



CLARK COUNTY FIRE DEPARTMENT
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- TITLE:** FIRE SAFETY AND RISK ANALYSIS REQUIREMENTS FOR ROOF-TOP FIREWORKS DISPLAY
- SCOPE:** This guideline applies to Fire Department requirements regarding roof-top fireworks display.
- PURPOSE:** Standardize Fire Department requirements relating to the display of fireworks from roof-tops.

SPECIFICATIONS AND REQUIREMENTS

Following is the required scope of fire safety analysis for roof-top launching of fireworks. Safety and risk aspects are to be addressed and presented with the stamp of (a) professional engineer(s) working within their areas of expertise.

Risk, in this context, is the frequency and severity of a fireworks mishap. The safety consulting firm shall be qualified to evaluate hazardous operations such as fireworks displays and demonstrate experience in hazards analysis and have knowledge of the fireworks industry. As such, common hazards that may not be known or recognized by the Clark County Fire Department (CCFD) are to be covered by the safety professional engaged.

Special Note: This scope does not cover structural analysis. The structural analysis must be accomplished by a Nevada registered engineer and submitted to Clark County Development Services – Building Department (CCDS-BD). (CCDS-BD).

The Fire Safety and Risk Analysis shall use the 1995 edition of the *Code for Fireworks Display, NFPA 1123*. The 1995 edition of NFPA 1123 is currently enforceable in Clark County. Additional measures based on current industry practices are to be identified. CCFD will not approve provisions less stringent than those in the 1995 edition of NFPA 1123. The minimum requirements for the Fire Safety and Risk Analysis would encompass at least the following areas/items:

Hazard Identification and Risk Analysis - Discussion of inherent hazards from fireworks shows

1. Conduct a literature search to identify the loss history associated with fireworks displays and fireworks mishaps. Also assemble the current literature of safe practices with respect to fireworks displays.
2. Discuss and review the general hazards of fireworks. Include an analysis of the devices with respect to quality control as well as the operational hazards and

operator training. Discuss the hazards to spectators and ignition potentials from misfired fireworks, burning embers, fall-out and the like. Address any additional requirements for additional fallout distances required when devices are angled. The method of determining the fallout distances is to be evaluated in this study and include an evaluation by a qualified engineer or specialist acceptable to the Clark County Fire Department.

3. Discuss failure modes of fireworks and fireworks launching equipment including but not limited to mortar rack failure, mortar rack fires, flowerpots, premature detonations, unexploded shell fallout etc. The study shall employ a systematic hazards analysis technique. The specific technique is to be determined by the safety professional engaged in this work. Examples of systematic safety analysis methods are a job safety analysis (JSA), failure modes and effects analysis (FMEA), and fault tree analysis (FTA). The basis for using a quantitative or qualitative technique is to be presented in the report.
4. Discuss the quality and type of equipment including, but not limited to, the use of used mortar tubes and racks. Discuss the hazards of non-engineered mortar racks.

Analysis of Venues, Roofing Surfaces, Exposures and Fallout Areas

1. The Fire Safety and Risk Analysis shall consider the hazards to exposures, including but not limited to, items that are susceptible to damage from fire works.
2. The report shall identify hazards to exposures in each venue including, but not limited to, roof top structures, HVAC equipment, elevator machine rooms, exposed buildings, and all areas that could be impacted by a credible fireworks mishap. Regions of influence are to be considered, e.g. unexploded shells may have a smaller region of influence than regions of carried burning embers.
3. The Fire Safety and Risk Analysis shall identify ignition potentials to exterior walls. Exterior Insulation and Finish Systems (EIFS) on the exterior walls are to be considered as well as the susceptibility to damage from fireworks. Combustible roof membranes are to be evaluated for ignition potential. Special consideration is required to address the actual installed conditions of the EIFS walls, by actual visual analysis/testing.
4. Combustible appendages, building architectural features, membrane structures, awnings, canopies, cabanas, etc, are to be evaluated for ignition potentials.
5. Openings into the buildings, i.e. exterior vents and HVAC shall be addressed. Burning material, fireworks fumes and smoke are to be considered.
6. The Fire Safety and Risk Analysis shall analyze the debris in the launch areas and requirements for mitigation of the debris.

7. Fire department response plans and emergency action plans shall be included in the Fire Safety and Risk Analysis. This report section will include, but not be limited to hazards to spectators, emergency response to fireworks operators, locations and possible obstructions to building exits and the means of egress. Delays in response due to the closure of streets are to be considered in the study. Discuss on-site fire department personnel and private fire safety measures through personnel (contract firefighters) and equipment.

Limitations, Modifications and Recommendations

1. Limitations are constraints on the fireworks operations. For instance, if the analysis shows that devices greater than 2-inch diameter are not permitted, then that is a limitation that must be presented in the report/analysis. Limitations are used where no modification is possible that would make a certain hazard to a certain exposure safe enough to allow the operation to continue.
2. Modifications are changes that can be made to operations to mitigate the hazard to subject exposures, sufficient to allow the operation to continue. For instance, if it is determined that rack fires are common, and the roof is combustible, a modification might be a requirement for non-combustible barrier of certain size between the roof and rack and placement of contract firefighters on the roof with charged lines.
3. The safety professionals shall present recommendations for limitations and modifications to the planned fireworks displays according to their findings. These are to be identified as specific to each venue and general, applicable to each venue.

The analysis of buildings, facilities and fireworks display will be considered valid for a maximum of five (5) years provided that significant modifications have not been implemented that would adversely affect fire and personnel safety.