

PROTEDES – Protection of Strategic Buildings against Blast Actions

Summary

The targeting of civilian infrastructures by terrorist groups has a long history within western societies. Since the sixties of last century, Britain experienced a long fight against IRA where the indiscriminate use of Improvised Explosive Devices was a common tactic. After 1995, the world started to witness the emerging of a new type of extremism, designed to become devastating in effects. In this matter, the U.S. was probably the first being shocked by terrorist attack against the Alfred P. Murrah Federal Building in Oklahoma City (April 1995). The following events of, Khobar Towers housing complex, in Dhahran (June 1996); the bombings of the U. S. Embassies in Nairobi and Dar Es Salaam (August 1998); the September 11, 2001, and subsequent incidents in Bali (October 2002), Madrid (March 2004), London (July 2006), Oslo (July 2011) demonstrated the ability of terrorists to cause civilian deaths and property damage at levels not seen since the end of World War II.

Besides, the proliferation of transnational terrorism and the increasing use of Improvised Explosive Devices (IEDs) as a weapon of choice by terrorist groups give particular emphasis to the protection of people and infrastructure and thereby to engineering measures that can mitigate these effects. This concern is all the more pressing when it comes to critical infrastructures, generally understood by physical structures, goods, services and systems (e.g. energy, transportation, water, communications and finance). Whether if disrupted or destroyed in whole or in part, it may have social, environmental or economic impacts, which threaten the security of the State and the well-being of society. Although the terrorism hazard of the Portuguese territory is considered moderate, a considerable number of deadly accidental explosions have been recorded in the last years.

This Project takes a multi-pronged and integrated approach of safety, protection and strengthening of strategic buildings to blast actions. It aims to develop protection solutions for the critical infrastructure and key resources. These purposes will be achieved through innovative structural design, numerical simulation and modelling, and full-scale blast tests. The findings, recommendations, and tools derived can become a part of the decision support system for local, or governmental leaders and technicians, as well for emergency responders for better preparedness. The research simultaneously addresses four research areas, which will be included in a Design Guideline manual in the end of the Project: robustness of structures; structural protection of buildings under blast; structural strengthening of buildings for blast actions; development of damage control measures for buildings under blast loading.



Figure 1. Hotel Canal, em Bagdad, Iraque, 2002.



Figure 2. Field test at Sta Margarida, Portugal.



Figure 3. Energy dissipater (patented system).



Figure 4. Energy dissipater (patented system).



Figure 5. Field test at NATO facilities, Spain.

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Project Reference

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Leading Institution

NOVA.ID.FCT – Associação para a Inovação e Desenvolvimento da FCT (Portugal)

Partners

IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal), Portuguese Army (Portugal)

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CERIS

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Project Website

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