

Focus on IFA's work

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Slip resistance of shoes on snow and ice

Problem

In Germany and other countries of the European Union, roughly 15 to 20% of all reportable accidents at work are attributable to slips, trips and falls. Accidents due to slipping thus continue to be an accident focus. During the winter months in particular, going to work or school harbours additional risks when pavements and roads become treacherously icy.

During the winter, it is particularly important for newspaper deliverers, postmen, parcel service employees and similar couriers to wear shoes that are sufficiently slip-resistant even on snow and ice.

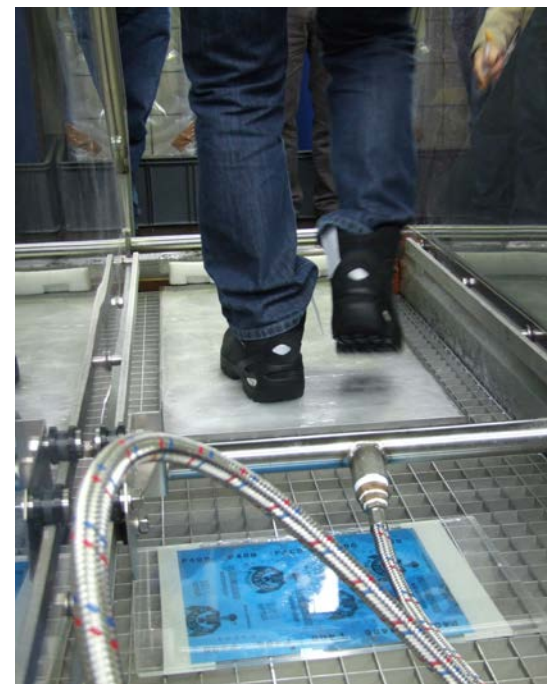
Activities

Nine different shoes were selected and investigated at IFA for their slip resistance. One of these models had a sole modified with glass fibres, and one was equipped with folding spikes. Also included in the study were a spiked overshoe and a microfibre overshoe.

The walking surface consisted of slabs of ice produced at $-15\text{ }^{\circ}\text{C}$. On these ice slabs, slip resistance was ascertained with the aid of two methods: firstly on the principles of DIN EN ISO 13287 to determine the coefficient of friction of shoes and on the principles of the now withdrawn DIN 4843-100 to determine the slip resistance of shoes on an inclined surface. The state of the ice



Determining the coefficient of sliding friction in accordance with DIN EN ISO 13287, method A/C – heel sliding forwards



Walking on an inclined surface

was assumed to be “dry” when the test was initiated immediately after its removal from the conditioning cabinet. The term “moist” was applied when a film of moisture had already formed on the ice.

Results and Application

On the basis of the evaluations from both test methods, only two shoes can be recommended: the shoe with the glass fibres integrated in the sole and the shoe with spikes. Both achieved adequate values for slip resistance on both dry and moist ice. The shoe with spikes has a mechanism for lowering the spikes and can thus be used on normal surfaces. On snow and ice, the sole without spikes did not provide sufficient slip resistance.

The overshoes made of microfibre and with spikes also achieved good ratings. However, it is not possible to make any statement about the durability of the microfibre overshoe. The spiked overshoe cannot be worn on normal surfaces or indoors and has to be taken off.

Area of Application

Users of safety and protective shoes who deliver newspapers, letters and parcels and the like; the named test and certification bodies for personal protective equipment; the construction industry, manufacturers of safety and protective footwear

Additional Information

- DIN EN ISO 20345: Persönliche Schutzausrüstung – Sicherheitsschuhe (04.2012). Beuth, Berlin 2012
- DIN EN ISO 13287: Persönliche Schutzausrüstungen – Prüfverfahren zur Bestimmung der Rutschhemmung (02.13). Beuth, Berlin 2013
- DIN 4843-100: Sicherheits-, Schutz- und Berufsschuhe; Rutschhemmung, Mittelfußschutz, Schnittschutzeinlage und thermische Beanspruchung; Sicherheitstechnische Anforderungen. Beuth, Berlin 1993 (now withdrawn)
- v. d. Bank, N.; Mewes, D.; Vogt, A.: Aktuelles aus dem Sachgebiet Fußschutz: Rutschhemmung von Schuhen und Überziehern auf Schnee und Eis. Sicher ist sicher – Arbeitsschutz aktuell 64 (2013) No. 1, pp. 32-33

Expert Assistance

IFA, Division 5: Accident prevention – Product safety

Literature Requests

IFA, Central Division