Blast Research

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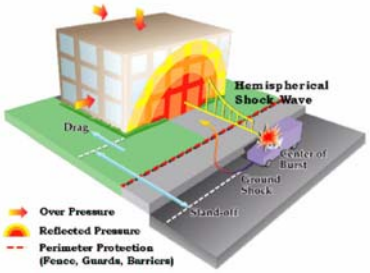
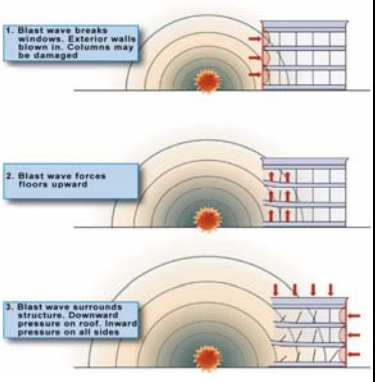
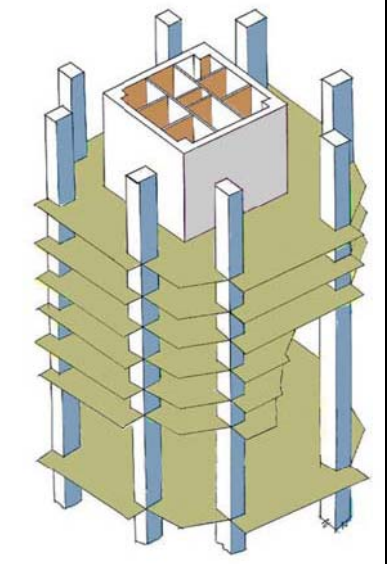




Recent bomb attacks on civilian facilities have heightened awareness on possible threats to buildings, bridges, dams, transportation systems and communication lifelines. While considerable classified research is underway for the protection of physical infrastructure against military bomb attacks, limited information is available on the mitigation of blast risk for civilian infrastructure.

In recent years the researchers at the University of Ottawa have been pursuing research on the effects of blast waves on critical infrastructure. The long term objective of the research effort is to develop blast-resistant design and mitigation strategies that can be adopted by the engineering practice. The short term objective includes the development of design and retrofit techniques for structural and non-structural components of building structures; transportation systems, including bridges; water distribution and treatment facilities; hydraulic structures, dams and power generation facilities; as well as industrial plants and telecommunication towers. While the application of the methodologies developed may be different for different types of infrastructure, the basic principles of material resistance, deformability, continuity and energy absorption capacity, as well as the prevention of progressive collapse remain the same. These principles are being developed through a number of experimental and analytical research projects.



Experts

- ***Mamadou Fall*** – Blast effects on geotechnical structures
- ***Simon Foo*** – blast risk mitigation methodologies; blast risk assessment; pre and post-screening of existing infrastructure
- ***Magdi Mohareb*** – effects of bomb blasts on steel structures and pipelines
- ***Nove Naumoski*** – dynamic analysis of structures under blast loading; progressive collapse analysis of buildings; blast-resistant design
- ***Ioan Nistor*** – dam breaching under bomb blast, protection of dams against blast effects, physical and numerical modelling of dam failures caused by bomb blasts
- ***Dan Palermo*** – hardening of building structures against blast loads; design and detailing of concrete structures against blast effects
- ***Colin Rennie*** - dam breaching under bomb blast, protection of dams against blast effects, physical and numerical modelling of dam failures caused by bomb blasts
- ***Murat Saatcioglu*** – performance, design and retrofit of concrete structures under blast loads; development of blast-resistant design guidelines for buildings; dynamic inelastic analysis of structures under blast-induced impulsive loads
- ***Sai Vanapalli –*** Blast effects on geotechnical structures

Some Current Projects

- Development of blast-resistant design guidelines for reinforced concrete and steel buildings
- Protection of Canadian lifeline structures against blast threats
- Effects of seismic design on blast resistance of reinforced concrete buildings
- The investigation of standoff distance-charge relationships for multi-storey buildings
- Risk-based assessment for blast resistance of reinforced concrete buildings
- The effect of the location of bomb blast on building response
- Progressive collapse triggered by bomb blasts in multi-storey buildings
- Characterization of blast loading on buildings
- Physical and numerical modelling of earth-fill dam failures due to explosive blast
- Dynamic inelastic analysis of structures under impulsive blast loads
- Punching shear capacity of reinforced concrete slabs under blast load