Inclusive Design for Getting Outdoors - Refining the tools of the trade

In the first part of our series focusing on the tools and methods employed by Inclusive Design for Getting Outdoors (I'DGO), we talk to Rob Shaw – Senior Scientist at the Health & Safety Laboratory – and I'DGO Principal Investigator, Professor Marcus Ormerod, about assessing pedestrian slip risk.

L-R I'DGO; Rob Shaw; Marcus Ormerod

Inclusive Design for Getting Outdoors (I'DGO): Rob, how did you become involved in the I'DGO project?

Rob Shaw (RS): I work in the Pedestrian Safety team at the Health & Safety Laboratory (HSL), focusing on the factors which influence slips, trips and other pedestrian falls. In 2005, my colleague Dr Marianne Loo-Morrey authored a report on tactile paving that – among other things – addressed the issue of its design and laying and the impact it has on the toe clearance of people walking on it. The report suggested further research may be needed in these areas, which Marcus and colleagues picked up on. They then came to talk to us about partnering a new phase of research.

Marcus Ormerod (MO): Yes, at the time we were working on the first phase of I'DGO, looking at the detailed design of streets and neighbourhoods and identifying barriers to universal access. A number of the older people we talked to said they found tactile paving a challenge when getting out and about in their local area. We wanted to find out why this was and what effect it had on people's ability to get outdoors and, by extension, their quality of life. This became our research focus for I'DGO TOO.

I'DGO: Rob, tell us about your input into the project to date?

RS: Well I think HSL's most significant contribution has been advising on the methodology of the project, specifically the assessment aspect of the 'real world' work.

I'DGO: Marcus, can you tell us what this part of the project entails?

MO: Sure. One of our three key research objectives is to examine how blister and corduroy tactile paving is designed, sited and laid, which requires assessing 'live' sites. To achieve a high degree of consistency and validity, the SURFACE team have devised 'toolkits' for pedestrian crossing sites and step sites (which is where most tactile paving is laid). Rob and his colleagues at HSL have had particular input into how to measure the factors that may influence pedestrian safety at these sites.

I'DGO: ... such as?

MO: The slipperiness of the paving is the primary one. This is related to the slip resistance of the surface which you measure using a type of portable pendulum that swings a rubber 'heel' over the area you're testing. It's called 'coefficient of friction' (CoF) testing and is covered by a British Standard, BS 7976: Parts 1-3, 2002. It provides what's known as a Pendulum Test Value (PTV).

I'DGO: And how have I'DGO and HSL worked together on this?

MO: Very early on in our research, the team at SURFACE realised that we would have to measure the PTV of tactile paving slabs slightly differently to that of level outdoor surfaces; those covered by

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BS 7976. We developed a new protocol, drawing on both British and Australasian standards, which involved measuring the PTV both on top of and between the tactile elements, using two different sizes of rubber heel (standard for the raised areas; narrow for the valleys). We were keen to ensure this method was valid, so we spoke to Rob and his colleagues about a 'belt-and-braces' approach.

I'DGO: Which was?

MO: Using what's called a surface roughness test, in our case to see if we could predict the PTVs of the areas of tactile paving we were testing.

RS: We would always recommend measuring both the Pendulum Test Value and Rz (surface microroughness) value of surfaces when assessing them for pedestrian slip risk. This is because it's impossible to explain what gives a surface slip resistance in contaminated conditions without referring to its roughness... an opinion we share with the United Kingdom Slip Resistance Group (UKSRG).

I'DGO: What are 'contaminated conditions'?

RS: Anytime you have something between the pedestrian's shoe or foot and the floor, most commonly this is water but other contaminants like oil or powders can also affect slip resistance. Indoors, you're talking about flooring in areas near the entrances of buildings – the surfaces people are walking over with wet feet if it's been raining – or in any area where things are likely to get spilled. Outdoors, of course, surfaces are almost permanently contaminated by the elements... snow, most recently, for example! Being able to characterise the finish of a surface, as well as the friction offered in different conditions, gives you a greater understanding of that surface

I'DGO: Could you tell us about progress to date, Marcus?

MO: We've now tested 32 tactile paving sites using our new protocol for measuring slipperiness, including both step and pedestrian crossing sites. We've also looked at a variety of patterns, including 'regular' pressed concrete blisters and corduroys and stainless steel studs. In each case, we've used a standard Stanley-Munro pendulum that conforms to relevant British Standards and a Mitutoyo SJ201P surface roughness meter for the prediction element of the research. The results have been validated through rigorous comparison with PTVs from a reviewed Australasian database (via regression) and equivalent tests have recorded PTVs in the 60s, which has added further support.

Still from the I'DGO film

I'DGO: Thanks to both of you. Rob, can you end by telling us what the future may hold for I'DGO and the HSL?

RS: We've really enjoyed making links with the SURFACE team, as we are looking at similar problems from different ends of the spectrum and have complementary expertise and technical facilities. We have already undertaken some small pieces of additional research with Marcus and colleagues and I hope that we can continue to work together in the future on pedestrian falls issues.

MO: Absolutely.

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