

Tall Buildings – Performance of Passive Fire Protection in Extreme Loading Events – An Initial Scoping Study (Project ref. BD2467)

Note of the first meeting of the Advisory Group held at BRE Garston, 16th November 2005.

Present

M Shipp	(BRE - Chairman)
T Day	(BRE)
T Lennon	(BRE)
A Burd	(ODPM)
M Payne	(AEAT)
V Molokov	(University of Ulster)
N Butterworth	(Buro Happold)
J Fay	(BDAG)
D Smith	(IFE)
T Roberts	(HSL)
G Ellicott	(ASFP)
P Brownhill	(CAFCO)
K Hart	(CAFCO)

1. Welcome and Introductions

M Shipp welcomed participants to the meeting. Following brief introductions Martin went on to set the scene for the project which has arisen in the light of the attacks on the World Trade Centre, the subsequent scoping study commissioned by ODPM (carried out by Arup) and the recommendations of the NIST report which highlighted the performance of passive fire protection in extreme events.

2. Background and Principal Project Objectives

A briefing note was handed out to all participants detailing the background to the project and identifying the principal objectives. These relate to an identification of extreme events in relation to the performance of passive fire protection and characterising these events in relation to physical phenomena (equivalent force, overpressure, degree of damage etc.).

The information derived from the project will be produced through a series of deliverables to ODPM culminating in the production of a final report. The report may be made public under the Freedom of Information Act and so care will be needed with any sensitive or commercial material.

Graham Ellicott suggested that the project should focus on landmark buildings (such as the Olympics) and not be restricted only to tall buildings. He also suggested that the project refer to passive fire protection systems rather than products.

It was agreed that concrete would not be considered. Glass may need to be considered.

3. Constitution of Advisory Group

In addition to the key stakeholders represented at the meeting the following organisations were suggested as potentially providing a valuable input to the project:

CBI
ABI
Avantica (John Evans)
FABIG (SCI)
RIBA
HO SDB (Scientific Development Branch)
TRL (re vehicle impact)
Planners (Brian Ellis?)
ODPM Civil Resilience

Approaches will be made to these organisations. Anyone within the advisory group with specific contacts in any of these organisations please contact Tom Lennon (lennont@bre.co.uk). (Action: all)

4. Milestones and Project Deliverables

The dates of deliverables are identified in the Gantt chart included in the briefing note. Participants are reminded that the first deliverable, progress report, is due by the end of the current calendar year.

5. Presentation of HSL work

Terry Roberts gave an extremely interesting presentation on the work on jet fires undertaken at HSL. This included the development of the Jet Fire Resistance Test and considered the performance of pfp in relation to LPG tanks. Current work includes a study to consider the requirements for resistance to blast testing. Graham and Terry pointed out that much of this information is available as downloads from the ASFP web site (see the catastrophic fires section).

6. Brainstorm session

The results of the brainstorm session are summarised below. Advisory Group members are asked to consider any missing items or further items and forward them to Tom Lennon for inclusion.

Definition of "Extreme loading event"
Impact – ranging from low energy accidental scenarios (dropping tools), through medium (forklift collision) to very high impact accidental scenarios (lorry crashing into a building. Impact scenarios may also be malicious. These are likely to concentrate on the high energy end of the spectrum. There was some discussion as to whether the event should be the focus or the consequence of the event.
Explosion – again may be either accidental (gaseous) or deliberate (high explosives). Gas explosions are different from explosives – can create negative pressures.
Flying debris – arising from any of the events described above.
Excessive deflection due to accidental overload or possibly a fire in another area of the building.
Corrosion having a deleterious effect on the lifespan of the pfp. This is linked to the wider issue of the effect of aging.
Excessive wind. (Building sway)
Vibration
Earthquake
Flooding – water shock.
Arson particularly involving multiple seats of fire.
Transport of dangerous goods – generally related to the first and second items above.

Outline Matrix

	Fire	Blast	Impact	Vibration	Load	
9/11 event	Fire ball + pool fire	x	x	x	x	
Rocket attack	x		localised			
Suicide bomber	Consequential?	x				
HGV crash	X depend on load (dangerous goods)		x	x	If building collapses	
Strong wind			x	x	If building collapses	
Gas explosion	Consequential?	x	x	x	If building collapses	
H2 explosion	x	x	x	x		
Earthquake	Consequential?		x	x	x	

Issues to consider include:

- Flying debris
- Corrosion
- Chemical spill
- Water shock/ effect of water
- Partial collapse
- Glazing
- Disproportionate collapse
- Multiple collapse
- Changes (increases) in fire loading
- Ventilation systems
- Critical structural members
- External spread
- Venting via windows

Potential sources of data
Product data – ASFP (TL to email one page request to Graham Ellicott). May be subject to confidentiality considerations.
HSL jetfires – contact details of product manufacturers (possible web search).
Taylor Woodrow/Chiltern Jet fire tests
NFIRD (Japan) – earthquake resistance.
IMechE group/ IchemE
Gas Safe Project
Home Office/TRL for impact damage.
Lloyds
DNV
FM and UL
Natural fire test data
GasSafe Project
Nuclear Fuel flask tests (HSE?)
California building codes re Eathquake (NFIRD)

6. Date of Next Meeting

The next meeting of the Advisory Group was preliminarily scheduled for 2nd March 2006.

Wednesday, 16 November 2005