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MEZZANINE SPECIFICATIONS

PART 1 GENERAL

1.1 SCOPE

This specification is intended to describe the general requirements applicable to a proper structural mezzanine design. In addition, it is to serve as a quick reference of general information related to custom-engineered, Cogan freestanding, structural mezzanine systems.

1.2 APPROVED MANUFACTURER

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1.3 REGULATORY ORGANIZATIONS AND GROUPS

- American Institute of Steel Construction (AISC);
- American National Standards Institute (ANSI);
- American Society of Civil Engineers (ASCE);
- American Society for Testing and Materials (ASTM);
- American Welding Society (AWS);
- Canadian Institute of Steel Construction (CISC);
- Canadian Standards Association (CSA);
- Canadian Welding Association (CWA);
- International Code Council (ICC);
- National Research Council Canada;
- Occupational Safety and Health Administration (OSHA);
- Research Council on Structural Connections (RCSC);
- Steel Deck Institute (SDI).

1.4 QUALITY ASSURANCE

The mezzanine manufacturer shall be an established firm with a minimum ten years of experience in the design and fabrication of custom, freestanding mezzanine systems. The system design shall be under direct supervision of a civil or structural engineer experienced in the design of mezzanines in accordance to the standards set forth by the organizations and officials listed in §1.3. The installation contractor shall be a firm experienced in installing mezzanine systems.

The supplier shall warrant the mezzanine materials to be free from manufacturing defects for a period of one year. Warranty does not cover damage caused by conditions beyond the control of the supplier.

1.5 Project Approval

The client or owner must submit signed, approved drawings prior to the fabrication of the mezzanine. The client or owner shall be responsible for all quantities and dimensions, including the verification of and coordination with field conditions. The client or owner shall verify all critical dimensions and conditions of existing construction that relate to the mezzanine project prior to manufacturing. Cogan must be notified, in writing, of any elements found to be inconsistent or not compatible with the details indicated by approval drawings.

1.6 Code Compliance

The client or owner shall be responsible for the building classification on all construction and warrant that all construction shall be governed by and in compliance with the latest edition of the building code (including any revisions or addenda) and/or with any other applicable code or requirements of all authorities having jurisdiction.

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Part 2 Architectural Specifications

2.1 Overview

Mezzanines shall be freestanding, custom-engineered, pre-fabricated structures designed in accordance to the appropriate methods and in compliance with the applicable codes published by the organizations and officials listed in §1.3. Mezzanines shall have a minimum clearance of 6'-10", above its finished floor and below its lowest element. Mezzanines exceeding one-third of the existing floor area where the mezzanine is being installed are subject to additional code requirements that shall be verified by contacting the local building department. Equipment platforms exceeding two-thirds of the floor area are subject to additional code requirements that shall be verified by contacting the local building department.

2.2 Joist-to-Beam Connections

Joists are framing channels, up to 24-feet in length, used to support the mezzanine deck. Joists transfer shear loads to the main mezzanine beams through a bolted, L-shaped, shear connector.

2.3 Beam-to-Column Connections

Beams are structural elements that transfer loads from joists to columns. Beams shall transfer shear loads to the column through a shear connector that is factory-welded to the column on its center axis. Bolt holes on the beams are pre-punched and positioned to maximize the strength and stability of the connection.

2.4 Columns

Columns support gravity loads transferred by the beams. In addition, columns support the lateral load resisting system that provides stability to the structure. Columns are square hollow structural sections with shop welded base plates.

2.5 Braces

A lateral force resisting system is required for lateral stability. The most effective and economical system is comprised of cross braces. The use of knee braces is acceptable, but less favorable anchoring conditions typically result from the use of knee braces (often requiring one or several of the following: larger base plates, thicker base plates, larger or longer anchor bolts, chemical anchors, footings).

2.6 Base Plate and Connections

Base plates transfer column loads to the anchoring slab. Base plates shall be a minimum thickness of ½-inch. The column shall be centered on the base plate and welded around its entire perimeter. Centered base plates permit an even transfer of loads to the slab and help reduce the effects of sway on the mezzanine. In limited cases, off-centered base plates are acceptable, but unfavorable anchoring conditions typically result from the use of off-centered plates (often requiring one or several of the following attributes: larger base plates, thicker base plates, larger or longer anchor bolts, chemical anchors, footings).

Base plates are pre-punched with four ¾-inch diameter holes for anchors. Base plates of columns adjacent to walls or other structures are placed at a distance of 1-inch from that obstruction. That detail, in general, is omitted from the detail drawings as walls or obstructions could be built after the installation plans are devised.

2.7 Anchors

The mezzanine manufacturer shall not supply anchor bolts. The client or owner shall be responsible for adequate anchoring conditions and shall be responsible for the installation of adequate anchor bolts. Anchors shall resist the column loads indicated on the approvals drawings.

2.8 Guards

Guards (sometimes referred to as handrails) shall be a minimum of 42-inches from the finished floor surface. Guards shall be a 1½-inch square profile fastened to intermediate rail posts not exceeding a center-to-center spacing of 72-inches. Two-rail guard systems limit the clear opening between rails to 19½-inches. Three-rail guard systems limit the clear opening between rails to 10½-inches. Intermediate rail posts shall be bolted to the web of perimeter channels or to the top flange of perimeter beams. All guard systems shall have a kick plate (toe-plate), 6-inches high, fastened to the top flanges of the perimeter beams or channels.

2.9 Staircases

Staircase stringers shall be a 14-inch deep formed channel of structural grade steel, pre-punched for bolted treads. Treads shall be formed of galvanized, solid steel plate, embossed, to create a slip-resistant surface. Stair guards shall be 1½-inches square tube welded to the channel stringers. Tread, guards, and staircase dimensions shall meet the requirements of the applicable codes. Landings for staircases shall be of depth no less than the width of the staircase and requiring a formed lip (nosing) to bridge the staircase and landing deck surface.

2.10 Deck

Deck systems shall be composed of elements that must resist the load capacity of the mezzanine. The most common deck systems are corrugated steel deck with a wood overlay (composite wood decks, plywood, oriented strand board, etc.). However, other deck systems such as bar grating or open steel planking are available.

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PART 3 STRUCTURAL SPECIFICATIONS

3.1 DESIGN CRITERIA

The mezzanine manufacturer shall design the mezzanine system for a load capacity of uniformly distributed live load specified by the client. The load capacity shall conform to any applicable building codes and the manufacturer shall include dead loads for the mezzanine. The client shall specify to the mezzanine manufacturer the intended use of the mezzanine, the required load capacity of the mezzanine, any applications that may cause concentrated (point) loads or vibrations and the location of the installation site so that applicable seismic loads may be determined. In addition to general geometric details (i.e. length, width, floor height, preferred column spacing, etc.), the client shall specify the deck type and the required deflection limits if not equivalent to §3.3. The aforementioned design loads and vertical deflection limit shall meet or exceed the minimum design values prescribed by the national building code.

3.2 DIMENSIONAL PROPERTIES

The system shall be sized for _____ clear height and top of deck height of _____.

3.3 VERTICAL (GRAVITY) LOADS

The system shall be designed for self-weight and a uniformly distributed live load of _____ PSF and intended to be used primarily for _____.

The system shall be designed for a maximum concentrated load (point load) of _____ -lbs and for a maximum rolling load of _____ -lbs.

The system shall be designed for a maximum vertical deflection of L/_____.

3.4 LATERAL LOADS AND SWAY

The mezzanine shall be designed for the appropriate lateral loads, as contributed by impacts and seismic conditions. Design methods are simplified by considering a minimum lateral load equivalent to 2.5% of the total gravity (vertical) load applied to the entire mezzanine deck surface.

A lateral force resisting system is required for lateral stability. The most effective and economical system is comprised of cross braces. The use of knee braces is acceptable, but less favorable anchoring conditions typically result from the use of knee braces (often requiring one or several of the following attributes: larger base plates, thicker base plates, larger or longer anchor bolts, chemical anchors, footings).

The system shall be designed for the applicable seismic loads of the installation site, located in the following zip code/postal code: _____.

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Part 4 Material Standards

4.1 Framing

Beams and joists shall be cold-formed C-sections with pre-punched holes, meeting the material requirements of ASTM A1011 Grade 55. When required by design, wide flange beams, W-sections, meeting the material requirements of ASTM A572 Grade 50 and/or CSA G40.21 350W shall be used.

4.2 Columns

Columns shall be HSS shapes meeting the material requirements of ASTM A500 Grade 50. Base plates shall meet the material requirements of ASTM A36 44W.

4.3 Bolted Connections

All bolted connections (joist to beam, beam to beam, and beam to column) shall be made with high strength structural bolts meeting the requirements of ASTM A325.

4.4 Finish

All components shall be powder-coated Cogan Grey (including posts for mezzanine guards and stair stringers with welded guards and handrails).
Exceptions:

- Ladders and gates shall be powder-coated safety yellow.
- Mezzanine guard rails, kick plate, stair steps and risers are galvanized.
- Wide flange beams shall have one coat of liquid paint, applied by airless electrostatic process.

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Part 5 Installation Standards

5.1 Work Area

The area where the mezzanine is installed shall have a concrete slab, troweled smooth and level. Mezzanine columns placed in areas that are smooth and level shall have a grouted base to ensure that mezzanine columns are anchored adequately. The entire surface of a base plate shall be in contact with the slab to ensure an even transfer of column loads and minimize sway. The concrete areas where mezzanine column placement occurs shall be capable to withstand the loads specified by the mezzanine manufacturer.

5.2 Work and Inspection

Working areas shall be inspected and cleaned of all debris to ensure that adequate access is provided to the installers. The client or owner shall advise the installation company of any embedded floor obstacles that may interfere with the installation of floor anchors.

5.3 Preparation

The mezzanine contractor's technician shall inspect the job site prior to the preparation of approval drawings.

5.4 Installation

Erection of the mezzanine and accessories shall be in accordance with the specifications and instructions contained in the erection manual and installation drawings. The installation plan is based on the specifications, dimensions and approval of the dealer and/or client. All drawings must be reviewed carefully prior to installation.

5.4.1 Bolt tightening

Bolts are installed in properly aligned holes, but need only be tightened to the snug tight condition. The snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact. This may be obtained by an impact wrench or the full effort of a man using an ordinary spud wrench.

Once the installation of the mezzanine is complete, all bolts should be verified. If installation was performed using an impact wrench, random inspections should be made to ensure that the wrench is obtaining the desired torque.

It should be verified during actual installation in the assembled steelwork that the wrench adjustment selected by the calibration does not produce a nut or bolt head rotation from snug tight greater than 1/3 turn. When securing all hardware, make sure that end of bolt is flush with or exceeds the face of nut.

5.5 On-Site Modifications

Any modifications required during installation (on-site) of any Cogan products shall be proposed to and approved by a product engineer employed by Cogan. Cogan shall not guarantee any products modified without the consent from a product engineer employed by Cogan.

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PART 6 GLOSSARY OF TYPICALLY USED TERMS

The following is a list of terms, which are found on approval, installation drawings and in Cogan's manuals.

BUILDING CODE: are enacted to protect public health, safety, and welfare. Codes establish regulations to govern a structures design and construction and represent the minimum requirements used to protect the public from harm.

IBC: stands for International Building Code

OSHA: stands for Occupational Safety And Health Administrators

DEAD LOAD: dead load of a mezzanine includes weight of joists, beams and flooring material.

LIVE LOAD: live load on a mezzanine is the maximum capacity of materials that can be loaded onto the surface. This load is specified by the end user and is used to calculate the mezzanine components.

UDL: stands for uniformly distributed loads. Typically measured in pounds per square foot (psf). The following list the common udl loadings for mezzanines.

- 125 psf: 1500 lbs on a 40" x 48" pallet - light storage
- 135 psf: 75 psf live load + 60 psf dead load - office loading
- 150 psf: 2000 lbs on a 40" x 48" pallet - light shelving
- 200 psf: 2500 lbs on a 40" x 48" pallet
- 250 psf: 3000 lbs on a 40" x 48" pallet - heavy storage

LATERAL LOADS: loads, which apply horizontal forces to the mezzanine causing sway. Typically these forces are caused by seismic conditions.

POINT LOADS: are forces applied at a point. As an example, the loads from a shelving unit transmitted through the shelving legs are considered point loads. If a shelving unit had 5 shelves, and each shelf can hold 1000 lbs, then the point load at each shelving unit leg will be 1250 lbs. Contact Cogan's engineering staff for advice when dealing with point loads.

WHEEL LOADS: are rolling point loads as are caused by a pallet jack. Contact Cogan's engineering staff for advice when dealing with wheel loads.

T.O.F.: top of floor. The distance from the concrete floor to the top of the finished mezzanine floor.

T.O.S.: top of steel and/or top of structure. The distance from the concrete floor to the top of the steel support structure.

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