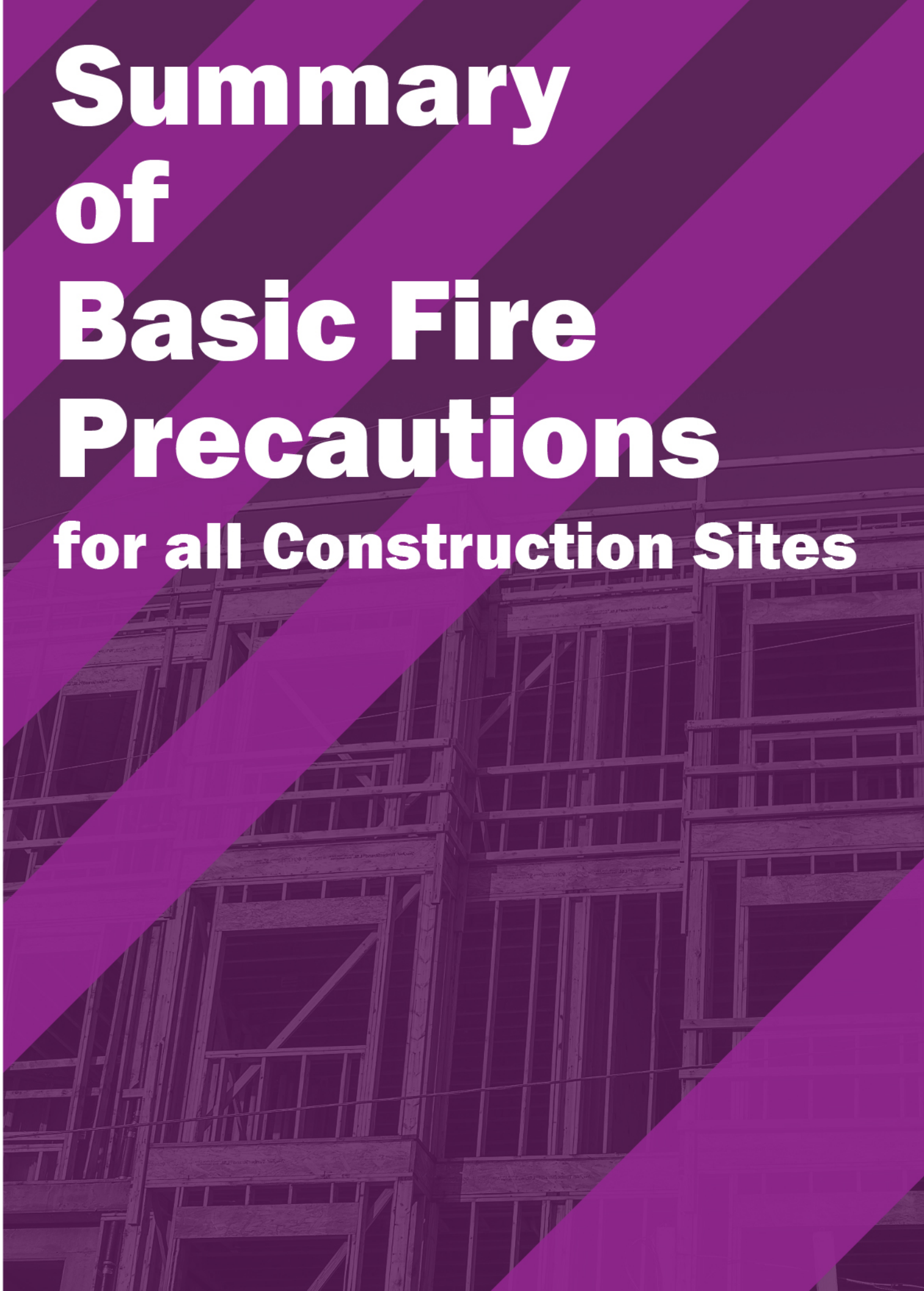
CONSTRUCTION FIRE SAFETY COALITION

Summary of Basic Fire Precautions

for all Construction Sites



Summary

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Basic Fire Precautions for all Construction Sites

The following is a summary of best management practices designed to reduce the probability and the severity of the fire occurring when a building is still under construction. This is a matrix that combines various code provisions, and the use of NFPA standards to develop a process of best practices.

The matrix is based on the assumption that every location in the United States operates under a model code of some type. The process is not the code and the code is not the process. This matrix identifies a flow of events and activities that is based upon best practices. For purposes of reference of the users of the matrix should be familiar with model code process and their state and the use of NFPA standards which may be adopted or cited as reference material. See website http://catalog.nfpa.org/Complete-List-of-Codes-and-Standards-C182.aspx

Guidance	Activity
This **workbook and check sheet** applies to structures that are in various stages of construction. During focus group discussions addressing fire safety in construction there was no discernible distinction made between lightweight wood frame construction and other heavier dimensional wood building styles. All were generally categorized together as combustible construction. The major concern is not about the type of construction is on the prevention and containment of fires	There are three international code documents that apply to this area. They are the International Fire Code, the International Building code and NFPA 1. All three establish that NFPA Standard 241 is to be used as guidance for items not specifically addressed in this check sheet. These documents are fundamental to the process of preventing fires in buildings under construction.
Precaution against fires should be considered at the outset of the design stage and well before any work on a building starts. These precautions have to continue until the building is complete and has a certificate of occupancy. Moreover, basic precautions of fire should continue once the building is occupied. Materials, methods of construction and site processes should be selected to minimize fire risk. Any design and specification changes which may have an impact on fire risk may be carefully	Reference – Section 1408 – Owner's Responsibility for Fire Protection - International Fire Code The owner of the building should designate a person to be the Fire Prevention Program Superintendent Drawing up of the fire plan should remain under review at every stage of the project. The principal contractor should work closely with both subcontractors and the local authority having jurisdiction. The timber frame supplier should be oriented towards providing necessary fire precautions. The stage at which buildings are at their most

considered. Reducing the risks is particularly important when there are constraints which cannot be removed such as location of the site and access to it	vulnerable the fire spread is when they are approaching completion, but still have critical fire protection features that are not in service. For example fire Sprinklers may not be activated. In built-up areas, adjacent properties should be considered and addressed with respect to potential fire spread to exposures
Adopt a Code of Safe Practices for the Company	This is an element of the Safety Program. Provide adequate training for employees and require a receipt by the employees that they have been exposed to the materials. Samples of this type of document are available on website
Liaison with the fire department – before any specific project begins meet with the local fire service to provide them with information regarding the project. They will have an interest in several components of the process of construction.	Provide the fire authority with a map of the general site. Discuss with them access to the site, and access to the building. Discuss location a private and public fire hydrants discuss with them security measures and emergency procedure for notification discuss locations of both sprinkler and standpipe connections discuss with them various aspects of the water supply.
The company should start the development of the **fire plan** as quickly as possible.	The fire plan should be court needed with the authority having jurisdiction. The fire prevention program manager should conduct the daily site inspection to verify that the plan is being followed. This would include but not be limited to all the provisions identified in the fire code, building code, and NFPA standards
A detailed **fire risk assessment** and identification of required controls needs to be developed from the outset of the project. Identifying the various stages and activities which will give rise to critical activity needs to be conducted	Reference - NFPA Standard 241 The risk assessment document should be shared with all appropriate parties.
A high degree of communications and cooperation is required between all parties, including the principal and the subcontractors in order to assure that adequate controls are in place at all times	Regularly scheduled meetings, conferences and an established communications process needs to be developed and executed.
Reducing the amount of combustible material on-site is difficult at best. During the design stage any consideration for limiting storage should be defined and instructions for proper placement stated.	Identify how storage will occur on-site. This could include but not be limited to restrictions on how high piles of combustible material may be, the need to provide periodic cleanup of weeds and grass that may grow under the combustible material, the distance that the material may be stored from the building and any security precautions regarding prevention of theft and

	vandalism
Plan to reduce storage of combustible materials by using-just in time ordering.	Storage of flammable and combustible materials must be especially considered and all necessary controls put in place
Good housekeeping is absolutely essential-untidy worksites are usually unsafe. Materials such as timber become a lot more vulnerable if there are waste materials, such as shavings, wrapping, and other materials are left lying around. Regularly scheduled disposal of rubbish from active areas of construction will help to prevent an accidental fire starting. Keeping rubbish away from worksites also diminishes the ability of vandalism or arson.	Reference IFC section 1408.2 - The fire chief and the building owner shall develop and maintain a fire plan that addresses housekeeping issues. NFPA 241 stipulates that more frequent removal rates may be needed for safe operations depending upon the type of activity. Containers that are used for trash and waste, especially those dealing with oily flammable or hazardous-waste must be properly designed. Garbage and other waste should be dispensed with daily
Control of **flammable liquids and gases** is absolutely essential. Gases and liquids can go beyond the area of their storage. Once involved in fire they require appropriate actions to be taken. Therefore, all forms of flammable liquids and gases should be stored in utilized in a safe fashion. Transferring fuels into tools and equipment that operate in the area of hot work must be handled very carefully. Fuels for generators and tools should be in a safe area far away from combustible materials	Reference Section 1405, 1406 and 1407 IFC. The code spells out very specific requirements for flammable and combustible liquids, flammable gases and explosive materials. In addition there are several NFPA standards that provide best management practices for the handling of these materials. Attention should be given to NFPA 51B - Standard for Fire Prevention during Welding, cutting and Other Hot Work. Individual operators should be held accountable to assure that these practices are adhered to.
There are a variety of reasons why **temporary heating equipment** must be utilized in buildings during construction. Failure to properly install, supervise and/or maintain temporary heating equipment can provide scenarios resulting in a fire	Reference Section 1403, IFC all temporary heating devices should be listed and labeled in accordance with the international mechanical code by the international fool your code. In addition conformance with NFPA standards is appropriate. The fire plan should include the fact that any temporary heating equipment is to be supervised and maintained only by competent personnel.
All **Ignition sources** are to be considered and eliminated whenever possible. This would include Smoking, open burning, concern about spontaneous ignition, cutting and welding and electrical sources.	Reference Section 1404, IFC The fire plan should address the elimination of all heat sources whenever possible. This is a separate activity from supervising hot work.

	No smoking signs and a written policy for a smoking ban should be vigorously enforced by the principal contractor. There should be a high standard of discipline to assure that any smoking materials are kept away from areas where combustible materials are present
If **smoking** is going to be provided for anywhere on the worksite the designated area should be designed and approved by the fire prevention coordinator	1. Use noncombustible construction for any enclosure or seeding 2. Provide adequate separation from all combustible areas 3. Posts signs indicating that smoking is permitted within a specific parameter F4.Provide visible marking of the designated smoking area boundary 5. Provide adequate receptacles for the collection of discarded smoking materials
Hot works are to be carefully planned and executed (Reference 1408.5 IFC, as well as Chapter 26 UBC The superintendent of the site is responsible for supervising the permit system.	There are very specific practices that are required when an employee is performing hot work. It is very critical that there be a strict policy of compliance with acceptable practices. This means a zero-tolerance for any violation of any safety practice. All areas in which hot work is being performed must be actively monitored. The code sets a minimum period of time, but smoldering fires can occur any time after that. Also, if possible hot work should be done during the early portion of the day. Leaving a minimum of two hours between completion of hot work and end of the work shift the labor force
The superintendent should try to eliminate **Hot Work** as far as possible. If assembly work can be done off-site or can be moved to a safer site of this action should be taken	It should be the goal of all duty holders, such as designers principal contractors and subcontractors to design out hot works in any vulnerable areas of high risk buildings.
Electrical equipment properly designed and used in accordance with manufacturer's specifications is usually safe. However temporary wiring lighting installations and damaged equipment have been known to cause fires	The best Reference for this is either the ICC or National Electrical Code (NEC) from the NFPA competent person doing hot work should perform routine inspection of all electrical equipment to assure that it is not being overloaded or that there is damage to the wiring. Inspections it should be conducted to assure that all wiring components in hazardous locations are properly maintained in a dust-tight, dust-ignition-proof, or explosion-proof assembly. There should be no loose or missing

	screws, gaskets, threaded connections, seals or any other impairments to making sure that electrical equipment will not malfunction
One of the most difficult areas of prevention is to deal with the subject of **arson and in some cases of vandalism**. For a variety of reasons buildings of this nature are attacked by vandals or arsonists. Therefore, security has to be appropriate to the location of the site. Keeping the site as clean as possible and having a disciplined approach to fire watch and security will often prevent the vandalism activities	security is a variable. The fire plan should take into consideration what is required in the way of fencing, signage, light control, closed circuit television, and actual watchmen. The size of the site may determine how extensive security needs to be. Nighttime security should be Informed of any hot work that was done in the previous shift.
Open fires should be avoided at all costs. Reference section 1403.3 and section 307 of the IFC	The fire plan should have provisions for the elimination of all waste materials. They should be removed from the site . In high-risk buildings open flame should be totally eliminated
Site inspections to conduct the a review of how fire prevention is impacting the work area need to be conducted frequently.	The fire prevention program manager must be authorized to pursue fire protection deficiencies immediately. This person should interface closely with fire and building inspectors to assure conformance
Water supply is an issue for both the developer and the fire department. Coordination with water departments and public utility organizations often results in the water system being in various stages of availability. One of the most critical stages of water supply is just before the building is completed. This is because this is the timeframe in which sprinklers and fire hydrants can be compromised because they had have not been approved	Water supply should be available for emergency operations as soon as any combustible material is bought on-site hydrant location should be carefully coordinated with the authority having jurisdiction and they should be properly protected against parking or other blockage they could deny fire department access. All fire department connections should be free from obstruction and readily visible during the process of construction
Access to the site is very important for both the developer and the local fire agency. This can easily be compromised on a daily basis by the delivery of materials to the site.	Provide a process to assure that parking and movement of heavy equipment, including areas where combustibles are being stored do not interfere with access by firefighting apparatus.
Fire warning systems are needed on all sites. The actual type of alarm can range from manually activated devices to sophisticated automatic systems, including visible warning devices. Whatever system is chosen, make sure that: is appropriate for the size of the building, including the number of stories and complexity of the structure you can be heard by everyone working on the site over normal background noise; it is located so they can be activated immediately.	Fire extinguishers and other mechanisms to control fire should be incorporated in the plan. Fire station location should be examined during the planning phase to see how long the response time might be. Signage should be located an appropriate sites in accordance with NFPA 10. All extinguishers should be appropriate for the risk they are attempting to protect. This is in reference to class a, B C, and D fire classifications. Extinguishers should be serviced and maintained by competent individuals

Manual bells are klaxon's should only be used on very small sites on complex multistory buildings the alarm should have an appropriate interconnected alarm to assure that the entire site is notified and emergency is in progress lastly, everything should be done to make sure that there is never a delay of alarm when an event occurs. The average fire department is going to take 5 to 6 minutes to get to the scene of the emergency. A small fire, with access to combustible materials can grow on very small to catastrophic proportions in those same six minutes	Note: any individual carrying out hot work should have their own fire extinguisher with them and be properly trained to utilize them
If an emergency occurs all of this planning will be compressed into a period of time when the fire starts until it is under control. The objective of the fire plan is to make sure that that timeframe is a short possible. As noted previously the emergency plan may range from simple to complex depending upon the site. High-risk sites require careful and detailed consideration of what happens if a fire does occur: the emergency plan, which should be developed and distributed before actual work starts must be comprehensive and easily executed. A responsible person must be designated to ensure that these these fire precautions are in place; as construction progresses the plan must consider possible changes in planned activities if a fire does occur staff must know what they need to do and what they are not supposed to do. If emphasis needs to be placed on the fact that any delay in getting emergency services personnel on the scene can be catastrophic site managers need to make sure that everyone(including visitors) on their sites know what to do. On larger high risk of sites fire drills may even be appropriate: fire drills, which are an important check for the principal contract on whether induction and fire safety plans really work and training for foresight workers is a form of assessment that should be considered fire action notices, we should be clearly displayed where everyone on the site can see them, should provide direction to all personnel on how to	

evacuate and assemble. On larger and complex sites foreman and fire wardens might need to be designated to oversee the evacuation process there should be very specific arrangements to engage in liaison with emergency services personnel once they arrive on scene. There should be information and support from the construction site to aid the incident commander and his job should be arrangements to ensure instruction, information and training for all personnel who work on the site `	