Appendix A – Delaware Fire Department Risk Assessment Program

Delaware Fire Department Risk Assessment Guide

Fire Department

Contents

Overview

In order to prepare appropriately for potential disasters and emergencies that might occur within the jurisdiction, one must have an accurate understanding of the kinds of risks the community might be faced with. The goal of the Community Risk Assessment is to evaluate the whole community to allow elected officials, city administration, the fire department and the citizens the ability to make calculated decisions on the level of service desired from their fire, rescue and EMS provider.

The 2016 edition of NFPA 1730 (Organization and Deployment of Fire Prevention Operations) provides direction for the creations of a Community Risk Assessment process. NFPA 1730 states "The purpose of that process is to assist in the development and implementation of a community risk reduction plan and program to reduce, mitigate or eliminate the community's risk". This risk assessment should be reviewed every 5 years.

The 2016 edition of NFPA 1710 (Organization And Deployment Of Fire Suppression Operations By Career Fire Departments) states that "NFPA 1710 is scoped to focus strictly on deployment, staffing, and service levels, it is one component of a total community fire protection planning process".

The National Fire Protection Association (NFPA) and the Federal Emergency Management Association (FEMA) set out the basic definition of a risk assessment, which details the fact that it is "a quantitative and qualitative tool used for measuring the probability of incident occurrence and impact that a given area may experience if certain criteria are met during an incident". These tools can take many forms, from a simple paper survey to a calibrated set of indicators designed to be applied and manipulated for each analyzed area. Information is then prioritized and ranked to assess the importance and degree of preparation needed for each event.

Community Threat and Hazard Risk Assessment

This section identifies how the analysis of the various risks and threats, both natural and man-made, were considered within the city of Delaware. A three step-process is being utilized to create the threat and hazard assessment. A similar process was also used to identify the risks as part of the 2018 Delaware Co. Emergency Management Mitigation Plan.

- Step one is to identify all possible natural and man-made incidents that could impact the city of Delaware.

Fires (NFIRS 100 Series)
Structural Fires
Vehicle Fires
Other Types Fires

Ruptures Explosion (NFIRS 200 Series)
Emergency Medical Responses (NFIRS 300 Series)
Motor Vehicle Accidents
Hazardous Conditions (NFIRS 400 Series)
Hazardous Materials
Electrical Issues
Explosive Device
Service Calls (NFIRS 500 Series)
Assist Invalid
Good Intent Calls (NFIRS 600 Series)
False Calls (NFIRS 700 Series)
Malicious False Alarm
Alarm Activations - Unitentional
Alarm Activation Malfunction
Utility Failure
Water Utility Failure
Sewer Utility Failure
Gas Utility Failure
Electric Utility Failure
Natural Hazards
Dam Failure
Drought
Earthquake
Flooding
Severe Summer Weather/Extreme Heat (This includes hailstorms & windstorms)
Severe Winter Weather
Tornado
Man-Made Incidents
Aircraft Crash
Civil Disturbance
Cyber
Pandemic
Shooting
Terrorism
Utility Failure

- Step two is to analyze the responses made by Delaware Fire Department to natural and man-made incidents. The approach taken was to evaluate the incidents; probability of an incident occurring, consequences of the incident, and needed resources to handle the incident. The Risk Assessment Score is developed using the Heron's Formula and the risk is the also visually provided in a graphic. The following chart identifies the methodology used:

Risk Assessment Methodology		
Probability	0	Greater than Annually
	2	Quarterly/Annually
	4	Monthly
	6	Weekly
	8	Daily
Consequences	0	No People/Vacant Property
	2	Individual/Single Residence or Business
	4	Multiple People/ Residence or Business
	6	Multiple People/ Residence or Business /Financial Impact to City
	8	Mass Quantity People/ Residence or Business /Financial Impact to Region
Resources Needed	0	None
	2	2 or Less Apparatus
	4	3 to 4 Apparatus
	6	4 to 8 Apparatus
	8	Greater than 8 Apparatus
Risk Assessment Score	**< 19.5**	**Low Risk**
	19.6-44.0	**Medium Risk**
	44.1-78.3	**Large Risk**
	> 78.4	**Ultra-High Risk**

- Step three is the development of a profile that contains a general description of the nature and behavior of the hazard followed by a summary of the most critical occurrences of the event in the City.

Building Risk Analysis

The risk analysis process also involves the scoring of each structure. This model was developed by modifying the NASJAX Community Risk Profile (CRA) and identifying additional characteristics that may impact the community. The type of risks identified included life safety, fire, value to the community, hazards to the community and included a review of the structure, concentration of structure, occupancy, process, and population. The frequency and historic severity of an incident for each of the risks and hazards were also applied to identify a potential for occurrence. This historical data was provided by the comprehensive record management database maintained by the department.

Hazards (Total Value 3-9)

Occupancy Type

Light - 1 Pt

Light hazard occupancies are defined as occupancies or portions of other occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected.

- Animal shelters
- Churches
- Clubs
- Educational
- Hospitals
- Animal hospitals and veterinary facilities
- Institutional
- Kennels
- Libraries, except large stack rooms
- Museums
- Residential
- Restaurant seating areas
- Unused attics
- Theaters and auditoriums, excluding stages and prosceniums
- Offices, including data processing
- Nursing or convalescent homes

Ordinary - 2 Pts

Ordinary hazard occupancies are defined as occupancies or portions of other occupancies where the quantity and combustibility of contents are low to high and fires with relatively moderate rates of heat release are expected.

- Bakeries
- Beverage manufacturing
- Automobile parking /showrooms
- Canneries
- Electronic plants
- Glass and glass products manufacturing
- Laundries
- Restaurant service areas
- Agricultural facilities
- Barns and stables
- Cereal mills
- Chemical plants — ordinary
- Confectionery products
- Distilleries
- Dry cleaners
- Exterior Loading Docks
- Exterior loading
- Feed mills
- Horse stables
- Leather goods manufacturing
- Libraries — large stack room areas
- Machine shops
- Metal working
- Mercantile
- Paper and pulp mills
- Paper process plants
- Piers and wharves
- Post offices
- Printing and publishing
- Local fairgrounds
- Repair garages
- Racetrack stable/kennel areas
- Resin application area
- Stages
- Textile manufacturing
- Tire manufacturing
- Wood machining
- Tobacco products manufacturing
- Wood product assembly
- Dairy products manufacturing and processing

Extra Hazard - 3 Pts

Extra hazard occupancies are defined as occupancies or portions of other occupancies where the quantity and combustibility of contents are very high, flammable or combustible liquids are present, dust, lint, or other materials are present, introducing the probability of rapidly developing fires with high rates of heat release.

- Die casting
- Metal extruding
- Combustible hydraulic fluid areas
- Saw mills
- Asphalt saturating
- Flow coating
- Rubber Facilities
- Flammable liquids spraying
- Textile picking, opening, blending,
- Plastics processing
- Solvent cleaning
- Varnish and paint dipping
- Manufactured home or modular building assemblies
- Printing [inks flash points , 100°F]
- Plywood and particle board manufacturing
- Upholstering with plastic foams
- Printing [inks flash points , 100°F]

Number of Occupants

Number of Occupants that are typically in the building. Buildings that fluxuate with occupants should use maximum occupancy limit, designed occupancy, or the estimated amount for a normal event. (i.e. Church – use the typical Sunday Service.)

- < 25 — 1 Pt
- 26 - 99 — 2 Pts
- > 100 — 3 Pts

Occupant Mobility

Are the occupants able to egress the building without any assistance.

- Ambulatory (Yes) — 1 Pt
- Non-Ambulatory (No) — 3 Pts

Community (Total Value 2-6)

Historic Value

Buildings that if they exhibit a catastrophic event would have a historic impact on the community. Examples would be Perkins Observatory, Downtown businesses, historic buildings and churches.

- No — 1 Pt
- Yes — 3 Pts

Economic Value

Buildings that if they exhibit a catastrophic event would have an economic impact on the community. Examples would be large industrial properties such as PPG.

- No — 1 Pt
- Yes — 3 Pts

Building (Total Value 5-15)

Construction Type

- Non-Combustible - 1 Pt

  Types I and II. Type I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials, except as permitted in OBBC Section 603 and elsewhere in this code.
- Limited Combustible - 2 Pts

  Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing complying with OBBC Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour rating or less.

  Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section. Fire-retardant-treated wood framing complying with OBBC Section 2303.2 shall be permitted within exterior wall assemblies with a 2-hour rating or less. Minimum solid sawn nominal dimensions are required for structures built using Type IV construction (HT). For glued-laminated members the equivalent net finished width and depths corresponding to the minimum nominal width and depths of solid sawn lumber are required as specified in OBBC Table 602.4.
- Combustible - 3 Pts

  Type V. Type V construction is that type of construction in which the structural elements, exterior walls and interior walls are of any materials permitted by this code.

Square Footage

This is the square footage per floor of the building. This shall not be reduced by firewalls or separations. The County Property Appraiser files should be used if the square footage is not able to be determined.

- 0-7,500 — 1 Pt
- 7,501-15,000 — 2 Pts

- 15,000+ 3 Pts

Number of Stories

This is the total number of stories for the building. If a building contains a basement, this should be added as a story. Buildings with attics that can be habited should also be added as an additional story.

- 1 Story (<12') 1 Pt
- 2 Story (<24") 2 Pts
- 3+ Story (>25') 3 Pts

Fire Protection

Identify if the building is protected by fire protection equipment. If the building is not complete covered, they should be considered as having none.

- Sprinkler System or Fire Alarm ***monitored*** 1 Pt
- Fire Alarm or Sprinkler System ***not monitored*** 2 Pts
- None 3 Pts

Fire Flow/Water Flow

Utilizing the Ohio Fire Code, Appendix B (Fire-Flow Requirements for Buildings), identify the required fire flow for the building. Determine the water flow availability through the use of public or private fire hydrants. Determine the water availability utilizing the following formula (WA/FF x 100 = WA%)

- 100% Fire Flow/Water Availability Ratio 1 Pt
- 50% - 100% Fire Flow/Water Availability Ratio 2 Pts
- < 50% Fire Flow/Water Availability Ratio 3 Pts

Summary Score (12-42)

Risk Assessment	*Community Risk Assessment*
Low	10 - 15
Moderate	16 - 17
Significant	18 - 19
Special	20 – 30

Geographical District Risk Analysis

In order to provide a complete and accurate portrayal of the risks posed throughout the City, an analysis was conducted based on the demand zones. The demand zone analysis created four categories of risks known as Low, Medium, High and Ultra High Risks. The probability, consequences and impact of responses were analyzed based on the demand zones. These demand zones are primarily based on geographic boundaries, and include residential units, business locations, governmental facilities, health care facilities, educational buildings and manufacturing complexes to name a few. The department continues to utilize the demand zones jointly created by the Delaware Police and Fire Departments. The department has 101 individual reporting demand zones.

Risk Assessment Methodology		
Probability	0	None
	2	Monthly
	4	Weekly
	6	3 Times a Week
	8	Daily
Consequences	0	No People/Vacant Property
	2	Low
	4	Medium (Highest Building Risk)
	6	High (Highest Building Risk)
	8	Ultra-High (Highest Building Risk)
Resources Needed	0	None
	2	2 or Less Apparatus
	4	3 to 4 Apparatus
	6	4 to 8 Apparatus
	8	Greater than 8 Apparatus
Risk Assessment Score	< 19.5	Low Risk
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