Title: Human Heel Surrogate to Analyze Barefoot Slip

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KEYWORDS: Barefoot, Heel, Surrogate, Slip, Floor, Ergonomic
DOMAIN: Material Science
SUMMARY:

The development of a novel human heel surrogate that can precisely simulate the human heel properties, beneficial for the assessment of barefoot slipping risk. The surrogate is mounted on the slip-tester to understand and measure the biomechanical and frictional properties during heel and floor interaction, and to assess the barefoot slip risk. The slip-risk experiment was done on four different bathroom floors containing six different contaminants. It offers detailed insights into heel-floor interactions. Mimicking human slips recreates real-world scenarios, improving friction measurement accuracy, and gathering additional data for better ergonomic interventions against slipping accidents.

Surrogate Material and fabrication procedure

1. The human heel surrogate is fabricated using a biomimetic material.
2. A 3D scanner is used to capture the structural and surface properties of a foot, and then its surrogate is developed using a 3D printing device.
3. An adaptor is also fabricated to give the necessary support to the surrogate during mounting on the slip tester

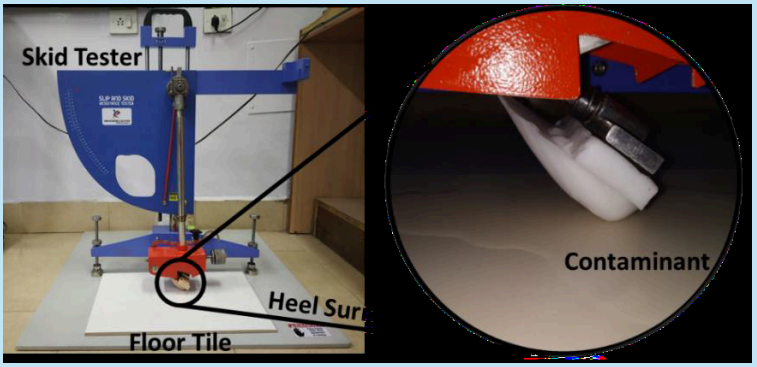

Figure: Skid tester used for slip testing and close up of the mounted heel surrogate for testing on contaminated floorings

ADVANTAGES:

1. The surrogate is made out of biomimetic material for precise simulation of biomechanical and frictional properties of the barefoot human heel skin.
2. The experiment performed on barefoot surrogates is essential for the selection of effective slip-resistant floorings for fall injury prevention.

APPLICATION:

1. Footwear Industry (comfort assessment for different footwear, and diabetic feet)
2. Application in testing flooring tiles for selection of suitable floor titles to prevent injury.

SCALE OF DEVELOPMENT: Functional prototype is available at lab scale

TECHNOLOGY READINESS LEVEL: TRL 4

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