

CODE OF STANDARD PRACTICE

SPECIAL PROFILE STEEL JOISTS, SP-SERIES

SECTION 1 GENERAL

1.1 SCOPE

The practices and customs set forth herein are in accordance with good engineering practice and tend to insure safety in SP-Series joist construction. There shall be no conflict between this code and any legal building regulation. This code shall only supplement and amplify such laws. Unless specific provisions to the contrary are made in a contract for the purchase of SP-Series joists, this code is understood to govern the interpretation of such a contract.

1.2 APPLICATION

This Code of Standard Practice is to govern as a standard unless otherwise covered in the architects' and engineers' plans and specifications.

1.3 DEFINITIONS

Buyer or Customer: The entity that has agreed to purchase material from NMBS and has also agreed to the terms of sale.

Erector: The entity that is responsible for the safe and proper erection of the materials in accordance with all applicable codes and regulations.

Material: SP-Series joists and accessories as provided by the seller/NMBS.

Owner: The entity that is identified as such in the contract documents.

Placement Plans: Drawings that are prepared depicting the interpretation of the contract documents requirements for the material to be supplied by the seller/NMBS.

These roof framing plans are approved by the specifying professional, buyer, or owner for conformance with the design requirements. The seller/NMBS uses the information contained on these drawings for final material design. A unique piece mark number is typically shown for the individual placement of the SP-Series joists and accessories along with sections that describe the end-bearing conditions and minimum attachment required so that material is placed in the proper location in the field.

Seller: New Millennium Building Systems, herein referred to as NMBS, (or its representative) engaged in the manufacture and distribution of SP-Series joists and accessories.

Specifying Professional: The licensed professional who is responsible for sealing the building contract documents, which indicates that he or she has performed or supervised the analysis, design, and document preparation for the structure and has knowledge of the load-carrying structural system.

Structural Drawings: The graphic or pictorial portions of the contract documents showing the design, location, and dimensions of the work. These documents generally include plans, elevations, sections, details, connections, all loads, schedules, diagrams, and notes.

1.4 DESIGN

In the absence of ordinances or specifications to the contrary, all designs prepared by the specifying professional shall be in accordance with the Special Profile Steel Joist, SP-Series, Specification of latest adoption.

1.5 RESPONSIBILITY FOR DESIGN AND ERECTION

When material requirements are specified, the seller/NMBS shall assume no responsibility other than to furnish the items listed in Section 5.2(a). When material requirements are not specified, the seller/NMBS shall furnish the items listed in Section 5.2(a) in accordance with Special Profile Steel Joists, SP-Series, Specification of latest adoption, and this code. Pertinent design information shall be provided to the seller/NMBS as stipulated in Section 6.1. The seller/NMBS shall identify material by showing size and type. In no case shall the seller/NMBS assume any responsibility for the erection of the item furnished.

SECTION 2 JOISTS AND ACCESSORIES

2.1 SPECIAL PROFILE STEEL JOISTS, SP-SERIES

SP-Series joists shall carry the designated loads and meet the requirements of the Special Profile Steel Joists, SP-Series, Specification of latest adoption.

SP-Series joists are furnished either underslung or square ended, with special profiles as clearly specified in the contract documents.

Underslung types are furnished with standard end bearing depth of 5 inches (127 mm), 7½ inches (191 mm), 10 inches (254 mm) or 12½ inches (318 mm) as required by geometry and material requirements. The nominal depth shall be the maximum depth measured between the top chord and bottom chord. The measurement shall be made as described in Section 904.3 of the SP-Series Specification.

2.2 JOIST LOCATION AND SPACING

Where sidewalls, wall beams, or tie beams are capable of supporting the roof deck, the first adjacent joist may be placed one full space from these members. SP-Series joists are provided with no camber and may have a significant difference in elevation with respect to the adjacent structure. This difference in elevation should be given consideration when locating the first joist adjacent to a side wall, wall beam or tie beam. It is recommended that SP-Series joists be located one full space away for these members.

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2.3 SLOPED END BEARINGS

Where SP-Series joists are sloped, beveled ends or sloped end bearings may be provided where the slope exceeds 1/4 inch in 12 inches (1:48). When sloped end bearings are required, the seat depths shall be adjusted to maintain the standard height at the shallow end of the sloped bearing.

2.4 EXTENDED ENDS

Extended ends shall be in accordance with NMBS' standards and shall meet the requirements of Special Profile Steel Joists, SP-Series, Specification of latest adoption.

2.5 CEILING EXTENSIONS

Ceiling extensions shall be furnished to support ceilings which are to be attached to the bottom of the joists. They are not furnished for the support of suspended ceilings. The ceiling extension shall be either an extended bottom chord element or a loose unit and shall be of sufficient strength to properly support the ceiling.

2.6 BRIDGING AND BRIDGING ANCHORS

- (a) Bridging standard with NMBS and complying with the Special Profile Steel Joists, SP-Series, Specification of latest adoption shall be used for bridging all SP-Series joists furnished by NMBS. Positive anchorage shall be provided at the ends of each bridging row at both top and bottom chords.
- (b) For spans less than or equal to 20 feet (6.096 m), welded horizontal bridging may be used. If the joist center-of-gravity is above the supports, the row of bridging nearest the center is required to be bolted diagonal bridging.
- (c) For spans more than 20 feet (6.096 m), all rows shall be bolted diagonal bridging. Where the joist spacing is less than 2/3 times the joist depth at the bridging row, both bolted diagonal and bolted horizontal bridging shall be used.
- (d) Refer to Section 905 of the Special Profile Steel Joists, SP-Series, Specification of latest adoption for erection stability requirements.

(a) Horizontal Bridging

Horizontal bridging shall consist of continuous horizontal steel members. The ℓ/r ratio for horizontal bridging shall not exceed 300.

(b) Diagonal Bridging

Diagonal cross bridging consisting of angles or other shapes connected to the top and bottom chords of SP-Series joists shall be used when required by the Special Profile Steel Joists, SP-Series, Specification of latest adoption. Diagonal bridging, when used, shall have a ℓ/r ratio not exceeding 200.

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

- (1) The bridging shall be indicated on the SP-Series joist placement plan.
- (2) The SP-Series joist placement plan shall be the exclusive indicator for the proper placement of this bridging.
- (3) Shop installed bridging clips, or functional equivalents, shall be provided where the bridging bolts to the SP-Series joist.
- (4) When two pieces of bridging are attached to the SP-Series 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 piece.
- (5) Bridging attachments shall not protrude above the top chord of the SP-Series joists.

2.7 HEADERS

Headers are not provided for SP-Series joists.

SECTION 3 MATERIALS

3.1 STEEL

The steel used in the manufacture of SP-Series joists shall comply with the Special Profile Steel Joists, SP-Series, Specification of latest adoption.

3.2 PAINT

Standard Shop Paint - The shop coat of paint, when specified, shall comply with the Special Profile Steel Joists, SP-Series, Specification of latest adoption.

DISCLAIMER – The typical shop-applied paint that is used to coat SP-Series joists is a dip-applied, air-dried paint. The paint is intended to be an impermanent and provisional coating which will protect the steel for only a short period of exposure in ordinary atmospheric conditions.

Since most SP-Series joists are painted using a standard dip coating, the coating may not be uniform and may include drips, runs, and sags. Compatibility of any coating including fire protective coatings applied over a standard shop paint shall be the responsibility of the specifier and/or painting contractor.

The shop applied paint may require field touch-up/repair as a result of, but not limited to, the following:

- abrasions from: bundling, banding, loading and unloading, chains, dunnage during shipping, cables and chains during erection, bridging, installation, and other handling at the job site

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- NOTE: Rusting should be expected at any abrasion
- dirt
- diesel smoke
- road salt
- weather conditions during storage

NMBS shall not be responsible for the field touch-up. NMBS shall not be responsible for the condition of the paint if it is not properly protected after delivery.

SECTION 4 INSPECTION

Inspections shall be made in accordance with the Special Profile Steel Joists, SP-Series, Specification of latest adoption.

SECTION 5 ESTIMATING

5.1 PLANS FOR BIDDING

Plans to serve as the basis for bids shall show the character of the work with sufficient clarity to permit making an accurate estimate and shall show the following:

- designation and location of materials (see Section 5.2(a)), including any special design or configuration requirements
- locations and elevations of all steel and concrete supporting members and bearing walls
- locations and length of joist extended ends
- locations and size of all openings in roofs
- locations of all partitions
- loads and their locations as defined in Section 6.1
- construction and thickness of roof decks, ceilings, and partitions
- SP-Series joists requiring extended bottom chords
- shop paint, if other than NMBS standard

5.2 SCOPE OF ESTIMATE

(a) Unless otherwise specified, the following items shall be included in the estimate, and requirements shall be determined as outlined in Section 6.1:

- Special Profile Steel Joists, SP-Series
- joist substitutes
- joist extended ends
- ceiling extensions
- extended bottom chord used as strut
- bridging
- bridging anchor clips

- one shop coat of paint, when specified, shall be in accordance with Section 3.2.

(b) The following items shall not be included in the estimate but may be quoted and identified by NMBS as separate items:

- steel deck
- miscellaneous framing between SP-Series joists for openings at ducts, dumbwaiters, ventilators, skylights, etc.
- loose individual or continuous bearing plates and bolts or anchors for such plates
- erection bolts for SP-Series joist end anchorage
- horizontal bracing in the plane of the top and bottom chords from SP-Series joist to SP-Series joist or SP-Series joist to structural framing and walls
- wood nailers
- moment plates
- SP-Series joist web configuration or bridging layouts for ductwork or sprinkler systems
- material required for slip end bearing conditions

SECTION 6 PLANS AND SPECIFICATIONS

6.1 PLANS FURNISHED BY BUYER

The buyer shall furnish the seller/NMBS plans and specifications as prepared by the specifying professional showing all material requirements and SP-Series joist designations, the layout of walls, columns, beams, girders and other supports, as well as roof openings and partitions correctly dimensioned. The live loads to be used, the wind uplift (if any) and the location and amount of any special loads such as monorails, fans, blowers, tanks, etc., shall be indicated. The elevation of roofs and bearings shall be shown with due consideration taken for the effect of dead load deflections.

(a) Loads

NMBS does not presume to establish the loading requirements for which structures are designed.

The SP-Series Weight Tables are based on uniform loading conditions and are valid for use in comparing weights of selected joist sizes designed for gravity loads that can be expressed in terms of "pounds per linear foot" of joist. When SP-Series joists are required to support unbalanced loads, concentrated loads, axial loads, end moments, or other special loads, a load diagram or load schedule shall be provided in the contract documents by the specifying professional.

The specifying professional shall provide the nominal loads and load combinations as stipulated by the applicable code under which the structure is designed and shall provide the design basis (ASD or LRFD).

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The specifying professional shall calculate and provide the magnitude and location of all SP-Series joist loads. This includes all uniform and special loads (drift loads, unbalanced loads, mechanical loads, net uplift, axial loads, end moments, structural bracing loads, or other applied loads), which are to be incorporated into the joist design. When necessary to clearly convey the information, a load diagram or load schedule shall be provided.

The specifying professional shall give due consideration to the following loads and load effects:

- (1) Ponded rain water
- (2) Accumulation of snow in the vicinity of obstructions such as penthouses, signs, parapets, adjacent buildings, etc.
- (3) Wind
- (4) Type and magnitude of end moments and/or axial forces at the joist end supports shall be shown in the contract documents. For moment resisting joists framing near the top of a column, due consideration shall be given to extend the column length to allow a plate type connection between the top of the joist top chord and the column.

Avoid resolving SP-Series joist end moments and axial forces through the bearing seat connection.

A note shall be provided on the structural drawings stating that all moment resisting SP-Series joists shall have all dead loads applied to the joist before the bottom chord struts are welded to the supporting connection, whenever the moments provided do not include dead load.

The top and bottom chord moment connection details shall be designed by the specifying professional. NMBS shall furnish the specifying professional with the joist detail information if requested.

Horizontal thrust at the support of Arch and Scissor joists shall also be considered by the specifying professional. Refer to Special Profile Steel Joists, SP-Series, Specification of latest adoption for more information.

The nominal loads, as determined by the specifying professional, shall not be less than that specified in the applicable building codes.

Where concentrated loads occur, the magnitude and location of these concentrated loads shall be shown in the contract documents when, in the opinion of the specifying professional, they may require consideration by NMBS. This information shall be communicated by means of a load diagram or a load schedule that shows the specified design loads, load categories, unbalanced loadings and required load combinations with applicable load factors. If the loading criteria are too complex to clearly communicate in a simple load diagram, the specifying professional shall also provide a load schedule showing the specified design loads, load categories, unbalanced loadings and required load combinations with applicable load factors.



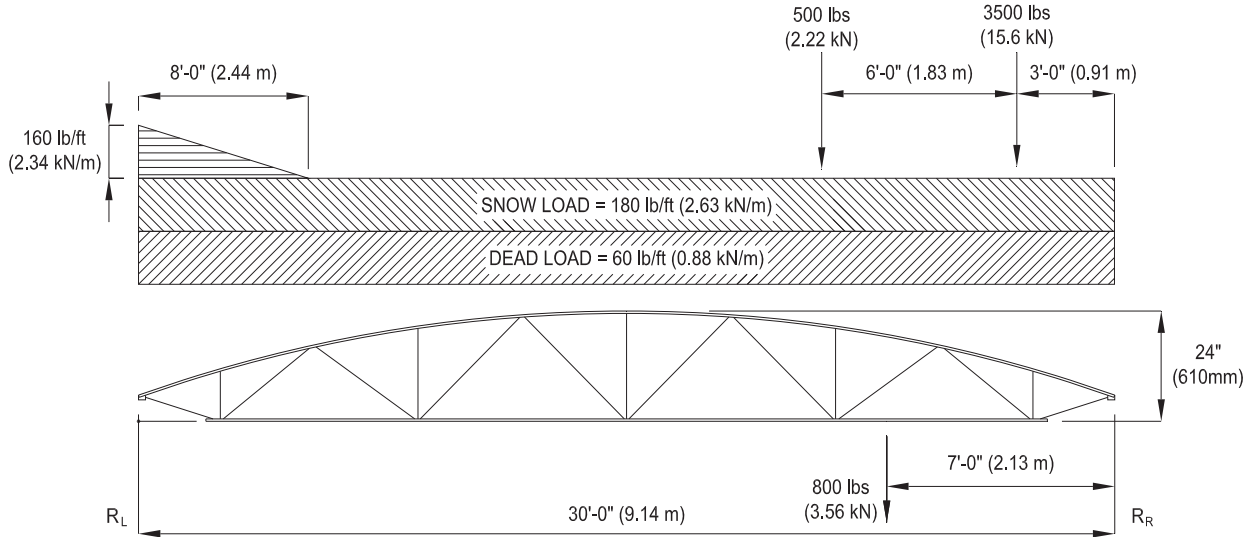
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ASD LOAD DIAGRAM EXAMPLE:

U.S. CUSTOMARY UNITS AND (METRIC UNITS)

Load diagram per ASCE 7

2.4.1(3) D + S



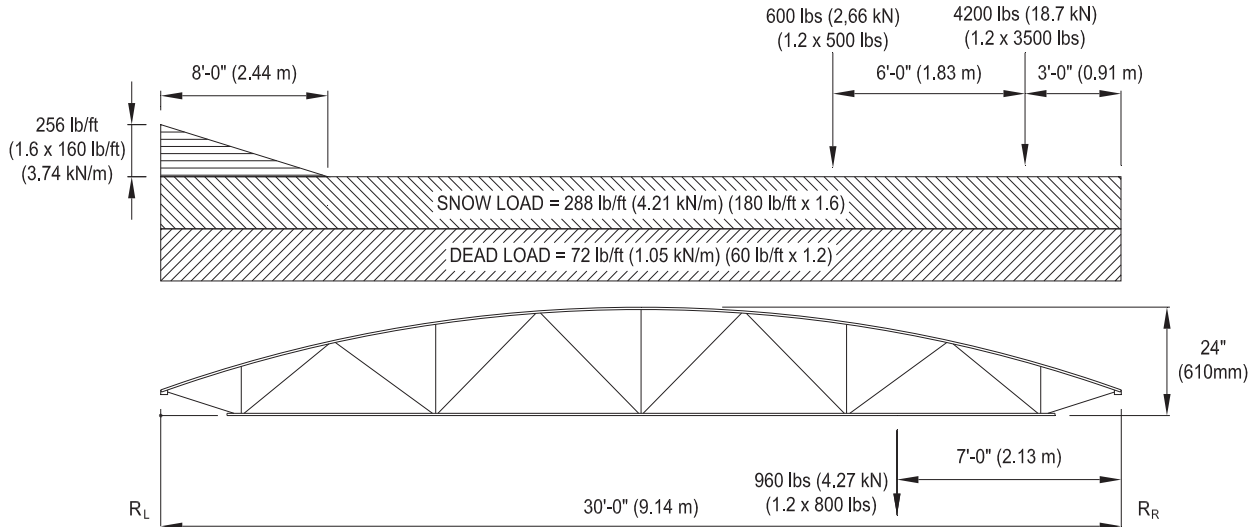
24 SPBW 240/180

LRFD LOAD DIAGRAM EXAMPLE:

U.S. CUSTOMARY UNITS AND (METRIC UNITS)

Load diagram per ASCE 7

2.3.2(3) 1.2D+1.6S



24 SPBW 360/288

(b) Connections

Minimum bearing seat attachment for simple span gravity loading (no horizontal thrust) shall be in accordance with Special Profile Steel Joists, SP-Series, Specification of latest adoption. The specifying professional is responsible for the design of the joist connection when it is subject to any other loads including; horizontal thrusts, uplift, end moments or lateral loads. The specifying professional is also responsible for bridging termination connections. The contract documents must clearly indicate these connections.

(c) Special Considerations

The specifying professional shall indicate in the contract documents special considerations including:

- profiles for SP-Series joists
- oversized or other non-standard web openings
- extended ends
- deflection criteria for live and total loads
- bridging other than NMBS standard bridging

6.2 PLANS FURNISHED BY SELLER/NMBS

The seller/NMBS shall furnish the buyer with SP-Series joist placement plans to show the material as specified in the contract documents and are to be utilized for field installation in accordance with specific project requirements as stated in Section 6.1. SP-Series joist placement plans shall include, at a minimum, the following:

- listing of all applicable loads as stated in Section 6.1 to be used in the design of the SP-Series joists as specified in the contract documents.
- profiles for SP-Series joists as indicated in this publication
- connection requirements for:
 - 1) SP-Series joist supports
 - 2) field splices
 - 3) bridging attachments
- deflection criteria for live load and total loads for SP-Series joists
- size, location, and connections for all bridging

All material shall be identified with its mark which also appears on the bill of material. The shop paint shall be as noted on the joist placement plans. **SP-Series joist placement plans do not require the seal and signature of the NMBS registered professional engineer.**

6.3 DISCREPANCIES

The specifying professional's bid plans and specifications will be assumed to be correct in the absence of written notice from the buyer to the contrary. When plans are furnished by the buyer, which do not agree with the architect's bid plans, such detailed plans shall be considered as a written notice of change of plans.

However, it shall be the buyer's responsibility to advise NMBS of changes which affect the SP-Series joists.

6.4 APPROVAL

When SP-Series joist placement plans are furnished by the seller/NMBS, prints thereof are submitted to the buyer and owner for examination and approval. The seller/NMBS allows a maximum of 14 calendar days in their schedule for the return of placement plans noted with the owner's and customer's approval, or approval subject to corrections as noted. The seller/NMBS makes the corrections, furnishes corrected prints for field use to the owner/customer and is released by the owner/customer to start joist manufacture.

Approval by the owner/customer of the placement plans, sections, notes and joist schedule prepared by the seller/NMBS indicates that the seller/NMBS has correctly interpreted the contract requirements and is released by the owner/customer to start joist manufacture. This approval constitutes the owner's/customer's acceptance of all responsibility for the design adequacy of any detail configuration of joist support conditions shown by the seller/NMBS as part of the preparation of these placement plans.

Approval does not relieve the seller/NMBS of the responsibility for accuracy of detail dimensions on the plans, nor the general fit-up of joists to be placed in the field.

6.5 CHANGES

When any changes in plans are made by the buyer (or the buyer's representative) either prior to or after approval of detailed plans, or when any material is required but was not shown on the plans used as the basis of the bid, the cost of such changes and/or extra material shall be paid by the buyer at a price to be agreed upon between buyer and seller/NMBS.

6.6 CALCULATIONS

NMBS shall design the SP-Series joists in accordance with the Special Profile Steel Joists, SP-Series, Specification of latest adoption to support the load requirements of Section 6.1. The specifying professional may require submission of the SP-Series joist calculations as prepared by the registered professional engineer responsible for the product design. If requested by the specifying professional, NMBS shall submit design calculations with a cover letter bearing the seal and signature of the registered professional engineer. The seal shall be from registration in the state of the manufacture. In addition to standard calculations under this seal and signature, submittal of the following shall be included:

- non-SJI standard bridging details (e.g. for cantilevered conditions, net uplift, etc.)
- connection details for:
 - 1) non-SJI standard connections (e.g. flush-framed or framed connections)
 - 2) field splices

SECTION 7 HANDLING AND ERECTION

The current *OSHA Safety Standards For Steel Erection, 29 CFR Part §1926, Subpart R- Steel Erection*, contain regulations and definitions concerning the safe erection of steel including steel joists and joist girders. NMBS Special Profile Steel Joists, SP-Series, Specifications have increased restrictions beyond those in the OSHA regulations as deemed prudent to enhance safe erection practice. As SP-Series joists have profiles resulting in higher center-of-gravity, the erection procedures contained in the SP-Series Specifications and in the OSHA regulations should be considered minimum requirements and should be reviewed for application to SP-Series joists by a "qualified person"⁽¹⁾ as defined by OSHA.

Except for SP-Series joists that have been preassembled into panels, all connections of individual SP-Series joists to steel structures in bays of 40 feet (12.2m) or longer shall be fabricated to allow for field bolting.

The current *OSHA Safety Standards For Steel Erection, 29 CFR Part §1926, Subpart R- Steel Erection*, refer to certain joists at or near columns to be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging. **This STANDARD shall not be interpreted that any joist at or near a column line is safe to support an employee without bridging installed.** Many limitations exist that prevent these joists from being designed to safely allow an employee on an unbridged joist. Because of these limitations these SP-Series joists must be erected by incorporating erection methods ensuring joist stability and either:

- installing bridging or otherwise stabilizing the joist prior to releasing the hoisting cable, or
- releasing the hoisting cable without having a worker on the joist.

A SP-Series joist shall not be placed on any support structure unless such structure is stabilized. When SP-Series joists are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation.

A bridging terminus point shall be established before joist bridging is installed.

SP-Series joists shall not be used as anchorage points for a fall arrest system unless written directions to do so is obtained from a "qualified person"⁽¹⁾ as defined by OSHA.

⁽¹⁾ A copy of the *OSHA Steel Erection Standard §1926.757, Open Web Steel Joists*, may be found at www.newmill.com for reference. Qualified person is defined therein as "one who, by possession of a recognized degree, certificate, or professional

standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project."

The buyer and/or erector shall check all materials on arrival at the job site and promptly report to NMBS any discrepancies and/or damages. The buyer and/or erector shall comply with the requirements of the Special Profile Steel Joists, SP-Series, Specification of latest adoption in the handling and erection of material.

No modification that affects the strength of an SP-Series joist shall be made without the written approval of the project engineer of record.

NMBS shall not be responsible for the condition of paint finish on material, if it is not properly protected after delivery.

NMBS shall not be responsible for improper fit of material due to inaccurate construction work. Refer to Steel Joist Institute *Technical Digest #9, Handling and Erection of Steel Joists and Joist Girders*.

SECTION 8 BUSINESS RELATIONS

8.1 PRESENTATION OF PROPOSALS

All proposals for furnishing material shall be made on a Sales Contract Form. After acceptance by the buyer, these proposals must be approved or executed by a qualified official of NMBS. Upon such approval the proposal becomes a contract.

8.2 ACCEPTANCE OF PROPOSALS

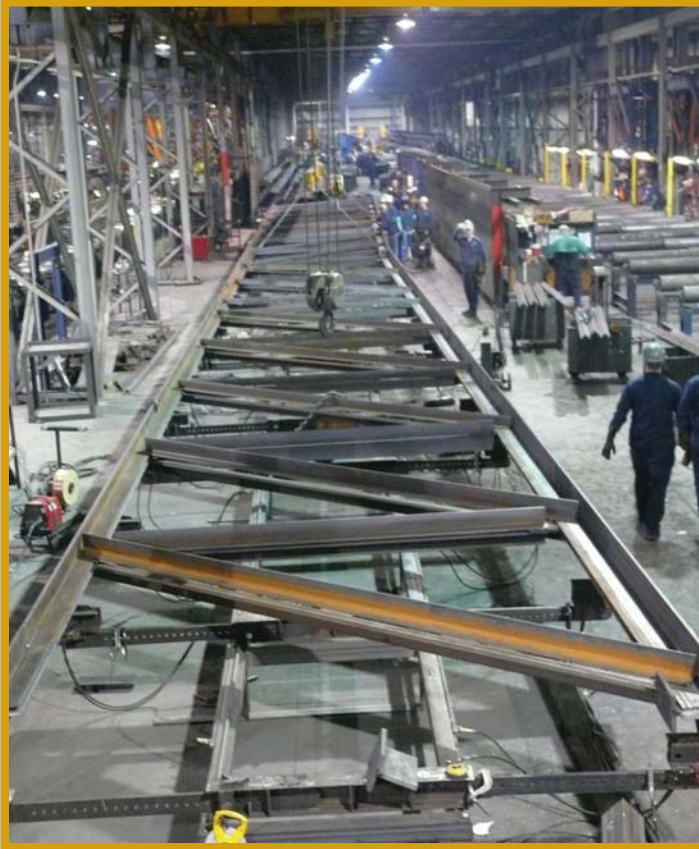
All proposals are intended for prompt acceptance and are subject to change without notice.

8.4 PAYMENT

Payments shall be made in full on each invoice without retention.

8.5 ARBITRATION

All business controversies which cannot be settled by direct negotiations between buyer and NMBS shall be submitted to arbitration. Both parties shall sign a submission to arbitration and if possible agree upon an arbitrator. If they are unable to agree, each shall appoint an arbitrator and these two shall appoint a third arbitrator. The expenses of the arbitration shall be divided equally between the parties, unless otherwise provided for in the agreements to submit to arbitration. The arbitrators shall pass final judgment upon all questions, both of law and fact, and their findings shall be conclusive.



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