Fire Service response to emerging Building Control Issues

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  - Construction Product Regulations
- Examples of Fire issues arising
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  - Legal position (enforcement)
  - Approach
- Future needs!!
  - Current stats
  - Regularisation Certs
  - Issues
Tools to ensure compliance

- **Building Control Acts 1990 & 2007:**
  - To secure the health, safety, and welfare of people in or about buildings

- **Fire Service Act 1981 & 2003:**
  - Relates to most premises including sleeping accommodation, institutions, entertainment, teaching, etc. excluding premises consisting of a dwelling house occupied as a single dwelling

- **Building Regulations:**
  - Works completed in accordance prima facie compliance however other approaches allowed

- **NDFEM Vision** ... ‘the Fire Services is driven by the imperative of making society a safer place, primarily through work at community level in both prevention and emergency response’.
The Legislative Situation

- The fire safety provisions, enable a fire authority to take a range of advisory/enforcement actions...statutory duties on ‘persons in control’ of premises....

- Offence to willfully or recklessly give to an authorized person or Fire Authority information which is false or misleading in a material respect.
  - All certification must be true and correct
  - Certificate of
    - Design
    - Installation
    - Commissioning
    - Verification
    - Service and Maintenance
Fire Service Enforcement

- Fire Safety Notice may be served on the **owner or occupier** of a Potentially Dangerous Building to:
  - prohibit the use of the building and/or impose specific requirements on the owner or occupier.

- A Closure Notice may be served on **the person in control of the building** if the building poses or is likely a serious and immediate **risk to the safety of persons in or on the premises, including a risk of fire.**

- Contravention by any person of any requirement or regulations made, or a failure to comply with a Fire Safety Notice or Closure Notice, as served, **is an offence.**
Where .....the building or works are not designed or have not been, or are not being, constructed or carried out in conformity with building regulations,

Shall not be served after the expiration of the period of five years commencing on the date of the completion of the building or the works, or the material change in the purposes for which the building is used.

may be served on—

the owner of the building or works concerned, or any other person who carried out, or is carrying out, the works to which the notice applies.

may....require such steps.....to be taken within such period....for the purposes of ensuring compliance......the removal, alteration or making safe of any structure, service, fitting or equipment, or the discontinuance of any works or the doing of any other thing... prohibit the use of a building, (or part),

Offences. (not statute barred) Any person who contravenes (by act or omission) any requirement of BCA or of any order, regulation or notice under BCA shall be guilty of an offence.
BC provides a broader understanding of issues

- BCMS & Commencement Notice
- Disability Access Cert
- Rapex notices
- Developer/Builder engagement & Agents Forum
- Determination on FSC and when to apply for a Regularisation Cert?
- Defective / Legacy buildings & Enforcement
- BER & Energy Compliance
  - Installation of heating devices (Stoves)
- Risk Assessments & Inspection Plans
- CPR & CE markings
- Determination of Fee’s
- Consistency & Professionalism
Lack of harmonisation of fire regulations in Europe

- Approval of harmonised system completed in 2002 to classify the reaction to fire performance of construction products
  - However no harmonisation of the description of fire safety strategies and hence its difficult to adjudicate and compare.
- Significant differences exist in levels of fire requirements in terms of
  - Travel Distance
  - Periods of Fire Resistance
  - Testing requirements
- Other differences
  - the nature of the involvement of private parties in checking technical requirements, and
  - in site inspections.
  - strategies, tactics, terminologies
- However commonalities in the four primary strategies:
  - stability in case of fire (fire resistance of structure);
  - limitation of spread of fire (compartmentation);
  - escape routes; and
  - limitation of the development of fire (spread of flame, characteristics of internal and external surfaces).
Straw Bale Construction

- Fire Safety Issues – 7-Day Notice for Communal Residential Building
  - B2 Class O
  - B3 Fire Resistance
  - B4 External Fire Fire Spread

- Agent argued the straw bale construction achieved required minimum fire resistance to BS 476 Parts 20-24 (1987) and Part 8 (1972)
Communal Residential Building

- Design
  - 2 Storey Halls of Residence  403.7 m²
  - Ground Floor (238.1 m²) Bedroom, Kitchen & Dining Room, Lounge and toilets & showers – 3 final exits
  - First Floor (165.6 m²) Bedrooms and toilets & showers – single means of escape - protected stairway
  - Timber frame building
B2 Internal Fire Spread - Linings

- Residential communal building
  - Purpose Group ‘Other Residential’ 2 (b)
  - Provisions stipulate a Class B – s3, d2 (European class) or Class 0 (National Class) in other circulation spaces
  - Proposed linings “Clay Plaster Render” made up of 3 coats 1\textsuperscript{st} thin coat of runny clay; 2\textsuperscript{nd} coat is made up of clay, sand and chopped straw; 3\textsuperscript{rd} coat is of clay and sand 5 mm thick; overall thickness is 30mm-50mm

No documentation or report demonstrating that the proposed ‘clay rendering’ lining achieves a Class O performance in accordance with Part B2 Internal Fire Spread (Linings) of TGD B 2006
Protection of the timber frame

- Proposed Timber frame will comply with EN 1995-1-2 2004 ‘Eurocode 5 – Design of timber structures’
- Timber columns and beams (hardwood) which are exposed and visible – the required fire resistance will be achieved by over-sizing the timber members (charring depth) in accordance with Eurocode 5
- However fire safety consultant proposed “that the timber columns will be relatively small and numerous and located in nearly all the internal and external walls in the building”...“straw bale walls”...
**B3 Internal Fire Spread - Structure**

- **Services**
  - Proposed to run either under or over the straw bale walls
  - Wires and cables are chased in the timber
  - Where they run up and down the walls the straw is chased so that a slot is cut out of the straw for the service
  - Clay is inserted in chased part, the cables are laid in a plastic conduit
  - Where they run through the straw bale the service is run in a plastic conduit through the wall, and small holes are left for any condensation
The structure considered to have a 100% unprotected areas, and therefore located a minimum of 12.5m from the relevant boundary.

The compliance report indicates the only unprotected areas of the development are the proposed openings along the elevations, totalling 26.5 m².

In the Authority’s view the building has not been so designed that, in the event of a fire the external walls will afford adequate resistance to the spread of fire to and from neighbouring buildings.
Straw construction conclusion

- **Fire Issues**
  - Internal linings to National or European Class
  - Fire Resistant Construction to National or European Standard

- **Determination of An Bord Pleanála!**
  - Recognised the method of construction unusual
  - Considered reasonable that BCA would seek additional measures than would normally be the case.
  - Received test certificate which demonstrates that the construction will meet B3 and B4 of the Building Regulation. B2 was satisfied changing the make-up to inorganic clay plaster.
  - Appeal is upheld and a Fire Safety Certificate granted
Innovative Design Example
Distillery

- Production & Storage of Whiskey, Offices & Visitor Centre on Castle grounds
- Development mixture of new build and protected structures
  - New build compliance with Building Regulations – TGD B
  - Protected Structures & High Risk Areas (Industrial & Storage) – Fire Safety Engineering Approach
Building Control & Fire Authority Issues

- Explosive Risk, Flammable Liquid & Fire Fighting Water Supply
- Explosive Risk - ATEX compliant
- Flammable Liquid
  - High Risk Areas Production & Storage
    - Production proposed a FSE solution using a Fire Model for Still Areas in lieu of sprinklers
    - Storage proposed Water/Deluge system over Spirit Store, cask filled building (separate) on-site and shipped off site for storage
Distillery

- **Fire Fighting Water Supply**
  - Fire Engineering Analysis – entire site including Castle (severely damaged by fire in 1991) assessed
  - Remote no public mains
  - Analysis
    - flow rate required for risk; no of buildings and volume of flammable liquid etc.
    - Water supply for fire suppression system (1 hour)
  - Solution
    - Flow rate of 50 l/s
    - Volume of 700 m$^3$ static storage (excluding water for fire suppression system) by the restoration of mill pond
    - Which is in line with the historic and heritage value of the site, and is in keeping with the planning conditions pertaining to the site.
Change of Use to Distillery

- Existing Building Car Dealership
  - Brewery & Distillery (Production and Storage) & Visitor Centre
  - 4 storey incl. Basement

- Adopted similar approach

- Issues
  - Explosive Risk, Flammable Liquid & Fire Fighting Water Supply
  - Explosive Risk - ATEX compliant
  - Flammable Liquid
    - High Risk Areas Production & Storage
Conversion Distillery

- **Solution**
  - Fire suppression system to be provided over Still’s
  - Underground Basement not to be used for storage of flammable liquid unless a fire suppression System and a FSE analyses demonstrates acceptable level of Fire Safety
  - Firefighting Water Supply 600 m³ static storage (incl. water for fire suppression system) & Flow rate 50 l/s
Stoves

Issues arising

- Stove’s not installed according to manufacturer’s instructions.
- Fire protection material not used to cover the floor and walls that are close to the stove

Sizing and Design

CO alarm requirements

Questions

Is the house suitable for a wood stove?.
What size stove do I require for my dwelling?
What qualifications and experience do the supplier/ installer have?
Legacy Buildings

BRE Review of Fires from 2003-2013 in UK

- 34 of 106 fires had aspects relevant to concealed fire spread
  - 11 related to compartmentation in roof void
  - 10 related to cavity barriers
  - 4 related to ducting

- 7 cases the junction of compartment wall with roof not fire stopped adequately and not continued to roof
- 5 cases where mineral wool in wire netting used as cavity barrier proved to be inadequate
- ‘Push-fit’ cavity barrier moved
- 20 inadequate cavity barriers

Shipp M., Holland C., Crowder D., & Lennon T. ‘Fire Compartmentation in Roof voids’ BRE Global 2013
Legacy Buildings
Safety in event of a Fire

Current regulations deal with a number of areas, including:

- Means of escape
- Fire spread: including, "fire resistance" and "reaction to fire"
- The fire resistance of the structure in terms of resistance periods - R30, 60, 90 or 120
- The smoke and heat exhaust ventilation system
- Active fire fighting measures such as fire extinguishers, smoke detectors, sprinklers
- Access for the Fire Brigade
Legacy Buildings

Factors that should be taken into account include:

- the adequacy of the means to prevent fires occurring
- early warning by automatic fire detection and alarm systems
- the means of escape provided
- provision of smoke control systems
- control of the rate of growth of a fire (fire load)
- the adequacy of the structure to resist the effects of a fire
- the degree of fire containment
- fire separation between buildings or parts of buildings
- the standard of active measures for fire extinguishment or control
- facilities to assist the fire service
- the degree of fire safety management including the likely standard of maintenance of the fire safety systems
Legacy Buildings

- Common issues include
  - Deviations from existing Fire Safety Certificates
  - Inconsistent construction
  - Effects on Compartmentation
  - Internal fire doors without self closing devices
  - Structural roof crossing over compartmented walls
  - Lack of smoke control in escape stairways
  - Lack of fire stopping & cavity barriers

- Determinants
  - Fire probability of Fire occurrence
  - Fire spread
  - Fire duration
  - Fire load
  - Severity of fire
Legacy Buildings: Questions posed?

- Can a FS Notice be served in respect of apartments?
  - Section 18, apply to all buildings other than a dwelling house occupied as a single dwelling. Hence a Notice can be served in respect of a building comprising multiple units.

- Who to serve the notice on?
  - Section 2 defines owners as any person having an estate or interest in the premises.

- Can one FS notice be served in respect of the entire building or must individual FS Notices be served in respect of each unit?
  - Serve on each entity in respect of the portion of the building owned or occupied by that entity or individual.

- Can a person review a Fire Safety Notice by way of Judicial Review? Yes
Learning points

- Establish & conduct
  - Appropriate communication
  - Ascertaining the scale of the issues
  - The planning & Building Control history
  - The current owners, developers management company, residence, etc;
  - Fire safety strategy
  - Risk assessment
  - Enforcement / Engagement
  - Resolution & Facilitator process

- Important to maintain the following
  - Empathy
  - Integrity
  - Openness
  - Credibility
  - Reliability
  - Commitment
Projected construction activity

Source: Current and projected construction output data derived from DKM Economic Consultants analysis for Forfás (Optimum output as a percentage of GNP assumes a flat GNP growth rate of 2.5 percent)
# Meath trend

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<td><strong>Total</strong></td>
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<td><strong>118</strong></td>
<td><strong>107</strong></td>
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**Benefits of Risk Assessment**

- Enables to focus resources on the higher risk building projects.
- Enables delivery of a proportionate, transparent and consistent approach to inspection of building work.
- Enables effective dialogue with various parties to carrying out the work.
FSC & Regularisation Certificates

- Issues
  - Stay on Opening / Operating / Occupation in absence
  - Uncertainty of status of works started / completed without Fire Safety Certificate
  - Status of design variations
  - Limitations on enforcement by BCA

- What is the standing of a Regularisation Cert? (06/2010)
  - Variation & Inconsistencies exist
Legislative Issues

- Regularisation Certificate
  - Non-compliance aspect and consistency of determination
- Fire Safety Notice
  - Is it practical today, socio-economic climate, living habits, apartments?
  - How do you define ‘Potentially Dangerous Building’
- Courts approach
- Risk Assessment process

- Enforcement Notices (BC Act)
  - Statutorily barred
  - S.I. No. 365 of 2015
Broader Issues:

- Quality of construction
  - Is there effective monitoring of practitioners?
  - Are we satisfied with
    - accountability and
    - performance indicators and auditing.
  - Is there a sufficient systematic review process for documents and plans lodged on BCMS?
- Building innovation & modular buildings
Thank You

Reference

- Fire safety in buildings and implementation of European fire test standards: Dr Debbie Smith OBE: BRE Global Ltd, UK
  

- Forás Ireland’s Construction Sector: Outlook & Strategic Plan 2015

- Shipp M., Holland C., Crowder D., & Lennon T. ‘Fire Compartmentation in Roof voids’ BRE Global 2013


- The classification standards EN 13501 parts 1-6 are the only recognised means of demonstrating fire performance for construction products across EU


- White paper of Fire Safe Europe December 2014 www.firesafeeurope.eu