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BULETIN PUSPEK

JBPM Fire Research Centre

KOMPLEKS PUSAT PENYELIDIKAN KEBOMBAAN (PUSPEK)
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN,
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Disediakan oleh
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INSULATED vs UNINSULATED FIRE RATED ROLLER SHUTTERS

STEEL BASED INSULATED RS		FABRIC BASED INSULATED RS
1. Steel curtain on surface and fire board **sealed within**.	Material	**1.** Layers of fire resistance fabric wool to achieve insulation integrity.
2. **10- 15 years** with regular maintenance.	Durability	**2.** 1-3 years due to fabric wear tear, sagging condensation condition.
3. Damage on panels **easily replaced** with single panel and steel fabricated low maintenance.	Repair & Maintenance	**3.** Damage on fabric high replacement cost for new curtain. Double roller drum double the risk for breakdown.
4. Solid Rigid Panels.	Deflection Resistance	**4.** Minimal for fabric, worsens when fabric is condensed and sags.
5. **Minimal of grease and oil stain** on the surface of solid panel . Also available for anti bacterial coating application.	Surface Properties	**5.** Easy contamination with grease and oil stain due to nature of fabric properties.

Disediakan oleh
PgKB I Dr Ahmad Faiz bin Tharima @ Zainuddin

Performance-Based Design Approach (PBD)

There are attempts devoted to change the prescriptive building codes with the ones based on performance. The performance-based design relies on fire engineering principles, calculations and software modelling to satisfy the requirements of the Fire Code of Uniform Building By-Laws (1984). This approach provides alternative means of meeting the requirements of prescriptive code. However, in Malaysia, the buildings that fail to comply the prescriptive code (i.e., UBBL) are controlled by authorities having jurisdiction (AHJ), i.e., Director General of Fire and Rescue Department of Malaysia. Only those buildings that exceed the travel distance and compartmentation are considered in the PBD proposal.

The principle of PBD is to ensure occupants to have enough time to exit the building before being engulfed in flame (Fleischmann, 2009). In addition, PBD could facilitate the fire fighting process by preventing fire to spread to the adjacent vehicles (Jug et al. 2014). Instead of prescribing exactly the required protective measures (such as prescribing the number of exits for evacuation purpose), the overall design objectives shoule be met. In this regard, fire and evacuation modelling can be used to assess the effectiveness of the proposed protective measures (Karlsson & Quintiere, 2000).

For assessing the fire safety aspect of PBD, existing timelines such as **available safe egress time (ASET)** and **required safe egress time (RSET)** are used. The duration of the ignition of fire to the onset of hazard is identified as ASET, whereas RSET is defined as the time taken for egress, upon being alerted to the fire. Hence, ASET must be larger than RSET for successful evacuation during any fire incident (Ng & Chow, 2006).

In fire engineering analysis, **ASET** and **RSET** are influenced by a number of design variables. Poon (2014) proposed that design fire, fire model, fire suppression system, smoke control systems, and building geometry are significant parameters that influence ASET. In an earlier publication, Poon (2007) emphasized on design fire, pre-movement time, and safety factors to improve safety level in the performance-based fire safety engineering design. Fleischmann (2009) listed four input parameter, i.e., fire scenarios, design fire, premovement time, and acceptance criteria to ensure the safety level of a building.

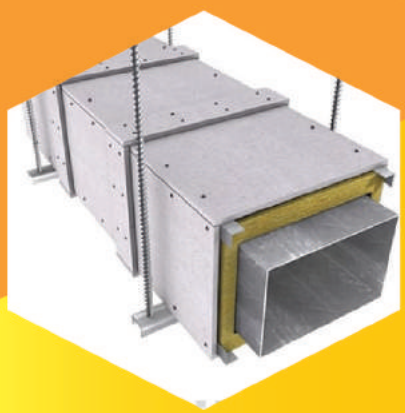
The Fire Dynamic Simulator (FDS), which is a **Computational Fluid Dynamics (CFD)** software, is commonly used to obtain ASET. For instance, Tosolini et al. (2013) compared the analytical ASET solution of Karlssson & Quintiere (2000) with the CFD data. In addition, Hede (2011) used FDS to determine the onset time until the critical condition (ASET) for ensuring occupant safety in performance-based design. Through FDS simulation, the limit of acceptability can be assessed and compared against the required safe egress time (RSET) after applying the relevant safety factor (Kong et al., 2013). The limits of acceptability are normally determined by assessing the thresholds: (a) smoke layer height, (b) smoke layer temperature, (c) heat transfer through radiation, (d) heat transfer through convection, (e) toxicity, and (f) visibility (BS 7346-7, 2013; Chow, 2011; Kong et al., 2013; National Fire Protection Association, 2009, 2015).

TYPES OF FIRE RESISTANT DUCTWORK

Disediakan oleh
PgKB II Jasni bin Ali

There are **4 basic types** of fire resistant ductwork that could be required or have special use under fire conditions. The following terms are used in identifying varying performance criteria for such ducts.

Ventilation fire ductwork. This ductwork is either supply or extract, and needs to be fire rated where it passes from a fire compartment through, for example, an escape corridor. It must be tested for type A fire outside and type B fire inside criteria. It is not necessary for the ductwork to maintain it's cross sectional area in a fire.



Smoke extract fire ductwork. This ductwork is for extracting smoke from the building and should be fire rated equal to the compartment walls or floors through which is passes for stability, integrity and insulation. The duct must also be tested to prove its cross sectional area does not reduce by more than 25%, both inside and outside the furnace, and to ensure that it will achieve its primary function, of extracting smoke. Stability and integrity ratings are only normally required within the area to be protected, i.e. car parks, if the duct is contained within a dedicated shaft or there is at least 500mm separation between the ductwork and combustible materials.

Non-domestic kitchen extract fire ductwork. This is sometimescalled grease ducting and should be tested for both type A fire outside and type B fire inside. Both tests are required as it isimportant to prevent flammable grease from either catching fire when it passes through an adjacent area, or if the grease itself is already alight, causing a fire to start within the adjacent area by radiant heat. Fire dampers should not be used in kitchen extract ductwork.

Pressurisation ductwork. Pressurisation is a method of restricting the penetration of smoke into certain critical areas of the building by ensuring the air within those areas is at a higher pressure than in adjacent areas. This particularly applies to protected stairways, lobbies and corridors as smoke inhibits escape. This also affects fire-fighting shafts serving deep basements' as there is greater difficulty in clearing smoke. As the air supply creating the pressurisation must be maintained for the duration of the fire, fire dampers cannot be used within the ducting. The ducting should be tested to type A fire outside criteria.

AKTIVITI / LAWATAN

LAWATAN DARIPADA DELEGASI

PUSAT KECEMERLANGAN KEJURUTERAAN DAN TEKNOLOGI JKR (CREaTE)

18 Februari 2020 Pihak PUSPEK telah menerima kunjungan delegasi daripada PUSAT KECEMERLANGAN KEJURUTERAAN DAN TEKNOLOGI JKR (CREaTE), Ayer Keroh, Melaka. Delegasi tersebut diketuai oleh Ketua Unit Makmal Penyelidikan Mekanikal, CREaTE iaitu Ir. Dr. Abdul Murad bin Zainal Abidin beserta 20 orang pegawai. Tujuan lawatan tersebut adalah untuk mengadakan sesi perkongsian maklumat dan mengemukakan cadangan jalinan kerjasama di antara CREaTE dan PUSPEK. Pihak delegasi juga telah dibawa melihat kemudahan dan peralatan makmal pengujian yang terdapat di PUSPEK.

SESI PERKONGSIAN ILMU & LAWATAN KILANG

SKB SHUTTERS MANUFACTURING SDN BHD

2 Mac 2020 PUSPEK dengan kerjasama *SKB Shutters ManufacturingSdn Bhd* telah mengadakan sesi perkongsian ilmu berkaitan dengan rekabentuk teknikal, pembinaan, jenis komponen *"Fire Rated Roller Shutter (Insulated)"*. Selain itu para peserta akan menyertai sesi lawatan di kilang yang terletak di Kota Damansara bagi melihat pemasangan sistem dan komponen *"Insulated Roller Shutter"*. Sesi tersebut telah melibatkan seramai 20 pegawai dan anggota daripada JBPM Negeri Selangor, JBPM Kuala Lumpur dan bahagian lain di IBu Pejabat Putrajaya.