SECTION 13 48 43 – seismic control assemblies for non-structural components

1. General
   1. SUMMARY
      1. Work Included: Provide seismic control assemblies for operational and functional components including but not limited to following:
         1. Work in this Section includes supplying and installing complete seismic restraint systems for architectural components. Work in this Section may also include the seismic restraint design and/or equipment/product certifications to be submitted for review by the registered design professional.
         2. Architectural assemblies or components requiring seismic restraint include, but are not limited to, the following:
            1. Interior partitions and infill walls.
            2. Suspended ceiling assemblies and bulkheads.
            3. Exit doors, and overhead doors.
            4. Wall-mounted components weighing more than 9 kg (20 lbs).
            5. Owner-supplied, Contractor-installed equipment.
            6. Other components needing seismic restraints and listed in Contract Documents.
      2. Related Requirements:
         1. Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.
   2. reference standards
      1. Canadian Standards Association (CSA):
         1. CSA S832-06, Seismic Risk Reduction of Operational and Functional Components (OCFs) of Buildings.
      2. American Society for Testing and Materials (ASTM):
         1. ASTM E 580/E 580M-17, Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
      3. American Concrete Institute (ACI):
         1. ACI 318-19, Building Code Requirements for Structural Concrete and Commentary.
   3. SUBMITTALS
      1. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
      2. Submit manufacturer's product data and installation instructions for each material and product used.
         1. Submit complete seismic restraint design, consisting of calculations, restraint selection, installation details, and other documentation signed and sealed by professional engineer stipulated herein Seismic restraint shop drawings shall be prepared and overseen by a professional engineer as specified herein experienced in designing seismic restraints for operational and functional components as required by the authority having jurisdiction.
         2. Where walls, floors, slabs, or supplementary steel work is used for seismic restraint, submit details of acceptable attachment methods for equipment and components, including spacing, static loads, and seismic loads at all attachment and support points. Obtain approval of Consultant prior to installation.
         3. Provide specific details of seismic restraints and anchors; include number, size, and locations for each piece of equipment; provide details of suspension supports and restraints for equipment hung from ceiling.
   4. QUALITY ASSURANCE
      1. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
      2. Provide Work of this Section by a specialty consultant or equipment manufacturer designated to develop seismic restraint system and perform seismic calculations in accordance with requirements of OBC, standards stipulated herein and additional requirements particular to this Section.
      3. Ensure equipment manufacturer or specialty consultant specified herein designs, recommends, reviews, and supervises installation of proposed seismic restraint design and connection methods for entire Project, excluding work associated with Divisions 20, 21, 22, 23 & 26.
2. Products
   1. DESIGN AND PERFORMANCE REQUIREMENTS
      1. Seismic Control Assemblies design is based on mutually agreed upon details submitted by Subcontractor for final review by Consultant. Seismic sensitivity criteria are as follows:
         1. [Refer to the Structural Drawings].
         2. Importance Category = Normal.
         3. Site Class = C.
         4. Earthquake importance factor (IE) = 1.0.
         5. Acceleration based coefficient (Fa) = 1.0.
         6. FaSa (0.2) = 0.439.
         7. IeFa Sa (0.2) = 0.439.
      2. Drawings covering Work of this Section may show design intent and profiles that are diagrammatic in nature. Drawings may also show general building standards for seismic restraint of operational and functional components, which are to be completed and coordinated by this Section. Drawings are not intended to identify or solve completely problems of structural or seismic movements, assembly framing, engineering design, fixings, and anchorages.
      3. Requirements of this seismic restraint Section are in addition to other requirements specified elsewhere for the support and attachment of operational and functional components. Nothing on Contract Documents shall be interpreted as justification to waive requirements of this Section.
      4. In addition to Contract Documents requirements, final design and performance of seismic control and restraint assemblies of operational and functional components and their approval by authorities having jurisdiction is responsibility of this Section.
      5. Design seismic restraint system and clearly indicate attachment points to building structure and design forces (in X, Y, and Z direction) at the attachment points in accordance with OBC for designated seismic hazard values for location of Project as listed in Supplementary Standard SB-1. Design anchorage in accordance with ACI 318, Appendix D.
      6. Provide attachment loading values to Professional Engineer specified herein for verification of attachment methods and building's structure ability to accept imposed loading. Base seismic restraint design on actual OFC data (dimensions, weight, center of gravity, etc.) obtained from submittals or item manufacturers. Ensure that equipment manufacturer verifies that attachment points on equipment and components can accept combination of seismic loading and other loads imposed.
      7. Design seismic restraint system in accordance with OBC requirements and requirements of CAN/CSA S832 based non-exhaustively on the following:
         1. Anticipated ground motion (including spectral response acceleration as defined by local codes and authorities having jurisdiction).
         2. Soil type in specific geographic area.
         3. Importance Factor of Building.
         4. Specific element of component factor.
         5. Height factor.
         6. Element's or component's response modification factor.
         7. Element's or component's weight.
      8. For each element or component identified herein determine seismic risk rating score (low, moderate, or high) and Provide mitigation and reduction procedures in accordance with CAN/CSA S832.
      9. Include in seismic analysis calculated dead loads, static seismic loads, and capacity of materials utilized for connection of the equipment or system to building structure. Detail anchoring methods, bolt diameter, embedment, and welded length. Ensure seismic restraint devices are designed to accept, without failure, forces through components or system's center of gravity.
3. Execution
   1. INSTALLATION
      1. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with other work.
      2. Unless otherwise indicated by seismic Consultant specified herein, provide the following seismic mitigation measures to following building elements:
         1. Partitions:
            1. In buildings with flexible structural frames, anchor partitions to only structural element, such as a floor slab, and separate such partition by physical gap from other structural elements.
            2. Properly anchor masonry walls to the structure for restraint, so as to carry lateral loads imposed due to earthquake along with their own weight and other lateral forces.
         2. Ceilings and Lighting Fixtures:
            1. At regular intervals, laterally brace suspended ceilings against lateral and vertical movements, and provide with a physical separation at the walls. Conform to ASTM E 580.
            2. Independently support and laterally brace lighting fixtures. Refer to applicable portion of lighting Specifications.
         3. Storage Racks, Cabinets, and Bookcases:
            1. Install storage racks to withstand earthquake forces and anchored to the floor or laterally braced from the top to the structural elements.
            2. Anchor medical supply cabinets to the floor or walls and equip them with properly engaged, lockable latches.
            3. Anchor filing cabinets that are more than two (2) drawers high to the floor or walls, and equip all drawers with properly engaged, lockable latches.
            4. Anchor bookcases that are more than 762 mm (30") high to the floor or walls, and equip any doors with properly engaged, lockable latches.

END OF SECTION