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Information sheet for sites near airports

Introduction

Aircraft, as they fly, produce vortices in the air from their wings and wing flaps, particularly during take off and landing. Under certain circumstances, vortices can strike buildings directly below. The risk of vortex strike is greater during an aircraft's landing approach as it is nearer the ground for longer. During take-off, aircraft gain height more quickly. The risk is greater for larger aircraft, though some medium-size aircraft may produce the same effect, depending on their wingspan and speed of approach.

Tiled and slated roofs can be particularly vulnerable to the effect of a vortex strike on a roof, especially close-fitting tiles and slates, where the uplift pressure can act to pull up the tiles or slates.

A vortex strike differs from normal wind gusts in that it is much more localised. When a tiled or slated roof with underlay is subjected to wind loading, the underlay can carry a significant proportion of the load, reducing the pressure on the tiles or slates. By contrast, a vortex strike is more localised and momentary, resulting in a much larger uplift load being borne by the tiles or slates.

BRE Digest 467

The Building Research Establishment (BRE) carried out a detailed study on the pressures generated by aircraft vortices and produced a paper, Digest 467, aimed at helping building designers, contractors, and roofing installers to identify the possible risks of aircraft vortices damages and by providing minimum safe fixing recommendations. BS 5534 recommends following the guidance given in BRE Digest 467 when calculating the uplift wind pressure for roofs near airports.

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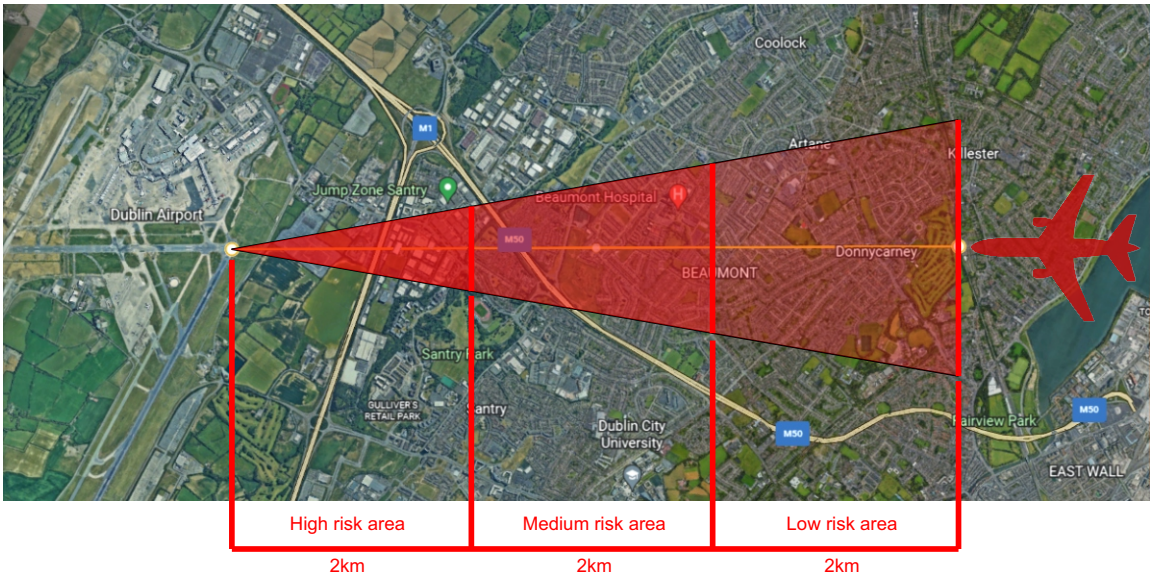
BRE Digest 467 recommends that a maximum uplift load of 1200N/m^2 (Pa) be assumed when calculating the roof tile or slate fixing specification for a roof at risk of vortex strikes. In practice, two calculations should be run, one using an uplift pressure of 1200Pa, and one assuming no airport. The calculation giving the greater uplift load should then be used to determine the number and type of tile or slate fixings required.

Risk area

The area susceptible to roof damage is triangular in plan, centred along the line of approach to the runway. Damage is generally contained within a sector $\pm 10^{\circ}$ each side of the runway centre line, extending up to 6 km from the point of touchdown (see illustration below).

Within this area of risk, most damage occurs in the last 2km before touchdown. Between 2 km and 4 km the risk of damage is much lower and between 4 km and 6 km it is slight.

Strike rate risk area



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National Codes of Practice

It is important to note that all slated and tiled roofs should be installed in accordance with the relevant Code of practice.

Roofs in the Republic of Ireland should be installed in accordance with SR 82: 2017: Slating and Tiling - Code of Practice. Further guidance is given in the document *'Condron Concrete Tile Fixing Guide (RoI only)'*, available for download from our website at www.condronconcrete.ie.

For roofs in the UK (Northern Ireland, England, Scotland and Wales), the recommendations on fixing should be followed given in BS 5534: 2014+A2: 2018: Slating and tiling for pitched roofs and vertical cladding - Code of practice.

Note: It remains the designer's and contractor's responsibility to ensure that their project is designed and installed in accordance with SR 82: 2017 or BS 5534, whichever is the relevant Code of practice.

For further information, please obtain a copy of BRE Digest 467, available online at www.BREbookshop.com.

This information sheet is based on Standards and good practice current at the time of writing. Condron Concrete reserves the right to change products and specifications without notice. Please contact us for our latest information.

http://www.condronconcrete.ie

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