Iso Floor Seismic for Data Centers and Electrical Equipment Rooms

Secure seismic design to withstand both horizontal and vertical ground motion forces.
Bernard Yacoub, CTIO, Digicel Haiti
2011-02-03

The secure solution

Bergvik provides a seismic restraint raised floor in compliance with the US Federal Government and international building code. Bergvik also has the expertise to determine seismic demand due to both horizontal and vertical ground motions at a given facility location worldwide and to design a raised seismic restraint support frame, if needed, for extreme ground motion forces.

Bergvik also has the ability to determine the shaking due to an earthquake, to help with the seismic demands for the fragility of the electrical equipment, data/server rack or other equipment mounted on Bergvik’s Iso Floor Seismic design.

Every project is designed by Bergvik in 3-D using Revit or Auto CAD. Layouts are provided for client’s approval prior to commencing with installation. Due to the flexibility of the Bergvik Iso Floor Seismic design, layout and equipment changes can be accommodated.

Iso Floor Seismic Design benefits

• The fully modular design allows for initial installation of the steel sub-structure only. Once other Sub Contractors have completed their work in the under-floor plenum, Bergvik can return to site and complete the installation. This process allows for faster installation by third party contractors.

• Bergvik Iso Floor Seismic Design provides up to 48 inches (1200 mm) between pedestals, allowing for up to 70% less pedestals than with conventional 24”x24” (600x600 mm) grid access floors. This affords the client maximum space in the under-floor plenum for chiller-piping, fire-suppression systems, full-size cable ladders, etc.

• No need for pre-welded support stands for heavy equipment. This allows the end user additional time to negotiate the purchase of high cost equipment such as switchgears, UPS and transformers.

• Allows for optimized equipment layout and full access to electrical, data, plumbing and ventilation under floor in service aisles.

• Bergvik offers panel sizes from 12-50x24 inches (315-1220x600 mm) under equipment rows, as well as for service aisles.

• Quick and easy installation due to due to the fully modular design.

• Fulfills all requirements according to ASTM E-84 / UL 723 / NFPA 266.

• Tested and approved according to NEBS GR 2930.

• Static and Seismic load calculations are provided as standard.

• Five-year standard warranty – priceless.

"Since its GSM Telecom Network launch in Haiti in 2006, Digicel has used the Bergvik Iso Floor raised floor and seismic zone 4 bracing system in three out of four Switch and Data Centers. On the 12th of January 2010 Haiti was devastated by a magnitude 7.2 Earth Quake that destroyed most of the Capital Port-au-Prince and southern region of the country. The Switch Rooms equipped with Bergvik Iso Floor remained operational, none of the racks fixed on seismic braces were affected; our network core survived the earthquake and kept the service up when the country most needed it.

We can highly recommend Bergvik as a vendor of raised floor and seismic bracing solutions."

Bernard Yacoub, CTIO, Digicel Haiti
2011-02-03
Heavy equipment is not a problem

During the initial design stage, the modular Iso Floor Seismic substructure and floor panels can easily be adapted to suit various equipment types and density layouts. This leaves all floor panels accessible in aisles, pathways, providing full and continuous access for changes or additions to the under-floor area. There is no need for separate floor stands as all Electrical Equipment sits directly on top of the Iso Floor Seismic substructure.

The modular design of the Iso Floor Seismic system allows for static loads of up to 800 psf (40 kN/m2 or 4,000 kg/m2). The distance between the primary beam sections (Lx) and pedestal placement on each primary beam (Ly) are the factors that decide the uniform distributed design load. The distance between the secondary beam sections (Lz) are normally 24 inches (600 mm), or based on the floor panel size needed in each specific area.

Floor layouts can easily be designed around large and bulky cable runs, as well as mechanical piping or ductwork. This creates a strong, flexible, easy to design, easy to install, cost effective and aesthetically pleasing solution for both below and above the floor level.

For extremely heavy load areas that may require support for up to 31,000 lbs (14,000 kg), a separate modular transformer support stand can be integrated into the floor system.
Fast and easy installation

Typical floor heights range from 300-1,200 mm (12-48 inches), and the floor design leveling capacity is +/- 25 mm (+/- 1 inch), to allow for the precise leveling of the finished floor.

Cable ladders, chiller piping, conduits, fire suppressant piping, etc. can be mounted directly to the Iso Floor Seismic pedestals using Bergvik’s Holder Clamp (pictured on page 7). This can make a significant reduction in the time and cost required to install these services.
The standard laminated floor panel is 38 mm (1.5 inch) thick, using a core of high density, moisture resistant and flame spread retardant particle board. To maximize the usage of the floor space and to allow for full access to all service aisles, floor panels are available in custom sizes. The three standard laminate finishes are M335 Granite, H818 Alder and A0040 Oak.

Bergvik’s laminate is applied with a direct lamination process, which prevents the panels from de-lamination. No glue is used in our lamination process. Bergvik laminate is antistatic, extremely durable and easy to clean.

- Electrically isolated for high personal safety.
- Custom panel sizes available to offer maximized optimization and access to service aisles.
- High mechanical strength, with the wood core offering negligible permanent deflection under load.
- Easy to handle due to its light weight, only 10 kg (22 lbs) for a 600x600 mm panel, and 11 kg (24 lbs) for a 24”x24” panel.
- Easy to clean, durable and resistant to harsh chemicals and battery acid.
- Fulfills all requirements according to ASTM E-84 / UL 723 / NFPA 266.
- Environmentally friendly and fully recyclable, unlike steel encapsulated cementitious panels, which generally end up in a landfill.
Take the worry out of the design process!

Bergvik takes the worry out of the design process. We custom design the floor for every project to provide our customers with the quality they expect and deserve. The equipment layout can be decided at the design stage and the floor is designed to adapt to your optimized equipment layout. As stated, we offer a standard 5 year warranty giving our customers the peace of mind they deserve.

Bergvik was founded in 1970. Through the years, we have exported our floor systems to more than 100 countries around the world.

Iso Floor specification 09 69 13

For a complete Iso Floor specification in PDF format, please download this document from our website at: [http://www.bergvik.com/ulfiles/images_42_SPECIFICATION_ISO_FLOOR.pdf](http://www.bergvik.com/ulfiles/images_42_SPECIFICATION_ISO_FLOOR.pdf)
Complete range of accessories

Bergvik offers a complete range of accessories and options for our raised floor systems. These typically include panel lifters, stairs, hand rails, ramps, border fascia panels, cable seals and grommets. Our popular Holder Clamp, which can be quickly mounted to a floor pedestal, provides simple and varied options for installation of cable ladders, cable trays, chiller piping, fire suppressant piping, smoke detectors, etc.

As part of our accessory range, we also offer various forms of airflow panels and grilles, as well as panels made of different materials and sizes. We can also provide vertically mounted emergency door openers and earthing bars. Contact us for specific data cut sheets on the listed accessories.

Bergvik Seismic Bracing Frames

In studies of earthquakes between 2000-2013, it was shown that the vertical ground motion has created significant damage to nonstructural components in buildings. In mission critical data centers, electrical and telecom environments, standard raised floors are commonly used and will not amplify the vertical ground motions. If a system is sensitive to shaking, it is likely to be sensitive in all three orthogonal directions. Companies are presently investing in lateral base isolation systems and will be shocked at the damage due to the vertical ground motions. The Seismic Bracing frame does not depend on any support from a raised floor, but is instead securely anchored directly from the equipment rack or electrical cabinet down to the concrete sub floor with seismic anchors.
Reference project providing highest quality and strength

33,000 sf Electrical Equipment Room installation for a technology company in Arizona. The Iso Floor is carrying a total load of about 12 million pounds or about 365 psf.

Battery racks weigh 740 psf (36.5 kN/m²)