Red Hook Small Business Hazard Mitigation Case Studies

- Case studies used to calibrate recommendations
  - Hazard environment
  - Range of businesses
  - Owned vs. leased space
  - Different building types
Red Hook Small Business Hazard Mitigation Case Studies

Methodology

- Red Hook Background
  - Business operations
  - Hurricane Sandy impacts
  - Storm Preparedness Challenges
  - Mitigation solutions
Small Business Case Studies

- Small Artisan Fabricator: Flickinger Glass Works
- Mid-size Manufacturer: Linda Tool
- Café Restaurant: Ft. Defiance
Hazard Risks and Consequences

- **Buildings**
  - Flooding
  - Power loss

- **Infrastructure (transportation)**
  - Staff access to business
  - Erratic response time for services recovery

- **Business Operations**
  - Document recovery
  - Lack of back-up of key records
  - IT and Telecommunications

Super storm Sandy flood water receding from MTA R line tunnel
Flickinger Glassworks

Business Operations:
- Small, artisan shop
- Custom repair and new glass fixture crafting using steel molds to specifications
- Staff of 8 to 16 based on business volume
Flickinger Glassworks

Hazard Risks:

- Located on Upper New York Bay
  - Near Buttermilk Channel
- Base Flood Elevation = +12 ft*
  - Existing ground elev. +7 ft.
- Front door and rear doors and windows are not water-tight
- Industrial hanging doors between spaces increase risk

* Base Flood Elevation based on FEMA post-Superstorm Sandy data

Connecting door between leased units allows water to enter Flickinger production area.
Hurricane Sandy Impacts

◦ Flood depth of about 3 ft.
◦ Business off-line for 4 – 6 weeks
◦ Operating equipment motors destroyed
◦ Business records destroyed
  • Off-site back-up storage also destroyed
◦ Brackish water contaminated kiln lining brick
Storm Preparedness Challenges

◦ Prevent flooding of business space
  • Includes flooding from adjacent businesses
◦ Difficulty in obtaining replacement parts for operational equipment
◦ Lost customer design archives
◦ Lost business records
◦ Staff availability via public transportation

Five at-risk custom kilns; this one features newly elevated electrical engine to the left of the kiln.
Flickinger Glassworks

Permanent Mitigation Solutions

- Elevate critical equipment such as kiln motors and polishing equipment
- Seal interior pass doors
- Scan and archive key customer designs using secure off-site provider
Temporary Mitigation Measures

- Evacuate critical office equipment, and small production equipment
- Install pre-fabricated ¾” plywood over door and window openings
  - seal edges with spray foam
- Use jacks and block stands to elevate equipment
- Institute emergency communications via e-blast
Linda Tool

Business Operations:

- Mid-size manufacturer of machined metal parts
- Custom fabrication of finished metal parts/components
- Maintains International Standards Organizations (ISO) quality management certification
- Staff of 20 to 30 based on business volume
Hazard Risks:

- Business is a few blocks inland from the Upper New York Bay and Erie Basin; Base Flood Elevation = 12 ft.*
  - Existing ground elevation = + 6 ft.
- Two pedestrian doors and one overhead door
- Plant floor is 3.5 ft. above street level
  - Office space located on mezzanine level

* Base Flood Elevation based on FEMA post-Superstorm Sandy data
Hurricane Sandy Impacts

- Flood depth of 3 ft. in loading dock bay
- Sewer line back flow contaminated mechanical room and locker/restroom area
- Eleven months later still working to fulfill backlog orders
Linda Tool

Storm Preparedness Challenges

- Prevent flood water from reaching production equipment
- Potential flood water damage to small tools and delicate measuring equipment
- Potential health hazards from sewer backflow
- Temperature and humidity control
- Staff availability via public transportation
Permanent Mitigation Solutions

- Install backflow preventer valve
- Install watertight pedestrian doors
- Reorganize plant floor storage to elevate sensitive items
Temporary Mitigation Measures

- Install temporary flood barrier at loading bay door
- Install temporary flood barrier on plant floor around the loading bay
- Institute emergency communications programs

Approximate top of temporary Flood Barrier
Business Operations:
- Locally owned and operated neighborhood café and bar
- Staff of about 20
- Open 7 days/week
  - 10:00 AM to Midnight except Tuesday
  - 10:00 AM to 3:00 PM Tuesdays
Fort Defiance Cafe

Hazard Risks:

- Basement flooding
  - Through sidewalk entry
  - Through basement wall masonry
- Water damage to ground floor
  - Water rising from basement
  - Seepage through door

Sidewalk hatch door to basement
Fort Defiance Cafe

Hurricane Sandy Impacts

- Basement flooding damaged critical equipment and inventory
- Ground floor flooding damaged equipment, furnishings and fixtures
- Power failure caused loss of refrigerated food
- Electric meters for other tenants also located in basement

Electric service entrance in basement
Meters for Fort Defiance Cafe and 2nd and 3rd flood tenants
Fort Defiance Cafe

Storm Preparedness Challenges

- Prevent basement flooding
- Prevent ground floor flooding of food preparation and dining areas
- Moving large quantity of small items to higher ground; e.g.
  - Food stuffs
  - Wine bottles
- Dewatering flood water from basement

Stairway from sidewalk hatch to basement
Fort Defiance Cafe

Permanent Mitigation Solutions
- Clean and repoint basement walls
- Install flood door at front entry

Ft. Defiance basement masonry wall

F. Defiance front entry door
Temporary Mitigation Measures

- Temporary flood barriers at openings
- Conduct plumbing survey and seal unused drains
- Disconnect and relocate critical equipment
- Evacuate critical supplies and inventory prior to severe storm event

Temporary mitigation opportunity: fabricate temporary flood barrier to fit hatch frame. Install barrier and seal joints with spray foam.
Case Study Summary

- **Common challenges**
  - Flood damage to business assets
    - Operating equipment
    - Business records
  - Staff availability/mobility
    - Mass transit–dependant
  - Information on recovery assistance
    - Public sources
    - Private sources

*Post Sandy flooding of MTA subway station*
# Case Study Summary

## Special Challenges

<table>
<thead>
<tr>
<th>Leased Space</th>
<th>Space with Basement</th>
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</thead>
<tbody>
<tr>
<td>Authority/responsibility for mitigation</td>
<td>Interior mitigation disruptive</td>
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<tr>
<td>Shared risk with other tenants</td>
<td>Exterior mitigation costly</td>
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</tbody>
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Flickinger Glassworks
Case Studies
Open Discussion/Questions