



BUILDINGS BULLETIN 2015-029

Operational

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Purpose: This document clarifies the planning required for construction sites to prepare for high-wind events.

Related Code/Zoning Section(s):	BC 1601.1	BC 1604.1	BC 1609.1	BC 1618.3
	BC 1906.1	BC 2104.6	BC 2205.6.4.4	BC 3303
	BC 3301.1.1	BC 3301.2	BC 3304	BC 3305.2
	BC 3305.3	BC 3307.6	BC 3307.7	BC 3308
	BC 3309.10	BC 3314	BC 3316	BC 3319
	RS 19-2			

Subject(s): Extreme weather, construction sites; Construction site, preparation; Preparing construction sites for extreme weather; inclement weather; pre-storm planning; high wind

This bulletin applies to construction sites and activities covered by the 2014 Code. For 2008 Code projects, please see Buildings Bulletin 2013-011.

Contractors are responsible for maintaining their construction sites in a safe and lawful manner at all times – including during inclement weather conditions. Contractors are responsible for monitoring weather predictions, including wind, by meteorological stations and DOB Weather Advisories.

Contractors must properly secure and prepare construction sites for extreme weather, including high-wind events – when sustained winds are predicted to reach or exceed 60 miles per hour, or when ordered to do so by the Buildings Commissioner – to ensure public safety and protect adjoining property.

Contractors and construction site managers must have a high-wind preparedness plan that details how they will prepare, secure, and protect their construction sites from high wind. The scope of the high-wind preparedness plan should, at a minimum, cover the following areas:

- Proper task planning;
- Pre-storm preparation;
- An emergency response team; and
- Post-storm inspection and repair procedures on construction sites.

The details contained in the high-wind preparedness plan should include, at a minimum, the following items, which include verifying that daily housekeeping requirements have been executed prior to shutting down the site, as well as executing specific actions in advance of high-wind conditions:

1. General Construction

1.1 Storage of Construction Materials / Debris

BC §3303 Safeguards and Maintenance of Site

- a. Materials and debris shall not be stored closer than 10 feet to the perimeter of the building, unless the perimeter is permanently enclosed, or full height (slab-to-slab) vertical cabling and netting are installed.
- b. Material and debris shall be banded and tied down to prevent dislodgment by wind, regardless of the material and debris' location on floor or site.
- c. No material (form work, shores, reshores) shall project over the perimeter of the building.
- d. Material/debris shall be removed from roofs and setbacks.
- e. Hole covers (in floors) shall be properly fastened.

1.2 Masonry Walls Under Construction or Repair

BC §2104.6 Masonry construction bracing; American Concrete Institute 530.1 §3.3F Bracing of Masonry

- a. Masonry that is under construction or demolition shall be shored and braced to prevent collapse under wind load. Shoring of masonry shall take into account the size (thickness) of the wall, the height of the wall, and the condition (strength gain in time) of mortar and grout.
- b. Special attention shall be given to masonry along the leading edge of the building that is above pedestrian right-of-way.
- c. Protect and cover against water infiltration of all unfinished or open masonry under construction or repair.

1.3 Steel Frame

BC §3305.2 Structural steel assembly.

- a. Frame, brace, and/or shore all structural steel frames and light-gauge frame.
- b. Secure planks and metal deck to supporting structure with positive attachments (nails, bolts, welds).

1.4. Wood Floor and Roofing

BC Chapter 23 Wood; American Forest & Paper Association National Design Standard National Design Specification (AF&PA NDS) §1.2.2

- a. Secure planks, plywood, and roofing to the supporting structure with positive attachments (nails, bolts, welds).
- b. In limited cases and only with an engineer's direction, prevent uplift by weighing down with bags of sand or brick pallets. These bags or pallets need to be solidly packaged so they will not fall apart under wind and rain.

1.5 Unfinished Building Enclosures

Stop installation of enclosures well in advance of wind event. Brace and shore.

1.6 Concrete Construction

See instruction at 2.2 for formwork and reshores.

2. Temporary Installations for Construction

BC §1601.1 Scope; BC §1604.1 General; BC §1609.1 Applications; BC §1618.3 Action plan;

- a. Temporary installations must be designed for wind; when using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.
- b. Nailed or bolted connections in temporary installations – including but not limited to sidewalk sheds, fences, netting, guardrails, formwork, “cocoon” systems, and climbing formwork – should be proportioned to safely sustain all wind-load effects. Nailing schedules should be proportioned for wet wood conditions. Friction connections should not be relied upon unless the down-weight provides a factor of safety of four (in wet conditions).
- c. Special attention shall be provided to adequate wind bracing and the transfer of these wind forces to braces and to their anchorage.
- d. Remove any add-ons and temporary structures that were not engineered, including any mock-ups.
- e. When the manufacturer does not specifically indicate that prefabricated proprietary installation or modular installation was designed for construction loads that include wind effects (at levels prescribed in the NYC Building Code), such installation may be used only when additional design is provided for local wind conditions.
- f. The contractor shall be familiar with the installation and implement all indicated manufacturer instructions.

2.1 Perimeter Netting, Guardrails, Cocoon

BC §3308 Protection of Unenclosed Perimeters

- a. Horizontal netting shall be cleaned of debris, retracted, and properly secured.
- b. All vertical perimeter netting, cabling, and guard rails shall be inspected and properly secured.
- c. “Cocoon” systems and climbing formwork shall be properly secured according to the manufacturer and/or engineer of record's recommendations for high wind.
- d. “Cocoon” systems should be proportioned to account for all potential wind effects (in any horizontal or vertical direction), including increases in wind load due to increase in elevation or specific building exposure.
- e. When using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.

2.2 Concrete Formwork

BC §1906.1 Formwork; BC §3305.3 Concrete formwork

- a. Remove any concrete formwork that is not weighted down by concrete. Consult with engineer.
- b. The formwork should be proportioned to account for all potential wind effects (in any horizontal or vertical direction), including increases in wind load due to increase in elevation or specific building exposure.
- c. Nailed or bolted connections should be proportioned to safely sustain all wind-load effects. Nailing schedules should be proportioned for wet wood conditions. Friction connections should not be relied on unless the down-weight provides a factor of safety of four (in wet conditions).
- d. Special attention shall be provided to adequate wind bracing and the transfer of these wind forces to braces and to their anchorage.
- e. Special consideration shall be provided to securing perimeter decking against uplift. Horizontal formwork deck panels and beam formwork located within 16 feet of the building perimeter shall, at a minimum, be positively attached to all formwork support systems.

- f. Reshores in close proximity (within 10 feet/3048 mm) of an unenclosed building perimeter shall be secured to prevent the reshores from falling off the building.
- g. Wedges shall not be used within 10 feet (3048 mm) of the façade or at such other locations as determined by the Commissioner.

2.3 Supported Scaffolds

BC §3314 Scaffolds

- a. Material/debris to be removed from scaffolds.
- b. Tiebacks to building shall be checked and properly secured.
- c. Planking shall be removed or properly fastened to prevent dislodgment.
- d. Netting shall be properly secured. Fully netted scaffolds (all floors) may require removal of netting or the cutting of holes in netting to reduce wind load. Consult the applicant of record for scaffold.
- e. When using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.

2.4 Construction Fences and Barriers

BC §3307.7 Fences

- a. Brace and secure all construction fences.
- b. Increase attachment of plywood to connection and supporting lumber.
- c. Secure construction barriers.
- d. When using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.

2.5 Excavation, SOE, Underpinning

BC §3304 Soil and Foundation Work

- a. Inspect excavation pre- and post-storm.
- b. Complete all SOE shoring systems in accordance with plans if time allows, or provide stable, benched berms (no less than 1:1 slope effective, or in accordance with recommendations by the engineer of record).
- c. Complete all excavated underpinning pits and transfer load. Secure pins against lateral displacement by means of shoring, tiebacks, benching and berming, in accordance with recommendations by the engineer of record.
- d. If water table has been drawn down, make provision for maintaining ongoing dewatering systems throughout the storm, including use of back-up generators. Do not cease ongoing dewatering unless recommended by the engineer of record.

2.6 Sidewalk Sheds

BC §3307.6 Sidewalk sheds

- a. Remove material and debris from deck.
- b. Secure deck planking against dislodgment.
- c. Secure deck parapet (side deck enclosure), which is particularly vulnerable to displacement in high winds.
- d. Consider lateral and uplift bracing of particularly tall or narrow sidewalk sheds. Consult with the applicant of record.
- e. When using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.

2.7 Roof Protection

BC §3309.10 Protection of roofs

- a. Adjoining property roof protections must be secured and inspected to ensure such roof protective measures are secured.

3. Material and Personnel Hoisting Equipment

3.1 Cranes

BC §3319 Cranes and Derricks; Reference Standard 19-2 Power-operated Cranes and Derricks

- a. The crane engineer of record and contractor must follow the pre-storm procedures that are part of the approved plans and secure the crane as per those plans. Contractors shall confirm to the crane engineer of record that their equipment has been made safe and that all pre-storm procedures have been implemented as outlined in the approved plans.

3.1.1 Mobile Cranes

- a. Telescopic Cranes: retract boom, stow jibs, retract outriggers, then store and secure crane.
- b. Crawler Cranes: lower boom to ground or otherwise fasten securely against displacement, and secure body of crane from displacement as per engineer or manufacturer recommendations.

3.1.2 Tower Cranes and Derricks

- a. Execute the pre-storm plan; when using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.
- b. Weather Vane Mode: release slew brake and verify (provided that site surroundings permit weather vane mode). Follow the engineer of record's specific instructions.
- c. Trolley: position in inner position.
- d. Tie-ins: check collars and ties as well as all connections. Verify the need to release tie-ins with the engineer of record.
- e. Pre-storm Inspection: check all base, mast, and boom connections.
- f. Climb Frame: position lowest possible (unless otherwise recommended by manufacturer).
- g. Hook: raise with no load.
- h. Foundation: provide protection surrounding mast base and ensure sufficient drainage.

3.2 Construction Hoists

BC §3316 Hoisting Equipment; BC §3317 Material Hoists and Bucket Hoists; BC §3318 Personnel Hoists

- a. Properly secure mast connections, overhead protection, nettings, cat head, outriggers, and landing plates.
- b. Remove any loose debris from car top, inside cab, landing, and surrounding areas.
- c. Properly secure hoist cab and counterweight as per manufacturer's (storm) recommendation.
- d. Shut off electrical power to hoist.
- e. When using wind load reductions, comply with the provisions of the action plan; see instruction 4 for further information.

3.3 Suspended Scaffolds and Unguided Material Hoist

BC §3314 Scaffolds

- a. Suspended scaffold rigs shall be lowered to sidewalk sheds or adequate set back and properly secured. All rope (wire and otherwise), along with lifelines, shall be removed or secured to prevent rope from displacing and damaging building or breaking windows.
- b. Shut off electrical power to scaffold hoist motors.
- c. C-hooks shall be removed.
- d. Outrigger beams shall be removed or secured against displacement.
- e. Unguided material hoist shall be secured, wire rope removed, electrical supply shut off.

4. Action Plan

BC §1618.3 Action plan

In addition to items 1 through 3, high-wind preparedness plans shall incorporate the requirements of an “action plan,” in accordance with BC 1618.3, for temporary structures designed for wind speeds lower than the basic wind speed of 98 mph as required by BC 1609.3. Depending on the types and number of temporary structures at each site, multiple action plans may be required and shall each be incorporated into the high-wind preparedness plan as well as implemented for the temporary structure as specified on the plans. The contractor is responsible to monitor that the required parties responsible to implement the action plan do so. Action plans shall at a minimum include the following:

- a. Temporary construction, including but not limited to cranes, scaffolds, sidewalk sheds, fences, formwork, and bracing systems that use design environmental load reductions, are required to possess an action plan. The action plan shall be kept as a standalone document at the site, and it shall be accessible to the commissioner upon request. The provisions of the action plan shall also be incorporated into the high-wind preparedness plan.
- b. At a minimum, the action plan shall be able to be implemented within one day’s notice or less as appropriate for the actions, and shall include the following:
 - Threshold of predicted environmental loads;
 - Method of monitoring environmental loads;
 - Party responsible for monitoring loads and determining implementation of action plan;
 - Party responsible for effectuating the action plan;
 - Evacuation procedures;
 - Safety zone, standoff distance or standoff perimeter as appropriate. Safety zone, standoff distance or standoff perimeter shall not extend beyond the property line;
 - Any other activities, such as the addition or removal of structural and/or nonstructural elements, removal of loads or creating sacrificial elements so that the structure may resist unreduced forces as required for permanent structures;
 - Plans to prevent wind-born debris; and
 - Verification that the design and procedures shall not adversely impact other structures.