The Importance of MFL Walls

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Objectives

- FM Global’s Philosophy
- Important concepts and definitions
- What is the MFL scenario
- What factors are considered?
- Why is it important to FM Global?
- What do MFL walls look like?
- The protection of openings
FM Global’s Philosophy

- The majority of property loss is preventable
- To evaluate risk, we apply engineering knowledge to event scenarios to quantify loss potentials
Important concepts and definitions

• **Maximum Foreseeable Loss (MFL)** - the largest loss that may be expected from a single fire (or other insured peril) to any given property taking into consideration the impairment of the fire protection system (on the basis of past experience).

• The impairment of the fire protection system indicates that dependence on control of fire is solely on physical fire barriers and manual fire fighting by the public fire department.

• Everything that can go wrong does go wrong.
How is MFL Calculated?

Property Loss + Business Interruption Loss = Maximum Foreseeable Loss
3:45 p.m. Sparks from a welder’s torch fell into a conveyor drip pan. Rustproofing compound in the pan burst into flame.

45 Minutes Later - Raging inferno engulfed the entire 34.5 acre facility.

Largest Industrial Loss on Record at That Time

$50 - $55 M in Property Damage
$750 M in Business Interruption
32,000 Employees Laid Off
Kmart

- **1,200,000 ft² (111,480 m²)**
  - Distribution Warehouse.
  - Stored everything. The facility had over 400,000 gal. of ignitable liquids: Motor Oil, spray paint, hair spray, paint, finger nail polish and remover, rubbing alcohol, carburetor cleaner, engine starter, etc.
  - A lot of fire protection – but still inadequate.
  - Fire walls created 4 sections – and prevented a much larger loss.
K-Mart, 1984: $120 M loss
MFL Walls Prevented a Larger Loss
How To Reduce The MFL

1. MFL Fire Walls – MOST IMPORTANT!

Other Factors:

2. Adequate Space Separation
3. Lack of Continuity of Combustibles
4. Fire Service Response
5. Property and Business Interruption Mitigation Capabilities
1. MFL Fire Walls
What do MFL Walls look like?

- 4-hrs fire resistance needed
- Structural stability needed, for example:
  - Concrete Masonry Units (CMU) aka concrete block - Fire resistance not based on tests. Based on thickness, etc.
  - Tilt Up Concrete - formed and poured on-site - Fire resistance not based on tests. Based on thickness, aggregate, etc.
  - Precast Concrete - fire resistance based on tests - Often insulated or hollow and not solid.
MFL Wall Materials

- Wall must resist heat, impact, hose streams and expansion forces.

- Gypsum board stud walls should be discouraged since they are subject to damage from impact before or during an MFL fire.

- Gypsum board walls may not perform well when subject to prolonged hose streams.
Cantilever MFL Fire Walls

30" (0.75m) Parapet
Flashings
Roof Covering & Gravel
Purlin
Truss
"H" Column
Masonry Units Such as Brick or Concrete Blocks
Provide Reinforcement
Footings or Foundations as Required
Double Fire Wall

3 Hr. Wall

St. Column

FM Approvals
The protection of openings

- FM Approved Automatic Closing Fire Doors, Double (one on both sides of the wall)
- FM Approved firestopping materials installed by an FM Approved Firestop Contractor
- Minimum 3-hour Fire Resistance
Double Fire Doors
Penetrations

- Pipes (etc.) should penetrate the wall no more than 3 ft (1.0 m) above the floor.

- Provide a steel sleeve with a 1 in. (25 mm) clearance around the pipe or conduit, to be filled with an Approved firestop a minimum 3-hour fire rating.
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1.0 SCOPE

This data sheet provides design criteria and guidelines for maximum foreseeable loss (MFL) limiting factors and the protection of openings in MFL limiting factors. Data Sheet 1-23, *Fire Barriers and Protection of Openings*, addresses non-MFL fire walls, floors, ceilings, and protection of openings used to separate occupancies within the same building.

1.1 Changes

February 2014. Minor editorial changes were made.

October 2013. The following changes were made:

- Revised Section 2.2.2.2.10 on explosion hazard distances.

- Revised penetration and fire stop recommendations based on comments from the Firestop Contractors International Association (FCIA).

- Changed Light/Ordinary occupancy hazard classification to HC-1/HC-2 to be in agreement with Data Sheet 3-26, *Fire Protection Water Demand for Non-Storage Sprinklered Properties*.

- Revised recommendations on roof drains and scuppers near MFL walls.
2.2.2.10.7 Locate fire-resistive end/angular exposure wall protection on the exterior surface. Do not place siding materials that are combustible or of limited combustibility over them.

2.2.2.11 Pipes, Conduit, Cables, and Ducts Penetrations

2.2.2.11.1 Where penetrations by pipes, conduit, cables, and or ducts, spaces are created for expansion or other joints in the building at top, bottom or in MFL Walls, provide through or membrane penetration or joint firestop materials that when installed to the tested and listed system, become firestop systems that conform to FM 4990, Approval Standard for Firestopping, or equivalent tested assembly.

Where MFL walls have been penetrated by pipes, conduit, cables, and or ducts, or spaces are created for expansion or other joints in the building at top, bottom or in MFL walls, firestop materials should be installed by an FM 4991 Approved Firestop Contractor.

2.2.2.11.2 Feed automatic sprinkler systems on either side of an MFL fire wall independently (Fig. 33) so it is not necessary to penetrate the wall.
2.2.2.11.3 Avoid penetration of MFL fire walls by pipes, conduit, cables, and ducts. Keep any unavoidable penetrations to a minimum and arrange them as outlined below.

A. Position pipes, conduit, and cables (regardless of size) penetrating MFL fire walls to pass through the wall as close as practical to, but no more than 3 ft (1.0 m) above, the finished ground floor level. Provide a steel sleeve with a 1 in. (25 mm) annular clearance around the pipe or conduit, to be filled with an FM Approved fire stop assembly with a minimum 3-hour fire rating. Provide mesh reinforcement in the horizontal joints above and below pipes in concrete block walls, and fill all cores of the concrete block immediately adjacent to pipe penetrations with concrete grout. Do not penetrate the wall with clusters of pipes or conduit. If more than one pipe penetrates the wall in the same area, provide center-to-center spacing of at least three times the largest pipe diameter. Exception: The structural aspects of this recommendation do not apply to panel walls in reinforced concrete buildings, providing the frames on both sides of the wall are reinforced concrete. However, FM Approved fire stop materials still need to be used to seal around penetrations.

B. Protect exposed cables with combustible insulation with an FM Approved fire-resistive coating or wrap for at least 3 ft (1.0 m) on each side of the wall, unless a 4-hour fire stop assembly is used.

C. Specify that fire stops be installed by an FM Approved Firestop Contractor whenever possible.
Questions?