# LABORATORY INVESTIGATION OF THE LANDING AIRCRAFT TIRE CONTACT PATCH

**J. Ferguson, D. Woodward & P. Millar**
Belfast School of Architecture, Art and the Built Environment, Ulster University, Northern Ireland

*ABSTRACT*
This paper summarizes the findings of a scaled laboratory experiment to look at what happens in the first few contact patches as a landing aircraft tire makes contact with a runway surface. The experimental procedure used was modified from a previous study that had considered the thermal characteristics of a free-rolling ASTM 1844 friction measuring tire. This previous study had used a 1.22 m diameter drum that could be rotated at speeds up to 60 kph. The tire rolls on the internal surface of the drum simulating a road or runway surface. The modification used in this study involved dropping the loaded tire unto the rolling surface to simulate a landing aircraft. Temperature change in the surface of the tire was measured at 100 Hz. This enabled considerable detail to be measured from the tire surface following its drop unto the surface. It took approximately 0.03 seconds for the tire to reach a maximum temperature for the first contact patch. This was found to quickly decrease with subsequent tire rotations. Rotation speed of the drum simulating the approach speed of a landing aircraft was found to be the dominant factor compared with load. Although the scaled laboratory experiment has obvious issues with respect to real-life this paper shows that its basic approach may help to provide further insight into the complexities of the landing aircraft contact patch and how it affects the operational safety and maintence of an airport.