Cranfield University and Altro Ltd are seeking a top class candidate to undertake research leading to the award of an International Engineering Doctorate (EngD(Int) awarded jointly by the Universities of Warwick, Exeter and Cranfield.

As a ‘research engineer’ on our International Doctorate programme you will have unrivalled access to some of the best teaching and industrial expertise in the world, across three universities. While you will be based at Cranfield University and Altro Ltd., you will also spend time at Warwick and Exeter Universities to give you the broadest possible experience. You will emerge from the four-year programme more confident and better equipped to make a difference to your company and the global marketplace.

This opportunity also provides a substantial tax free stipend equivalent to many graduate jobs.

Project

Safety Flooring is designed to provide slip resistance with a variety of shoes types, in the presence of surface contaminants including oil and water. It is consists of a flexible PVC sheet, and incorporates inorganic additives including silicon carbide, aluminium oxide, quartz and glass to provide slip resistance. While it provides the required slip resistance, and is sufficiently durable to maintain this throughout the lifetime of the product (20 years), cleaning and maintenance is more difficult than other flooring products. These include smooth floors, and floors which provide slip resistance at a lower level or for a shorter time period. While the incorporation of polyurethane coatings containing glass beads has improved this, cleaning and maintenance still requires significantly more effort than these alternative products.

Reduction in maintenance requirements will reduce both the quantity of chemicals used in cleaning, and electrical power used in machine cleaning. It is estimated that the energy used to clean a typical slip resistant floor over a ten year period is 5.5 kW / hr / m², requiring 32,000 litres of water and 0.4kg of detergent. (Source: ERFMI LCA for Safety PVC).

This project aims to design surface texture which will provide the required slip resistances and durability, while offering benefits in terms of maintenance. A variety levels of slip resistance will be targeted.

Aims:

- Characterise the surface (e.g. Surface roughness, hardness) of a range of flooring materials including Altro products, competitor products, other flooring products (e.g. Natural stone, wood). For this reason a testing facility will be built at Cranfield
- Produce computer models for surface structures, with the aim of correlating the calculated surface friction with typical shoes and bare feet with that test results from practical tests on these materials. This will include a range of different contaminants including water, vegetable oils, soaps and fine particles such as sand
- Investigate the effect of wear on these surface structures, and compare this to experimental data.
- Correlate surface information to experimental data on dirt pick-up and cleaning
- Using the models developed, and information collected, predict the idea surface structure to achieve slip resistance, durability and maintenance for a variety of levels of slip resistance
- Produce physical samples of candidate structures, and compare expected performance to that determined by experiment.
- Transfer the understanding of the interface mechanisms to other safety surfaces
Business Need and Opportunity

It is estimated that the energy used to clean a typical slip resistant floor over a ten year period is 5.5 kW / hr / m², requiring 32,000 litres of water and 0.4kg of detergent. (Source: ERFMI LCA for Safety PVC). Altro manufacture over 6M m² of flooring a year, and the potential for improved cleaning technology reducing environmental impact is considerable.

Entry Requirements

Qualifications

Candidates should have a minimum of an upper second (2.1) honours degree (or equivalent) in an Engineering, Technology or Physical Sciences Discipline

Attributes

- High levels of innovative thought and lateral thinking
- Excellent analytical and reporting skills
- Excellent communication skills
- Strong computer skills and the ability to learn new software quickly
- Self-motivated, capable of working with minimal guidance and supervision, and within a team.
- Enthusiasm for the subject

Due to funding regulations this project is open to Home/EU students only.

The Studentship

Qualifying students an attractive enhanced stipend which could be tax and NI free depending on your personal circumstances, paid by the Centre and topped up by a contribution from Altro ltd. For 2016 this totals approximately £19,000 tax free per annum.

The funding is for four years and will also cover University tuition fees and all course fees as well as a travel allowance to attend courses.

Information

For more information contact Dr Konstantinos Salonitis (+44(0)1234 758347 and/or k.salonitis@cranfield.ac.uk)

Apply

To apply directly at http://ccwebapps-dmz.dmz.cranfield.ac.uk/prospectuslinks/