

Construction Hazards

Know the risks... and take steps to mitigate them



Whether your organization is looking to build a new facility, add space to an existing structure or simply undertake roof repairs, it is extremely important to understand the risks associated with construction and take appropriate steps to mitigate them. The fact is, whatever the size or scope of your project, if the risks are not identified and managed and a loss does occur, the results can be devastating: personal injury, extensive property damage or total loss, significant legal and financial liabilities, business and/or service interruption, and reputational harm.

Planning for systematic risk management should be an integral part of the initial preparation and budgeting process for construction projects of all sizes. Procedures and standards should be clearly defined and adequate resources allotted to the prevention of fires and construction-related accidents. Most importantly, detailed quality control measures – along with who is responsible for implementing them – must be outlined in any contract.

Contractors... contracts... liabilities

'Investigate before you invest' is the best rule of thumb before engaging any contractor or trade. Check all references, speak to past clients, make sure that the contractor is licensed and bonded. Once you are satisfied with their credentials, craft a precisely worded contract that defines the contractor's obligations to the job and to the various sub-trades they will hire.

For a large project, it is advisable to get professional help with the contract – your lawyer, engineer, architect, insurance provider.

Proof of insurance

In the event of an injury or damage to your property, uninsured contractors can expose your organization to significant financial risk. Therefore, the contract should require the contractor to a) carry public liability insurance and property damage coverage to protect the contractor and all subcontractors on the

job, and b) provide proof of insurance in the form of a certificate naming your organization as 'an additional insured in relation to the project'. Should a claim be made against your organization resulting from the contractor's operations, being an 'additional insured' enables you to look to the contractor's insurance policy to respond.

The contract should include a clause that indemnifies and holds harmless your board, employees and volunteers from liability for claims and allegations of negligence of the contractor. Adequate limits are required and confirmation that the policy is current and will remain in force during the project can be satisfied through a Certificate of Insurance provided by the contractor's insurer.

Since vandals often target construction sites, the contract should also be very clear about the steps the contractor must take to maintain site security–

Ontario 2018: a fire caused by spontaneous combustion resulted in extensive interior damage to the roof and interior architecture of a century-old chapel.

The source? A pile of oily rags left by a workman.

Nova Scotia 2020: a raging fire destroyed a 170-year-old wooden church.

The source? External roof repair that involved hot work.

perimeter fencing, night watch service, etc. This is especially important when the site adjoins public walkways or parks that may embolden trespassers.

Workplace safety insurance

Make sure that your contractor has workplace safety insurance as required by your provincial government agency and that work is done safely and according to the health and safety legislation in your jurisdiction. For example, if you are located in Ontario, a valid clearance number issued by the Workplace Safety and Insurance Board (WSIB) must be in place before the work starts. A Clearance Certificate proves that a contractor is registered with the WSIB and that their account is in good standing. Ask your contractor to provide a Clearance Certificate and make sure that it is valid for the duration of the work. For requirements in other provinces, consult the Workers Compensation Board in your province or territory. See Appendix A for a complete list.

Fire: the most dangerous construction hazard

Construction-related fires are far more common than one would expect. Many have devastating consequences – personal injuries, severely damaged or completely destroyed properties, and equipment that is rendered inoperable. In recent years, we have witnessed the complete destruction of irreplaceable heritage buildings.

As construction work progresses, there is a daily accumulation of highly combustible material – wooden forms and scaffolding, scrap lumber, and paper and plastic packing. When combustible material comes into contact with ignition sources like temporary heaters and lights, roofers' tar kettles and heating guns, carelessly discarded matches or cigarettes, the results often spell disaster. When oil or solvent-soaked rags are left in a pile and unattended over a period of time, spontaneous combustion can cause a raging fire. The same is true for equipment that is poorly maintained – for example, overloaded temporary electrical equipment, damaged cables, welding equipment, etc.



'Hot Work' Operations

Hot work operations – procedures that involve the application of heat – are one of the most common causes of a fire loss, especially when appropriate precautions have not been taken. Hot work includes general roofing using blowtorches or lead heaters; soldering; welding; lead or pipe work; any work that involves grinding wheels and cutting discs; and activities involving the use of gases or flammable liquids.

It is always best to find alternate procedures that do not involve the application of heat. However, if hot work is unavoidable, the following safeguards will go a long way towards managing the risks:

1. The person who authorizes hot work – e.g. maintenance person or facilities manager – must be familiar with the hazards and be prepared to monitor the work, ensure compliance with fire protection measures and inspect the site on a daily basis.
2. A **hot work permit** must be issued before work can commence. The permit should include such details as the type of work; location; the time period allotted; completion date; a "final check"

In Ontario, Bill 119 – *the Workplace Safety and Insurance Amendment Act, 2008* – specifies that the person hiring a contractor or subcontractor must make sure that the hired party complies with all payment obligations under the Act. In cases of non-payment or non-compliance, the hiring party may become liable.

time; and a checklist of precautions to be carried out. Permits should not be issued for a protracted period. Where work extends beyond a single shift, a new permit should be issued.

3. Completion of the hot work checklist should be a mandatory requirement in order for the permit to be issued. It should include fire protection measures – for example, dry chemical fire extinguishers in good working order and easily accessible, a trained person to provide a continuous fire watch. It should also include precautions to be taken in the areas surrounding the work – for example, removal of all combustible material within 10 meters of the work site; using non-combustible or purpose made blankets, drapes or screens to cover walls, partitions and other surfaces that are combustible. For Hot Work Permit details and procedures visit <http://www.ecclesiastical.ca/2012/hot-work-permit/>
4. You or the general contractor, if you have appointed one, must assume responsibility for ensuring that fire protection equipment, procedures and protocols are in place prior to the start of hot work (or, for that matter, any type of construction).
5. Written emergency procedures should be displayed in prominent locations around the construction site. Appropriate signage should be posted to indicate the location of fire protection equipment. And, the local fire department should be invited to tour the site as soon as reasonably possible.

Flammable Liquids

Large quantities of paint, solvents, gasoline and diesel fuel and asphalt for roofing operations may be present on construction sites. When not in use during a shift, they should always be stored in a separate, detached non-combustible and well ventilated structure away from the main building. Handle low flashpoint flammable liquids such as gasoline and alcohol in maximum 5 gallon ULC listed or FM approved safety cans.

Portable Heaters

Portable heaters – in particular heaters that produce an open flame or that use waste materials

or flammable liquids as a fuel source – should not be used. Steam heaters are the preferred heating method. However, if portable liquefied petroleum (LPG) fired heaters must be used, the following precautions should be taken:

1. Position heaters in a clear space at least 1 meter away from any combustible materials.
2. Do not place heaters in high traffic areas where an impact could cause the heater to overturn.
3. Avoid trailing gas line hoses to heaters where they could be subject to mechanical damage or cause a potential trip hazard.
4. Maintain adequate ventilation in any area that permits the use of portable heating.
5. Use only heaters that are CSA (Canadian Standards Association) stamped and listed by the Underwriters Laboratories of Canada (ULC)



Demolition

Demolition work is an inherently hazardous activity requiring that the employer and/or contractor develop and implement safe working procedures for all demolition work. This includes but is not limited to the following:

1. All work is carried out in accordance with CSA Standard S350 – M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
2. Before any demolition work begins, all hazardous substances – including asbestos, tanks, wells, piping systems, flammable or explosive materials or gas cylinders – are removed from the building or structure being demolished.
3. Except for any water supplies required for fire-fighting purposes, all building services are shut off and gas and fuel lines are suitably capped.

4. All temporary electrical installations are installed in compliance with provincial or local enforcing authorities regulations and requirements.
5. The demolition site is free from unauthorized persons and is securely fenced to prevent any unauthorized access.
6. Where part of a building continues to be occupied or the existing structure is being retained, this part is separated from the section being demolished by a fire separation having a fire resistance of not less than 1 hour.

National and Provincial Fire Codes

The National Fire Code of Canada (NFC) provides minimum fire safety requirements for buildings, structures and areas where hazardous materials are used, and addresses fire protection and fire prevention in the ongoing operation of buildings and facilities. Both national and some provincial fire codes also require that fire safety be practiced during the demolition of buildings. The National Fire Protection Association’s ‘Standard for Safeguarding Construction, Alteration and Demolition Operations’ (NFPA 241) and ‘Building Construction and Safety Code’ (NFPA 5000) have been adopted by many jurisdictions and referenced in Canadian codes.

Slip, Trip and Fall Hazards

Wet or slippery surfaces, trailing cables, debris left unchecked, lack of guardrails, weather-related hazardous conditions, poorly maintained equipment – and poorly trained workers – are among the leading causes of slips, trips and falls.

Working at height poses very serious hazards. According to statistics compiled by the Association of Workers’ Compensation Boards of Canada, there were over 11,000 falls in the construction industry in 2012 and 2013 alone. The fact is, falling from a



height of just 3 meters – about 10 feet – can result in a critical injury or fatality. Workers have to be protected by a guardrail system or some other means of fall protection. Employers/contractors must also ensure that workers are trained in the safe use of ladders, scaffolding, lifts and platforms, as well as fall prevention techniques.

Establishing safe work practices at the outset of a job... making sure that workers have the right protective equipment (e.g. work boots with solid traction)... training workers to be mindful and aware...having procedures in place whereby workers can report slip, trip and fall hazards... will go a long way towards preventing slip trip and fall accidents.

Here’s how far you can fall in just a few seconds¹

Time (seconds)	Distance (metres)	Distance (feet)
0.5	1.2	4
1	5	16
1.5	11	36
2	20	64
2.5	31	100
3	44	144
4	78	256

¹ https://www2.worksafebc.com/i/construction/Toolbox/pdfs/TG14-01_Preventing_falls.pdf

Good Housekeeping – General Oversight and Maintenance

At the end of the day, poor oversight and quality control during construction can lead to more than injuries and liabilities. They can also lead to post construction problems – for example, missing or poorly installed insulation resulting in freeze-ups, badly installed sprinkler systems which lead to malfunctions, and a host of other costly and disruptive issues.

Proper oversight and good housekeeping are among the most effective ways to manage construction risks. Best practices include:

- Safe storage of flammable and combustible material: flammable, toxic and corrosive material, and compressed gas, should be stored in containers that are designed specifically for these hazards. In addition to fire prevention, this will also reduce the risk of vandalism and arson.

- Proper waste disposal: waste and debris should be removed regularly.
- Safe access for workers and materials: stairways, scaffolding and access routes should be free of obstructions and slippery conditions. Appropriate and visible signage: signage should be posted prominently throughout the site to indicate access routes and means of egress; identify hazardous material containers; indicate wet floors; and pinpoint the location of fire protection equipment.
- On-site hazard assessment: the worksite should be inspected daily by a responsible official to ensure that good housekeeping practices are 'practiced' and that conditions and/or changing work requirements do not pose additional hazards.



Health and Safety Management

A Health and Safety Committee should be established to conduct regular tours of the site. Records should be kept of the tours and management should be copied. Risk assessments should be completed for various hazards encountered on the site. Other items to consider include sign in/sign out procedures, what personal protective equipment is required and any safety presentations, questionnaires etc. required for visitors to the site.

Conclusion

Making 'risk management' an integral part of up-front project planning and budgeting is critical. It will ensure that adequate resources, both human and financial, are committed to the prevention of construction site accidents – from fires and fire-related accidents to slips, trips and falls, and more. In the final analysis, understanding the risks associated

Incident Reporting

A formal incident reporting system should be in place. Workers should also have had first aid training and first aid kits should be readily available. There should be an appointed person to take charge in the event of a medical emergency.



with construction and doing everything possible to manage these risks enables all parties to meet their commitments, minimize negative outcomes, and complete a successful and incident-free project.

Appendix A

Provincial Workers' Compensation Boards

Alberta: Workers' Compensation Board of Alberta
<http://www.wcb.ab.ca>

British Columbia: WorkSafeBC (Workers' Compensation Board of British Columbia)
<http://www.worksafebc.com>

Manitoba: Workers Compensation Board of Manitoba
<http://www.wcb.mb.ca>

New Brunswick: WorkSafeNB
<http://www.worksafenb.ca/>

Newfoundland and Labrador: Workplace Health, Safety & Compensation Commission of Newfoundland and Labrador
<http://www.whscc.nf.ca/>

Northwest Territories and Nunavut: Workers' Compensation Board of the Northwest Territories and Nunavut
<http://www.wssc.nt.ca/>; Iqaluit <http://www.wcb.nt.ca>

Nova Scotia: Workers' Compensation Board of Nova Scotia
<http://www.wcb.ns.ca>

Ontario: Workplace Safety and Insurance Board
<http://www.wsib.on.ca>

Prince Edward Island: Workers' Compensation Board of Prince Edward Island
<http://www.wcb.pe.ca>

Quebec: Commission de la santé et de la sécurité du travail du Québec (CSST) (Occupational Health and Safety Commission)
<http://www.csst.qc.ca/portail/fr/>

Saskatchewan: Saskatchewan Workers' Compensation Board
<http://www.wcbsask.com>

Yukon: Yukon Workers' Compensation, Health and Safety Board
<http://wcb.yk.ca/>

References

1. Canadian Centre for Occupational Health and Safety <http://www.ccohs.ca>
2. Ontario Ministry of Labour: <http://www.labour.gov.on.ca>
3. WorkSafe BC: <http://www.worksafebc.com>
4. Work Safe Alberta: <http://work.alberta.ca>
5. Occupational Health and Safety Administration, U.S. Department of Labor: <https://www.osha.gov>

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