
	<b>Steel erection and dismantling Guideline</b> <b>NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>00</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

Vale North Atlantic Project Group


## Steel Erection and Dismantling Guideline

Issue date: May, 2021  
 Version: 0.0


	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

## Table of Contents

<b>1.0 Purpose &amp; Scope .....</b>	<b>4</b>
<b>2.0 INSTRUCTION .....</b>	<b>4</b>
<b>2.1 Steel Erection.....</b>	<b>4</b>
2.1.1 Notifications .....	7
<b>2.2 Column Anchorage.....</b>	<b>7</b>
<b>2.3 Beams and Columns .....</b>	<b>7</b>
<b>2.4 Walking/Working Surfaces.....</b>	<b>8</b>
<b>2.5 Column Splices.....</b>	<b>8</b>
<b>2.6 Perimeter Columns.....</b>	<b>8</b>
<b>2.7 Open Web Steel Joists .....</b>	<b>9</b>
<b>2.8 Systems-Engineered Metal Buildings .....</b>	<b>10</b>
<b>2.9 General Requirements .....</b>	<b>11</b>
2.9.1 Exclusion Zone. ....	11
<b>2.10 Fall Prevention/Protection during Steel Erection/Dismantling.....</b>	<b>12</b>
2.10.1 Steel Erection and Dismantling Operations .....	12
2.10.2 Custody of Fall Protection .....	14
2.10.3 Walking/Working Surfaces .....	14
<b>2.11 Overhead Hoisting Operations .....</b>	<b>15</b>
2.11.1 General.....	15
2.11.2 Hoisting, Landing, and Placing of Metal Decking Bundles.....	15
2.11.3 Landing and Placing Loads on the Structure.....	16
2.11.4 Structural Stability and Plumbing-up .....	17
2.11.5 Erection Bridging.....	17
<b>3.0 Floors, Roofs, and Metal Decking .....</b>	<b>18</b>
<b>3.1 Roof and Floor Holes and Openings.....</b>	<b>18</b>
3.1.1 Covering Roof and Floor Openings.....	19
3.1.2 Decking Gaps around Columns .....	19
3.1.3 Installation of Metal Decking .....	19
3.1.4 Derrick Floors .....	19
<b>3.2 Dismantling Steel Structures (General) .....</b>	<b>20</b>

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

<b>3.3 Erection Bridging .....</b>	<b>22</b>
<b>4.0 References .....</b>	<b>22</b>

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>	
			<b>2021-05-05</b>	
			<b>Annually</b>	
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				

## 1.0 Purpose & Scope

This guideline is to establish the minimum requirements, measures and actions to be taken when steel erection and dismantling occurs on the Project Site. It applies to all workers

As per CAR 01 – It is prohibited to exit the elevated work platform from elevation, as per CAR-05 Tag lines will be used to control all loads.

Fall protection must have trauma straps or equivalent installed as per manufacturer’s instruction.

## 2.0 INSTRUCTION


### 2.1 Steel Erection

The Contractor will provide a list of qualified and competent persons for steel erection, crane use, etc.

A description of the following list of items:

- a) of the fall protection plans and procedures to be used;
- b) A methodology of that will be used to prevent or protect from falling objects;
- c) A procedure to be used in the event of rescue or emergency response situation.

A qualified Contractor shall develop the Site-Specific Steel Erection Plan. A pre-construction conference(s) and site inspection(s) shall be held between the Contractor and NAPG Construction Lead, and others, such as the Project Engineer and Fabricator before the start of steel erection. The purpose of such conference(s) is to develop and review the Site-Specific Steel Erection Plan.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			


In developing this plan, the contractor is to consider the following elements:

The sequence of erection activity, that includes the following:

- a) Material deliveries/handling;
- b) Material staging, storage, lay downs;
- c) Coordination with other trades and construction activities;
- d) A description of the crane, derrick and or hoisting equipment selection and placement procedures, including the following:
  - i. Site survey and locates;
  - ii. Site preparation to include relevant geotechnical survey and review;
  - iii. Crane or derrick set-up including addressing overhead and underground utility interfaces;
  - iv. Path of overhead loads and;
  - v. Critical lifts: including rigging supplies and equipment;

A written description of steel erection activities and procedures including the following:

- a) Stability consideration requiring temporary bracing and guying.
- b) Erection bridging terminus points;
- c) Anchor rod (anchor bolt) notifications regarding repair, replacement and modifications;
- d) Columns and beams (including joists and purlins);
- e) Connections;
- f) Decking, coverings; and
- g) Handrail, ornamental and miscellaneous iron.
- h) Eliminate column climbing.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>	
			<b>2021-05-05</b>	
			<b>Annually</b>	
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				


A Job Hazard Analysis shall be used to sequence the execution and identify the hazards. The following issues shall be addressed at the meeting:

- a) Delivery - off-loading
- b) Placement and storage in lay down - stability of material
- c) Cranes and rigging - lift calculation forms
- d) Fall protection, types - required approvals, 100% tie-off requirement
- e) Falling objects - flagging, barricades, securing of tools/equipment
- f) Procedure to be used in the event of rescue or emergency response situation.
- g) Temporary access - ladders, stairwells, scaffolds
- h) Temporary decking and handrail requirements
- i) Erection sequence - structural members, stairwells, decking
- j) Bolting and fitting, installation of braces
- k) Temporary guying

All decking, grating, and floor coverings are to be secured when installed to prevent movement. Any incomplete areas are to be identified (signed and fully barricaded) captured in work method JHA and managed appropriately as 100% tie off work zones. Under no circumstances shall unprotected openings be left in any temporary or permanent platforms and or floors. Hard barriers of suitable type shall be used to separate opening or incomplete areas from pedestrian traffic.

Description of the method(s) of access/egress to be used initially and sequentially through the steel erection process. All temporary/permanent access stairs, landings, handrails and ladders are to be complete from the bottom up, leaving no gaps (i.e.: open landings, missing stringers or handrails). Temporary covers, handrail, stairs, ladders are to be installed to ensure safe suitable access. The erection methodology must clearly indicate this critical requirement.

Site specific erection plan is to be signed and dated by the contractor qualified person (s) responsible for its preparation, modification and execution.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

### 2.1.1 **Notifications**

Before beginning steel erection, written notifications must be obtained from the Contractor and accepted by the NAPG Construction Lead related to the following:

- a) The concrete in the footings, piers and walls, and the mortar in the masonry piers and walls have attained either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection as indicated by engineer of record.
- b) Any repairs, replacements, and modifications to the anchor rods/bolts are adequate and have been approved by the Project Structural Engineer Red lines and updated drawings submitted for record.

## 2.2 **Column Anchorage**


All columns shall be anchored by a minimum of 4 anchor rods/bolts. Columns shall be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs, which are adequate to transfer the construction loads.

All columns shall be evaluated by a competent person to determine whether guying or bracing is needed during construction. If needed, it shall be shown on the steel erection drawings and it shall be installed as per design. Only suitable wire rope with a tensioning device (turfer) is to be used to temporarily support.

Anchor rods/bolts shall not be repaired, replaced, or field modified without the approval of the Project Structural Engineer of Record. If anchor bolts have been repaired, replaced, or field modified the contractor shall provide written notification approved by Project Structural Professional Engineer of record to the Site-Specific Steel Erection Plan prior to the erection of the column.

## 2.3 **Beams and Columns**

All connection of solid web structural members shall be designed such that a minimum of two bolts per connection of the same size and strength as shown in the erection drawings for the completed joint, drawn up wrench-tight (or equivalent welding as specified by the Structural Engineer of Record) will be able to withstand the construction loads.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

If two bolts cannot withstand the construction loads, the minimum required bolting shall be specified on the erection drawings. An example where more than two bolts may be required is for the stability of cantilevered members; if additional bolts are required during erection, they shall be specified on the drawings. The one exception for the two-bolt-minimum requirement is for diagonal bracing. Diagonal bracing shall be secured by at least one bolt per connection drawn up wrench tight (or the equivalent welding as specified by the Project Structural Engineer of Record).

When double connections at columns and/or at beam webs over a column share common connection holes, at least one bolt with its wrench-tight nut shall remain connected to the first member unless a shop-attached or field attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced.

Rather than provide a seat or connection device, engineering may offset the connection points or use a clipped end connection such that at least one bolt for the double connection does not interfere with the setting of the second side of the double connection. If a seat or equivalent device is used, the member shall be designed to support the load during the double connection process.

## 2.4 Walking/Working Surfaces

To avoid tripping hazards, such as shear connectors (headed steel studs, steel bars, or steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.


## 2.5 Column Splices

Each column splice shall be designed to full member capacity or as specified by the engineer of record and indicated on the drawings. Any field modification or changes to splices must be pre-approved by Project Engineer of Record prior to modification/change.

## 2.6 Perimeter Columns

The perimeter columns should extend a minimum of 1.2 m above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructability does not allow.



	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>Public Document</b>		<b>2.0</b>	<b>Date</b>
				<b>2021-05-05</b>
				<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				

When the perimeter columns extend above the finished floor, they shall have holes or other devices in or attached to perimeter columns at 38-42inches (96-108cm) above the finished floor and at the midpoint between the finished floor and the top cable to permit installation of top and-mid rail perimeter safety cables, except where constructability does not allow. Perimeters should be protected by suitable means (fencing, temporary handrail, etc.) if safety cables cannot be installed. Perimeter cables shall be at least 10mm in diameter. Perimeter cables require a turn buckle or similar tensioning device to be installed and tightened to eliminate deflection of the cable beyond the edge of the work surface should a load of 670 Newton's laterally and/or 450 vertical downward be applied. It must have additional vertical separators at intervals of not more than 2.4m and horizontal support at intervals of not more than 9m.

In multi-story structures, when holes in the column web are used for perimeter safety cables, the column splice must be placed sufficiently high so as not to interfere with any attachments to the column necessary for the perimeter safety cables. Column splices are recommended to be placed at every other or fourth level as design allows.


Avoid using Column splices at third levels because it is detrimental to the erection process.

## 2.7 Open Web Steel Joists

Where steel joists are used, and columns are not framed in at least two directions with solid web structural steel members: a steel joist shall be field-bolted at the column to provide lateral stability to the column during erection. For the installation of this joist, the engineer shall sketch/draw and place appropriate notes on erection drawings:

- a) The bottom chords of steel joists at columns shall be stabilized to prevent rotation during erection.
- b) Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted, and each end of the bottom chord is restrained by the column stabilizer plate.

During installation of solid web structural members, the load will not be released from the hoisting line until the member is secured at each connection with at least two bolts (columns 4 bolts minimum) or the minimum number of bolts specified on the erection drawings or by the Professional Engineer, they are wrench tight, and all other requirements of this Work Instruction are completed.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>2.0</b>	<b>Date</b>		
		<b>2021-05-05</b>		
		<b>Annually</b>		
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				

Where constructability does not allow a steel joist to be installed at the column:  
 Alternate means of stabilizing joists shall be installed on both sides near the column and shall:

- a) Provide stability equivalent to that required in this document;
- b) Be designed by a Professional Engineer;
- c) Be shop installed;
- d) Be included in the erection drawings; and
- e) Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted and the joist is stabilized.

When bolted diagonal erection bridging is required, the following shall apply:


- a) The bridging shall be indicated on the erection drawing;
- b) The erection drawing shall be the exclusive indicator of the proper placement of this bridging;
- c) Shop-installed bridging clips, or functional equivalents, shall be used where the bridging bolts to the steel joists;
- d) When two pieces of bridging are attached to the steel joist by a common bolt, the nut that secures the first piece of bridging shall not be removed from the bolt for the attachment of the second; and
- e) Bridging attachments shall not protrude above the top chord of the steel joist. All joist/bridging erection detail shall be indicated on the drawings.

## 2.8 Systems-Engineered Metal Buildings

Each structural column shall be anchored by a minimum of four anchor rods (anchor bolts). Rigid frames shall have 50 percent of their bolts or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released.

In girt and eave strut-to-frame connections, when girts or eave struts share common connection holes, at least one bolt with its nut wrench-tight shall remain connected to the first member unless a manufacturer-supplied, field-attached seat or similar connection device is present to secure the first member so that the girt or eave strut is always secured against displacement.

All temporary/permanent bracing will be installed per bay/section prior to proceeding.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>	
			<b>2021-05-05</b>	
			<b>Annually</b>	
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				

## 2.9 General Requirements

No modification of a steel joist or steel joist girder shall be made without the approval of the project structural engineer of record.

Containers will be used for storing any loose materials (bolts, drift pins, tools, etc.) and the container must be secured to prevent displacement/upset or fall.

When bolts or drift pins are being knocked out, a means will be provided to tether or capture/ catch them to prevent them from falling.

Impact wrenches must be provided with a locking device for retaining the socket.

Appropriate signage and barricades/tags shall be erected on lower exposed levels to keep unauthorized personnel out of the area.


Impalement hazards, such as vertical/diagonal rebar, must be removed or adequately covered because they could endanger persons working above if they should fall.

### 2.9.1 Exclusion Zone.

At no time will work be allowed directly below any steel erection and/or dismantling operation. Generally, it is recommended that a ratio of 2:1 (height of load to horizontal distance to load) be maintained for loads that are less than 15 m (50ft) off the ground or above employees on the structure. Thus, for a 12 m high load, a 6m horizontal distance to the edge of the load should be maintained. For loads above 15m (50ft) in height, use the greater of 7.5 m (25 ft) or a 30% ratio of load height to horizontal distance. For special lifts such as tall thin structures, greater distances should be utilized to ensure the safety of site personnel.

A Professional Engineer shall determine if more than two bolts are required for cantilevered members and if needed, they shall be installed as per the drawing.

Solid web structural members used as diagonal bracing shall be secured by at least one bolt per connection drawn up wrench-tight or equivalent welding as specified by the Project Structural Engineer of Record, before the hoisting cables are released.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench tight nut shall remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member while the second member is connected.

When feasible attach a freestanding lifeline/or SRL to structural steel members while they are still on the ground. This allows 100% fall protection when someone is required to access the member.

Tag lines will be used to control all loads. Where structural steel members/components must be manually handled, tag lines will be used to control movement, orientation and direction to ensure connectors and ground person does not have to physically “palm”/handle the load. Tag lines shall be used to manage suitable standoff distance of pinch points hazards and overhead loads. Manual handling of loads is not to occur at a distance greater than 1ft from the final position.


“Wind” loading on large structural members must be considered for the safety of the tag line holder. It is not recommended to lift loads at wind speeds above 20 mph (32 kph).

## **2.10 Fall Prevention/Protection during Steel Erection/Dismantling**


### **2.10.1 Steel Erection and Dismantling Operations**

The following requirements apply to all steel erection and dismantling operations

- a) Anytime employees are working from an unprotected elevation of 1.8 m (6ft) or more above the grade, 100% fall protection must be used. “Working” means while traveling, stationary, or at any time exposed to a fall from a surface not protected by a standard guardrail or other approved fall prevention device.
- b) Steel joists and steel joist girders shall not be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a Professional Engineer.
- c) Horizontal lifeline systems shall be designed by an engineer. They shall be installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system. They shall be inspected daily (documented) by a competent person prior to use.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

- d) When vertical lifelines are used, each employee shall be attached to a separate independent lifeline.
- e) Controlled Decking Zones (CDZ's) are not allowed. All decking to be completed.
- f) The permanent floors/decking shall be installed and secured as the erection of structural members progresses.
- g) On multi-story structures, guardrails such as perimeter safety cables (top and mid-rail) shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking or flooring has been installed;
- h) A standard guardrail meeting the requirements shall be installed around all temporary planked, decked floors or completed floors without walls. The top rail shall be installed between a maximum 1.14m, (standard 1.1m), and a minimum 0.99 m height above the walking/working surface, with a mid-rail installed midway between deck and top rail and suitable toe boards (20cm);
- i) Where perimeter cable handrails are used as a guardrail they should be minimum 10mm diameter cable. High visibility streamers (30 cm/1ft pieces of barricade tape are acceptable) will be tied to cable handrails not more than every 2 m/6ft. The lowest point on the cable (deflected with a 200 # load) is 0.99m. It is suggested to use interconnecting cable eyes to connect cables or at endpoint(s). The correct number, size, and distance between cable clamps for making cable connections shall be utilized. Manufacturer's requirements are to be strictly followed. Crosby cable clamps are recommended;
- j) Extreme caution must be used on partially completed stairways. Personal fall protection must be utilized from the bottom access point 100% of the time until the stairs are completed and safe for general use, this is to include all platforms and handrails and
- k) The JHA shall be followed during all phases of steel erection and/or dismantling.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

### 2.10.2 *Custody of Fall Protection*


Fall protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if other trades contractor as the controlling contractor or its authorized representative:

- a) Has directed the contractor steel erector to leave the fall protection in place; and
- b) Has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area;
- c) The subcontract document for the other users of the equipment clearly addresses their responsibility and liabilities for maintaining the system during their use; and
- d) Have reviewed and trained their Supervisor and work force in the maintenance/inspection and use.

### 2.10.3 *Walking/Working Surfaces*

Tripping hazards, shear connectors (such as headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors, or threaded studs shall not be attached to the top flanges of beams, joists, or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking or other walking/working surface, has been installed.

When shear connectors are used in construction of composite floors, roofs and bridge decks, employees shall lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a working platform.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

## 2.11 Overhead Hoisting Operations

### 2.11.1 General

All hoisting operations shall be pre-planned to include at a minimum on the spot lift plan and swing radius sketch, this is to ensure that the requirements of this procedure and Cranes and Lifting Equipment are followed. For this procedure, total load equal to or greater than 75% of the maximum capacity of lifting equipment are also considered critical lifts and the critical lift procedure as outlined in Cranes and Lifting Equipment must be followed.

Pre-planning requires the following data to be identified: the total lifted load weight is known and is within the capacity of the hoisting equipment, the maximum lift radius, lift path, details of hooking and unhooking the load, and signal person(s) designated. A pre-lift meeting must be held prior to the lift to communicate the lift data to the employees.

A load, having several structural members suspended/rigged one below the other (Christmas treeing), is not allowed without NAPG HSER Manager and NAPG Construction Manager written approval and a site-specific approved plan developed to prevent exposure to overhead loads.

If approved prior to activity, NAPG safety advisor shall notify appropriate jurisdiction of planned activity.


### 2.11.2 Hoisting, Landing, and Placing of Metal Decking Bundles

Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose. (Professionally Engineered documents are to be provided to NAPG for approval).

If loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items shall be secured to the bundles.

A Professional Engineer has determined and documented in the site-specific Steel Erection Plan that the structure or portion of the structure can support the load;

The bundle of decking is placed on a minimum of three steel joists/carrying members;  
 The joists supporting the bundle of decking are complete and fully attached at both ends;

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

At least one row of bridging or more if specified by manufacturer/ Professional Engineer is installed and anchored;

The total weight of the bundle of decking does not exceed the specifications determined by a Professional Engineer. The edge of the bundle of decking load shall be placed within 0.30 m (1ft) of the bearing surface of the joist end.

Minimum of 0.30 m (1ft) of overhang exists at either end of the bundle.

Metal decking bundles shall be landed on framing members so that enough support is provided to allow the bundles to be unbanded without dislodging the bundles from the supports or having individual pieces of material from falling over.

When steel joist(s) are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation.

At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement.

### **2.11.3 Landing and Placing Loads on the Structure**


During the construction period, any load(s) on steel joists shall be distributed so as not to exceed the carrying capacity of any steel joist.

No construction loads are allowed on the steel joists until all bridging is installed and anchored (“connected to a bridging terminus point”) and all joist-bearing ends are attached. The weight of a bundle of joist bridging shall not exceed the weight specified on the drawing/sketch by a Professional Engineer.

A bundle of joist bridging shall be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle shall be positioned within 0.30 m of the secured end.

*A steel joist or steel joist girder shall not be placed on any support structure unless such structure is stabilized and complete.*



	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>2.0</b>	<b>Date</b>		
		<b>2021-05-05</b>		
		<b>Annually</b>		
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				

#### 2.11.4 **Structural Stability and Plumbing-up**

All columns shall be anchored by a minimum of 4 anchor bolts. Columns shall be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads.

When deemed necessary by a Professional Engineer or if noted on the erection drawings, plumbing-up equipment/guys shall be installed during steel erection to ensure the stability of the structure.

When used, appropriate sized plumbing-up equipment shall be properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.

Turnbuckles used on “plumbing-up” equipment/guys shall be secured to prevent unwinding while under load.

Plumbing-up guys and related equipment shall be removed only under the supervision of a competent person.

Rope shall not be used to temporarily support/plum structural steel. Wire rope only.


All rigging shall follow good rigging practice.

Structural stability shall be maintained.

#### 2.11.5 **Erection Bridging**

When indicated by the erection drawing and/or Professional Engineer the following shall apply:

- a) A row or more of bolted diagonal erection bridging shall be installed near the mid-span of the steel joist;
- b) Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored (connected to a bridging terminus point); and
- c) No more than one employee shall be allowed on these spans until all other bridging is installed and anchored. 100% fall protection must be established; worker is not to be secured to incomplete bridging.


	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

### 3.0 Floors, Roofs, and Metal Decking

#### 3.1 Roof and Floor Holes and Openings

Metal decking at roof and floor holes and openings shall be installed as follows:  
 Framed metal deck openings shall have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.

Roof and floor holes and openings shall be decked (metal) over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stair wells, etc.) employees shall be protected with appropriate barricades. Metal decking holes and openings shall not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and which meets the strength requirements as detailed by Professional Engineer drawing or shall be immediately covered/protected by suitable handrail.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

### 3.1.1 ***Covering Roof and Floor Openings***

Covers for roof and floor openings shall be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time. For large openings, etc. that cannot be decked over, use barricades to protect employees.

All covers shall be secured when installed to prevent displacement by the wind, equipment or employees. Consider updraft/funneling when securing open.  
All covers shall be painted with high-visibility paint or shall be marked with the word "HOLE", "DO NOT REMOVE" or "COVER" to provide warning of the hazard.  
Light sheet metal dome and/or skylight fixtures that have been installed are not considered covers for this section unless they meet the strength requirements of covers listed above.

### 3.1.2 ***Decking Gaps around Columns***


Wire mesh, exterior plywood, or equivalent, shall be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through. Open hole conditions shall be safeguarded as per Working at Height Procedure.

### 3.1.3 ***Installation of Metal Decking***

Metal decking shall be laid tightly and immediately secured upon placement to prevent movement or displacement.  
During initial placement, metal decking panels shall be placed to ensure full support by structural members, to include perimeter angle/berm

### 3.1.4 ***Derrick Floors***

A derrick floor shall be fully decked and/or planked, and the steel member connections completed to support the intended floor loading.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

Temporary loads placed on a derrick floor shall be distributed over the underlying support members to prevent local overloading of the deck material. All loads shall be reviewed in advance by a Professional Engineer to ensure support and stability.

### 3.2 Dismantling Steel Structures (General)

Prior to demolition operations of a structure, an engineering survey shall be made by a Professional Engineer to determine the condition of the structure, floors, and walls, and possibility of collapse. Written evidence of this survey will be available to the employees. An engineered demolition/removal plan shall be developed and reviewed by a Professional Engineer prior to commencing work.

The demolition/removal plan is to include specific sequencing information to allow for a methodical approach.

When more than one crew is to be involved in a dismantling job, the responsible Site Manager must appoint one Supervisor as Lead Steel Erection/Removal Coordinator. Supervisors must be certain that their employees know exactly what part each plays in the operation.


If a bolt crew prepares the structure for a dismantling crew, at least two bolts in each connection in a pattern that prevents rolling when walked on.

If partial cutting of structural members is to be done prior to actual dismantling, the Superintendent or the Coordinating Supervisor must approve (and supervise) the amount to be cut.


Tag lines are required to be on both ends of beams being removed from structures until the center of gravity is found.

Only a very slight strain (slack) should be taken on a load line before burning off (or unbolting) completely. Any structural member being dismembered shall not be overstressed. Hoisting lines must always be kept plumb above the load to prevent uncontrolled swinging.

Appropriate signage and ground barricades must be used during any dismantling job.

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>	<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>
			<b>2021-05-05</b>
			<b>Annually</b>
<b>North Atlantic Projects Group</b> Plan for ZERO HARM			

- A standard guardrail meeting the requirements shall be installed around all temporary planked, decked floors or completed floors w/o walls. The top rail shall be installed between a maximum 1.14m, (standard 1.1m), and a minimum 0.99 m height above the walking/working surface, with a mid-rail installed midway between deck and top rail and suitable toe boards (20cm);
- Where perimeter cable handrails are used as a guardrail they should be minimum 10mm diameter cable. High visibility streamers (30 cm/1ft pieces of barricade tape are acceptable) will be tied to cable handrails not more than every 1 m/6ft. The lowest point on the cable (deflected with a 200 # load) is 0.99m. It is suggested to use interconnecting cable eyes to connect cables or at end(s). The correct number, size, and distance between cable clamps for making cable connections shall be utilized. Manufacturer’s requirements are to be strictly followed.
- Crosby cable clamps are recommended;
- Extreme caution must be used on partially completed stairways. Access and or use should be for installation crew only. Personal fall protection must be utilized from the bottom access point 100% of the time until the stairs are completed and safe for general use, this is to include all platforms and handrails installed secure and

	<b>Steel erection and dismantling Guideline NAPG-SAF-SPI-0015</b>		<b>Revision</b>	
	<b>Public Document</b>	<b>2.0</b>	<b>Date</b>	
			<b>2021-05-05</b>	
			<b>Annually</b>	
<b>North Atlantic Projects Group</b> Plan for ZERO HARM				

- JHA shall be followed during all phases of steel erection and/or dismantling.

### 3.3 Erection Bridging

When indicated by the erection drawing and/or Professional Engineer the following shall apply:

- A row or more of bolted diagonal erection bridging shall be installed near the mid-span of the steel joist;
- Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored (connected to a bridging terminus point); and
- No more than one employee shall be allowed on these spans until all other bridging is installed and anchored. 100% fall protection must be established; worker is not to be secured to incomplete bridging.

### 4.0 References

	OHSA Regulations, 213/91
	Manitoba Workplace Act and Regulation
	Newfoundland and Labrador Regulation 5/12
NAPG-SAF-SPI-0009	Working at Heights
NAPG-SAF-SPI-0008	Cranes and Lifting
NAPG-SAF-SPI-0011	Permit to Work
NAPG-SAF-SPI-0017	Surface Barricading
NAPG-SAF-FRM-0020	On the Spot Lift Plan FORM
NAPG-SAF-SPI-0007	Personal Protection Equipment
NAPG-SAF-SPI-0012	Dropped Object

**END OF DOCUMENT**