



# Case study

## Blast injury in the urban environment

### THE PROBLEM

Injury to personnel in the urban environment when a blast occurs can result from a number of causes. Injury can result directly from the blast, the subsequent throw of the person or from the impact from flying debris. The likelihood and seriousness of injuries are difficult to quantify, but it is essential to gain this insight if you are to plan appropriate mitigations.

### THE SOLUTION

Frazer-Nash played a lead role in coordinating a number of organisations in a six year study to understand blast, the response of buildings to blast and consequently the injury to people within those buildings. Our role was to develop a leading edge capability in predicting building damage, collapse and debris spread and then to use that capability along with blast and injury algorithms developed by other parties, to predict injury in the urban environment.

We examined injury and the relative importance of the various mechanisms in a wide range of buildings. Those buildings included factories, shops, domestic, offices and some fortified structures.

### THE RESULT

We generated real insight into the relative importance of the various causes of injury in the urban environment. It became clear that the likelihood of those causes varies hugely with the particular building and blast. This meant the prediction of injury based on only one injury criteria would be misleading.

We also generated and validated new modelling techniques to predict structural damage and the subsequent threat to people within and close to the buildings.

#### Client

Ministry of Defence

#### Business need

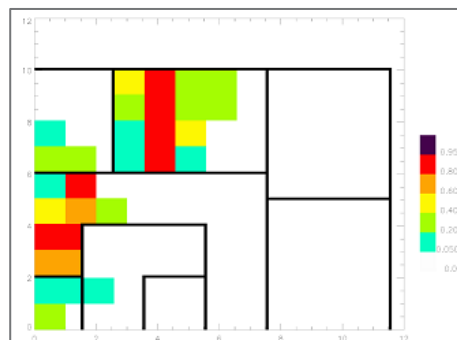
Understand the potential injury to personnel when operating in the urban environment

#### Why Frazer-Nash?

We provided a unique combination of understanding of injury and ability to model the effects of blast on buildings



Prediction of structural damage



Map of injury within a building

For more information please email [customercontact@fnc.co.uk](mailto:customercontact@fnc.co.uk)