from football players but from the governing body the FA. Boots have to follow certain requirements about conductivity, electricity insulation, and various other safety requirements. This means that there is a relatively small range of materials that can be used for football boots.

Historically, all boots were made out of natural leathers. This is because they were relatively durable, cheap to make, and gave players enough protection; however, in recent years leading companies such as Nike and Adidas have dropped natural leathers in favour of Synthetic Leather. This is due to the fact that it offers much more protection to players, is much more durable and is completely waterproof, whereas natural leathers have several issues in terms of water. When Natural Leathers get wet, the oils in the leather bind to the water molecules. As the water dries and evaporates, it draws out the oils with it. The loss of natural oils causes it to lose its supple quality and turn brittle.

At different ambient temperatures and humidity's most types of leather show mainly elastic behaviour, although delayed elastic effects may give the semblance of plasticity. The stress relaxation-time relation for constant linear strain shows the stress decaying linearly with time. The stress decay becomes discontinuous after sufficient time. The stress strain relaxation for extension of leather strips is often markedly non-linear even at low strains (<2%). Two-dimensional extension of leather has been analysed using an instrument allowing independent extension in two particular directions. To a first approximation each stress component is linearly related to the two elastic strain components in the perpendicular directions.

Another material that is taken into consideration when designing football boots is the studs. Different materials and types are used for different playing styles and conditions. For example, Moulded plastic blades are used generally in drier conditions and by casual players as they offer all round support and give a greater amount of traction on drier pitches. However, the main downsides include sticking in wet conditions and being worn down over time. On the other hand, Metal studs are most widely used in wet conditions as they tear through the sticky conditions and do not suffer the same wear and tear.

