



Wind Loading on Glass Façades

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Overview | Wind induced pressure is a major design consideration for determining the glass thickness and glass selection in façades. In addition there are various safety implications inherent to glazing design such as glass breakage through imposed dynamic pressures and the possible domino effect in façade failure caused by the breakage of a single glass pane. There are a wide range of guidelines for determining wind loading on facades. However, these guidelines contain several discrepancies and often provide a poor correlation with the corresponding pressures obtained from wind tunnel testing. Furthermore, the use of emerging computational techniques, such as Computational Fluid Dynamics (CFD), in this field is largely untested in this respect.

Outcomes & Impact | A façade can constitute up to 25% of the total building costs. Furthermore, windstorms account for about 70% of total insured losses and direct link is apparent between major storms and world wide insurance losses from major natural disasters. This project aims to develop an accurate and reliable computational methodology for determining wind loading on building envelopes and for predicting the performance of glazed façades. This methodology will allow a safer and more economic glazing design.

Work involved | The principle aim of this project is to investigate the dynamic effects of wind loading on glass. Three research stages are envisaged:

- Investigation of glass failure prediction models and practical design application
- Numerical investigations using the latest developments in CFD technology, verified through physical testing
- Coupling of dynamic wind loading history with glass failure prediction models validated by glass test results, to give an economic glass design while identifying areas where wind has the highest influence, to ensure overall safety