SECTION 112429

XSPLATFORMS – FALL PROTECTION SYSTEMS

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. Type of system required: XSImpact (Pro) anchor point(s) Use in combination with XSLinked/LinkedPro system or as single anchor points

B. System location: Roof

C. Maximum number of workers on system at one time: ##

D. Systems environmental exposure: What are the service conditions (indoors, outdoors, corrosive environment)? What materials will be required (steel, hot dip galvanizing, stainless steel, marine grade stainless etc…)?

E. Workers task while on the system: Workers will walk along edge. Occasionally, workers are required to look over the edge. While walking, workers need to carry heavy objects.

F. Type of fall protection required: Fall restraint or fall arrest system(s)

G. Additional information: Supporting Documents

H. Insurances required: Commercial Liability and Workers' Comp.

1.2 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete

B. Section 03400 - Pre-Cast Concrete

C. Section 05100 – Structural Metal Framing

D. Section 05400 – Cold Formed Metal Framing

E. Section 05310 - Metal Deck

F. Section 06100 – Rough Carpentry

G. Section 07510 - Built-Up Roofing

H. Section 07700 - Roof Specialties and Accessories

I. Section 11010 - Maintenance Equipment

1.3 REFERENCES

A. Occupational Safety & Health Administration (OSHA)

1. 29 CFR 1910.23(c) (1) & 29 CFR 1926.501(b) (1) - Occupational Health and Safety Standards General Industry & Construction: Duty to have fall protection

2. 29 CFR 1926.502(d) (15) (i-ii) - Safety and Health Regulations for Construction: Anchor Design Requirements

3. 29 CFR 1910.66 I(c) (10), I (d) (iv), II (2) - General Industry: Anchor Design Requirements

B. American National Standards Institute (ANSI)

1. Z259.0 [2012] – Definitions and Nomenclature Used for Fall Protection and Fall Arrest.

2. Z259.1 [2007] – Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

3. Z259.2 [2007] – Minimum Requirements for a Comprehensive Managed Fall Protection Program

4. Z259.3 [2007] – Safety Requirements for Positioning and Travel Restraint Systems.

5. Z259.4 [2007] – Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystem and Components.

6. Z259.6 [2009] – Specifications and Design Requirements for Active Fall Protection Systems.

7. Z259.12 [2009] – Connecting Components for Personal Fall Arrest Systems

8. Z259.13 [2009] – Personal Energy Absorbers and Energy Absorbing Lanyards

9. Z259.14 [2012] – Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems.

C. Materials, Bolting, Finishing: American Society of Testing Materials (ASTM)

1. A36 - Standard Specification for Carbon Structural Steel.

2. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

3. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

4. A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

5. A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

6. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

7. A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

D. American Welding Society (AWS) D1.1/D1 - Structural Welding Code – Steel

E. Design Standards

1. American Institute of Steel Construction (AISC) 325-11 [14th ed.] – Steel Construction Manual

2. National Design Specification (ANSI/NDS) [2012] – Wood Construction Manual

3. International Building Code (IBC) [2012] – Building Design Manual

4. American Society of Civil Engineers (ASCE/SEI) 7-10 [2010] – Minimum Design Loads for Buildings and Other Structures

5. American Concrete Institute (ACI) 318-11 Building Code Requirements for Structural Concrete.

6. CSA Z259.16—Design of Active Fall-Protection Systems

F. Canadian (Provincial) Standards

1. Alberta - OHS Part 9

2. British Columbia - OHS Part 11

3. Manitoba—Workplace Safety and Health Regulation - Part 14

4. New Brunswick - OHS Part 49

5. Newfoundland & Labrador - OHS Part X

6. Northwest Territories & Nunavut - OHS Part 7(103)

7. Nova Scotia - Fall Protection and Scaffolding Regulations

8. Ontario – Ministry of Labour OH&S Part X11

9. Prince Edward Island – Section 2.1

10. Quebec – Section 2.9.1

11. Saskatchewan – OHS Part V11 & IX

12. Yukon – OHS Part 1(37)

1.4 PERFORMANCE

A. System shall comply with 1.1 System Description

B. Performance Requirements

1. The XSImpact (Pro) shall provide a secure attachment means to the supporting structure in conjunction with the manufacturer's requirements. The anchor shall provide compatible connects with the applicable personal connection equipment. All components shall be designed by the fall protection system supplier and shall meet the applicable requirements of ANSI and applicable OSHA regulations.

2. Structural Performance:

a. Structure supporting XSImpact (Pro) anchor point(s) must be capable of withstanding the design loads as required by governing regulations and codes. Where component design loads are specified herein, they represent design minimum requirements.

b. All fall protection components shall be designed with a minimum 2:1 safety factor.

1.5 DESIGN

A. Design Requirements

1. The XSImpact (Pro) shall comply with current applicable OSHA, ANSI, and state regulations and standards.

2. XSImpact (Pro) anchor(s) and any supporting structure shall be designed by a XSPlatforms Registered Partner/Installer. Details can be obtained from XSPlatforms:

XSPlatforms (headquarters)
P.O. Box 510
4200 AM Gorinchem
The Netherlands

0031 183 56 91 11
info@xsplatforms.com

XSPlatforms USA
30 Bellarmine Court
Chico CA 95928
United States of America

001 530 343 1400
info@xsplatforms.com

3. General Requirements:

a. XSImpact (Pro) installation to structure shall be designed and installed, under the supervision of a Qualified Person, as part of a complete personal Fall Protection system.

b. The integrated energy absorbers shall not be used to limit the maximum arrest force of the worker. Integrated energy absorbers shall be used only to control or reduce the maximum arrest load on the structure.

c. The design engineer shall ensure the increased clearance requirements of a deployed XSImpact (Pro) will not conflict with the required clearance of the system.

d. XSImpact (Pro) anchor point(s) shall satisfy the seismic conditions for nonstructural components as described by ASCE/SEI 7 and the most current edition of the IBC. No exceptions can be taken if the system is required to function for life-safety purposes after an earthquake.

e. Brackets and supports shall be attached to the structure with appropriate anchors of proper size to adequately support the intended loaded.

f. The designer shall take into account environmental factors (snow, ice, debris, etc...) when designing an anchor point such that the XSImpact (Pro) functions properly.

g. The XSImpact (Pro) shall comply with XSPlatforms design requirements.

4. Restraint anchors of XSPlatforms shall be designed per ANSI Z259.2 & ANSI Z259.6:

a. The XSImpact (Pro) shall prevent workers from reaching and falling into any open hole or off the edge of a working surface.

b. The XSImpact (Pro) shall comply with the requirements for fall arrest anchor(s) as indicated in this document.

c. XSImpact (Pro) anchor(s) may be used in restraint systems; provided that the engineer has determined that the restraint forces will not cause the XSImpact (Pro) to deploy and ensures that the anchor extension in combination with other deformations of the restraint system will not permit the worker(s) to reach the fall hazard.

d. The use of fall restraint systems shall be limited to surfaces at or less than a slope of 1:3 from the horizontal. This is so a fall will not result in dynamic loading on the fall restraint system or where the authorized person could end up being suspended vertically from the system.

5. Fall Arrest anchor point(s) shall be designed per ANSI Z259.2 & ANSI Z259.6:

a. The selection, design, and installation of fall arrest anchor(s) shall be performed under the supervision of a Qualified Person.

b. Anchorages designed for fall arrest systems shall have the strength capable of sustaining static loads applied in the directions permitted by the system of at least two times the maximum arresting force.

c. When more than one user is attached to a horizontal lifeline, the load on the lifeline can be determined using either lumped mass or sequential fall calculations as described in ANSI Z259.6 [6.3.6]

d. The swing fall shall comply with ANSI Z259.6 [5.3]

e. The clearance safety margin shall comply with ANSI Z259.6 [7.2.6.2]

f. Where a worker is using a full body harness the force on the worker's body shall not exceed 8 kN (1800 lbf).

B. Sub-System Requirements

1. Harnesses used with the system shall comply with ANSI Z259.1

2. Connecting Components (carabiners and snap hooks) used with the system shall comply with ANSI Z259.12

3. Energy Absorbing Lanyards (EALs) used with the system shall comply with ANSI Z259.13

C. The fall protection system shall be used exclusively for its designed use and shall be marked to prevent other uses.

D. The design shall take into consideration the potential uses of and loads on the fall protection system, in order to facilitate the prompt rescue of workers who may fall while attached to the system.

E. The XSImpact (Pro) anchor(s) designed to meet EN ISO 9227 (salt spray test).

F. If required by engineer of record, the installer shall test the XSImpact (Pro) design using a 5 kN (1124 lbf) load for 30 seconds on applicable roof structures (tensile test).

G. The XSImpact (Pro) anchor shall be capable of providing a consistent level of energy absorption in any direction in the plane of the roof structure.

H. Each component of the XSImpact shall be full traceable.

1.6 SUBMITTALS

A. Product Data: XSPlatforms' data sheet on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations

3. Installation methods

B. Drawings and Calculations:

1. Drawings:

a. Show the layout of the system including where the system is located and the complete assembly of all components.

b. Include a specification of the number, location, and qualifications of workers using the system.

c. Clearly specify the equipment dimensions, materials, fabrication details, hardware, and installation instructions.

2. Calculations:

a. Calculations shall be prepared under the supervision of a registered Professional Engineer and Qualified Person.

b. Include a statement defining the type of system and indicating that the anchor attachment design is in accordance with the requirements of ANSI Z259.6.

3. The Professional Engineer who oversaw the design of the system shall affix their professional seal to each drawing and calculation package issued.

C. Operation and Maintenance Data shall be prepared per ANSI Z259.2 & ANSI Z259.6:

1. Include complete list of equipment replacement parts; identify each entry with the equipment description and part numbers.

2. Include technical information for servicing equipment.

3. Include legible “as-constructed” drawings of the installed system.

4. Include installation date and system owner’s name and address.

5. Include detailed operating procedures:

a. Written by a Qualified or Competent Person.

b. Identifying the XSImpact (Pro) anchor location

c. Stating any safety precautions that shall be followed during access and egress.

d. Describing the limitation on use of system: maximum load, designated equipment, required clearance and maximum number of persons permitted to be attached to the system at one time.

e. Instructions for inspection, maintenance, and retirement of the system and all of its components, including how often inspection and maintenance are to be performed and a description of the qualifications required for persons performing these tasks.

f. Procedure for inspection:

I. Required or recommended inspection intervals.

II. Detailed instruction for inspecting each component of the system.

III. Description of acceptance or rejection criteria, including retirement criteria, of each component of the system.

IV. Fall protection procedures shall include a requirement that any incidents, including accidents or near misses, be investigated to determine if procedures can be improved.

6. Provide or direct the owner of the system or the employer of the workers using the system to develop and implement a rescue plan before the system is used.

1.7 QUALITY ASSURANCE

A. Single Source: Obtain all materials and equipment required under this section from a single supplier.

B. Designer/Installer Qualifications: Engage a single firm to assume undivided responsibility for the design and fabrication of all fall protection system components. Firm shall have a minimum of 5 years documented experience in the fabrication of such components similar to that required for this project. Additionally, the firm shall have a minimum of 5 years documented experience in the installation of such components and who offers a regular inspection and maintenance service on such systems.

C. Design Engineer: Employ a firm with a minimum of 10 years of experience designing fall protection systems with a minimum of 5 systems installed in the previous 12 months. Who employs a registered Professional Engineer (PE), with evidence of being the principal PE on at least 3 fall arrest systems which have been in use for no less than 1 year prior to bid closing date.

D. Professional Engineer and Fall Protection Qualified Person: Shall oversee the fall protection systems' design, such that all component items meet the "Structural Performance" requirements, including sizing and spacing of all attachments to the building structure and verify the design is compliant with all applicable OSHA and ANSI standards. Additionally, they must prepare, stamp and sign all required calculations; while also approving the system designer's drawings.

E. Welding to be executed by certified welders in accordance with AWS requirements.

1.8 DELIVERY, STORAGE & HANDLING

A. Material delivery shall be coordinated with all effected entities.

B. Storage and Protection:

1. Store originally packaged materials in a cool, dry, and protected location.

2. Materials shall be in new condition and show no signs of damage.

1.9 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

A. Manufacturer's standard one year warranty for materials and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers shall comply with the *Quality Assurance* section of this documentation.

B. All supporting structure which connects the XSImpact (Pro) anchor(s) to the super structure shall be designed by a XSPlatforms Registered Installer/Partner (details can be obtained by emailing info@xsplatforms.com)

2.2 PRODUCTS

A. **XSPlatforms (headquarters)**
P.O. Box 510
4200 AM Gorinchem
The Netherlands

0031 183 56 91 11
info@xsplatforms.com

XSPlatforms USA
30 Bellarmine Court
Chico CA 95928
United States of America

001 530 343 1400
info@xsplatforms.com

2.3 MATERIALS

A. Product

1. The system shall be a complete and turnkey solution complying with the performance and design criteria of this document.

2. The energy absorbing XSImpact (Pro) anchor(s) shall be the product of XSPlatforms.

3. Components: All system connectors, cables and bolts shall be stainless steel Type 316 or epoxy coated aluminum. Fabricated supports required for additional support may be carbon steel with a corrosion resistant coating. However a faying surface shall be used to prevent galvanic reactions.

4. XSBase plates and anchors: Provided complete with required components for weatherproof mounting to the following surfaces:

a. Standing Seam Roof Type.

b. Metal Roofing Type.

c. Green Roofing Type.

f. Insulated Roof Deck Type.

e. Concrete Deck Type.

f. Timber Deck Type.

g. Non-Penetrating.

5. The XSImpact (Pro) anchor(s) shall be attached to the supporting structure with appropriate fasteners. The fasteners shall be designed to support a load on the fall protection system of 2 times the maximum design load without failure.

6. Provide all designed sub-system items per Section 1.5 (B) of this document.

B. Supporting Structure

1. Structural Components shall comply with the applicable standards:

a. Structural Steel: ASTM A36

b. Structural Tubing: ASTM A500 Grade B

c. Structural Bars, Plates, Shapes, and Sheet Piling: ASTM A6

d. Piping: ASTM A53

2. Fasteners shall comply with the applicable standards:

a. Structural Bolts: ASTM A325

b. Alloy-Steel and Stainless Steel Bolting: ASTM A193

3. Flashing and Sealing Material shall comply with the applicable standards:

4. Material substitutions shall be better than or equal to the requirements found in this section.

5 Fabrication

a. Fabricate work true to dimension, square, plumb, level, and free from distortion or defects detrimental to performance.

b. Coordinate the system with supporting structure.

c. Welding:

I. AWS D 1.1 as applicable.

II. If Butt welds are used, then surplus welding material is to be ground off to ensure exposed surfaces are smooth. Fillet welds shall not be ground.

III. Slag is to be removed from the materials surface.

2.4 XSIMPACT DESIGN

A. The XSImpact anchor design shall comply with the *Design Requirement* section of this document.

B. Fall protection systems attached onto an existing or new structure shall comply with IBC [2009] and ASCE/SEI [2010]

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation shall be performed by a XSPlatforms Registered Installer/Partner. Details can be obtained from XSPlatforms:

XSPlatforms (headquarters)
P.O. Box 510
4200 AM Gorinchem
The Netherlands

0031 183 56 91 11
info@xsplatforms.com

XSPlatforms USA
30 Bellarmine Court
Chico CA 95928
United States of America

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B. Install in accordance with approved shop drawings and manufacturer's instructions.
C. The XSPlatforms' Fall Protection System shall be installed under the direction of manufacturer's authorized trained personnel and under the supervision of a Qualified Person.

D. Install anchorages and fasteners in accordance with their manufacturer's recommendations to obtain the allowable working loads published in the product literature and in accordance with this specification.

E. Do not load or stress the XSPlatforms' Fall Protection System until all materials and fasteners are properly installed and ready for service.

F. Where bolting is used for fastening, no fewer than three threads are to be exposed and the nut is to be positively locked using a thread-locking fluid or the double nutting technique.

G. Dissimilar materials with greater than 0.15V shall be separated by a faying surface.

H. XSImpact (Pro) anchor point(s) must be secured to roof surface with waterproof mechanical connectors as approved.

3.2 FIELD QUALITY CONTROL

A. After the XSPlatforms' Fall Protection System is installed, XSPlatforms approved authorized Qualified or Competent Person shall inspect and operate the system and shall make all final adjustments for proper operation.

3.3 ADJUSTMENTS AND FINAL INSPECTION

A. Verify that all manufactured units have been installed in accordance with specifications and details, and will function as intended. Adjust any items where necessary to ensure proper operation.

B. Provide a complete drawing set with any revisions to the design or layout of the fall protection system during installation.

3.4 OPERATOR TRAINING

A Provide a minimum of 4 hours of operator training after system has been installed. Training is to be for the users of the system conducted at the installation site.

3.5 MAINTENANCE, INSPECTION AND TESTING

A. Provide manufacturer maintenance, inspection and testing instructions.

B. Provide documentation that is consistent with applicable OSHA and ANSI standards.

End of Section