Floating Floor Seismic Restraint Design

Floating floors, by nature of their design, can move horizontally when subjected to earthquakes. Large lateral movements could generate instability in the isolation pads or springs and must be prevented. The amount and type of restraint required is a function of the design earthquake and the properties of both the isolation system and the floor design.

Restraint Types

There are two basic types of floating floor seismic restraints – perimeter and interior. A perimeter isolation system consists of shock-absorbing pads spaced around the perimeter of the floor and attached to structural supports. These pads prevent direct contact between the floating floor and the supporting structural elements and their flexibility reduces the impact load on the floor and provides some damping for the horizontal motion. Ideally, the structural support will be integral with the building structural system, consisting of a structural wall or curb around the floor perimeter. Alternatively, the support system can be installed after the structure is complete by anchoring structural angles to the structural system. Both types of restraints are shown in Figures 1 and 2.

Interior restraints are embedded within the floating floor. Each restraint restricts seismic motion in all horizontal directions, reducing the number of restraints required. Large floors often require internal restraints to prevent buckling of the floor during an earthquake. Another common application is for a floor without perimeter supports where the use of angles is not desired. Figures 3 and 4 show typical installations of internal seismic restraints.

Restraint Selection

The choice of internal versus external seismic restraint most often depends upon the size of the floor to be restrained (preventing buckling in the floor system) and the presence or absence of a perimeter structural support. Kinetics Noise Control or the Structural Engineer or Architect of Record for the project should determine the buckling characteristics of the floor.

If a perimeter system is selected, the ability of any supporting structure (curb or wall) to carry the applied seismic load must be determined by the Structural Engineer of Record. If no adequate support is available, a support can be designed and supplied by Kinetics. The perimeter isolation system usually consists of twelve-inch wide neoprene pads spaced five to six feet on center, with the actual spacing determined by calculation. Kinetics PIB is placed between the pads to eliminate any flanking path for noise.

Internal restraints are used when they are required to prevent buckling of the floor or

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when no adequate perimeter support is available. The restraints are placed before the floor is formed in either the final position (RIM-type floor) or on the structural slab (lift-slab system). The outer portion of the restraint is attached to the floating floor while the inner portion is attached to the structural slab. Neoprene pads integral to the support provide the impact cushioning and damping required for proper restraint.

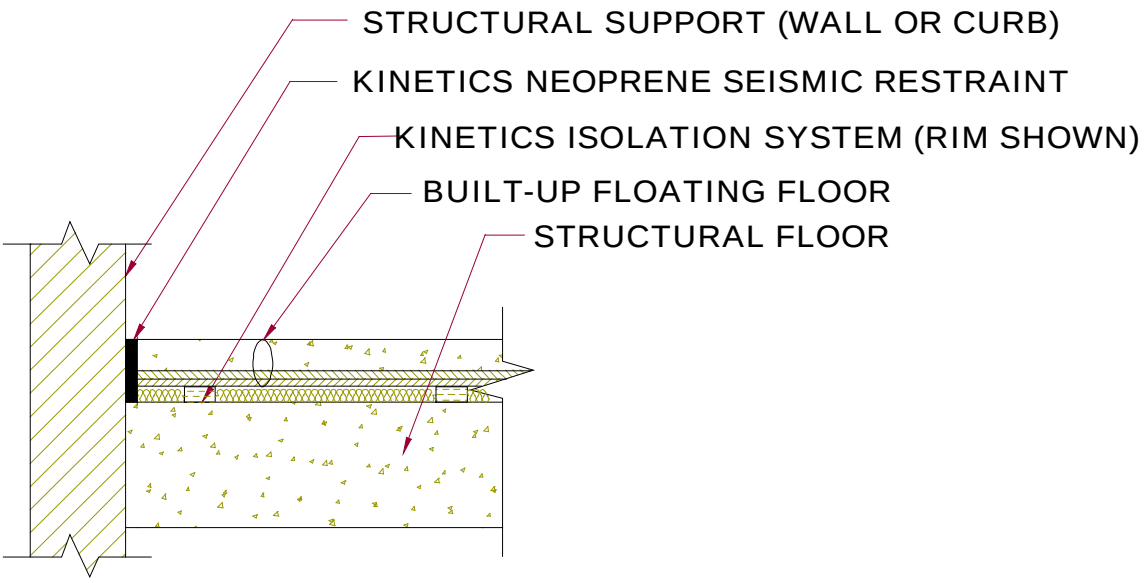
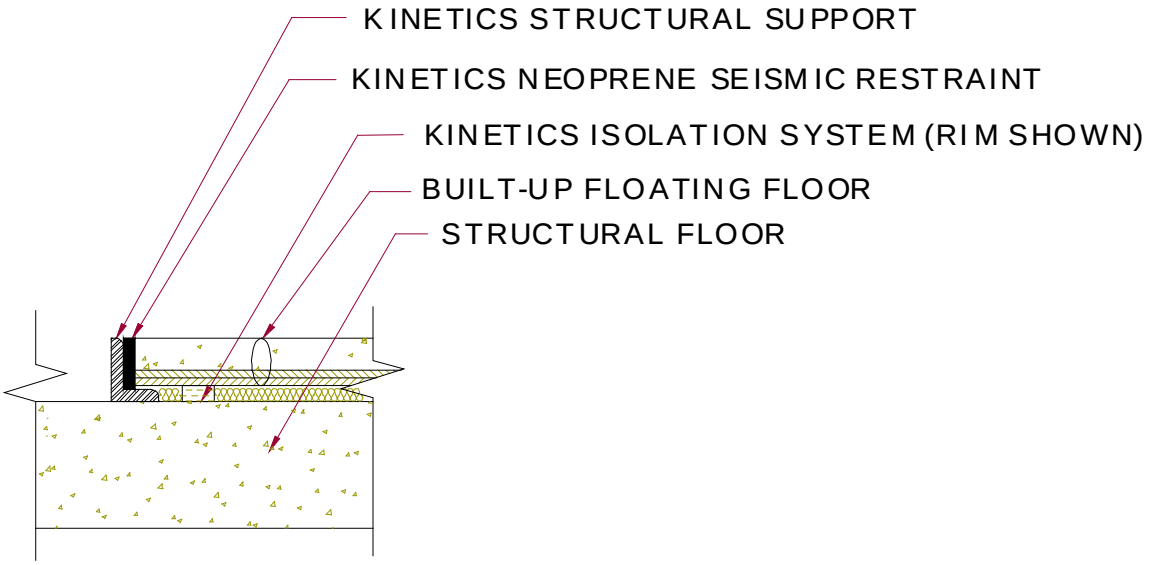


Figure 1. Floating Floor Perimeter Isolation w/Structural Support.



FLOATING FLOOR SEISMIC RESTRAINT DESIGN

RELEASE DATE: 5/21/04

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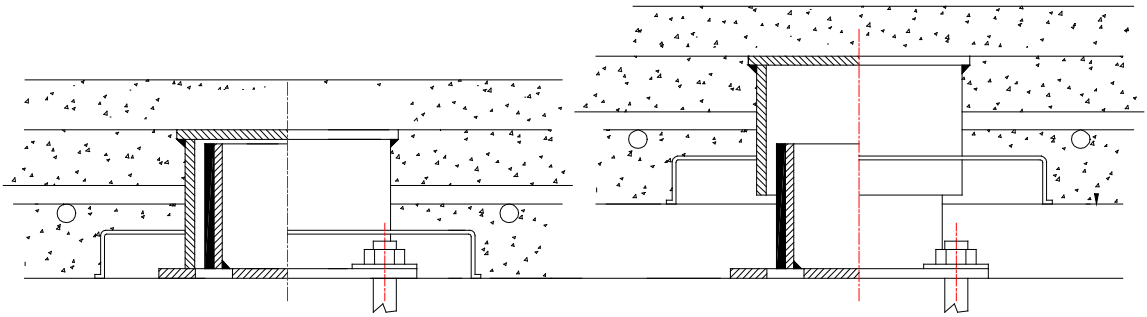

a) Initial Position b) Raised Position

Figure 3. Internal Restraint for Lift-Slab System.

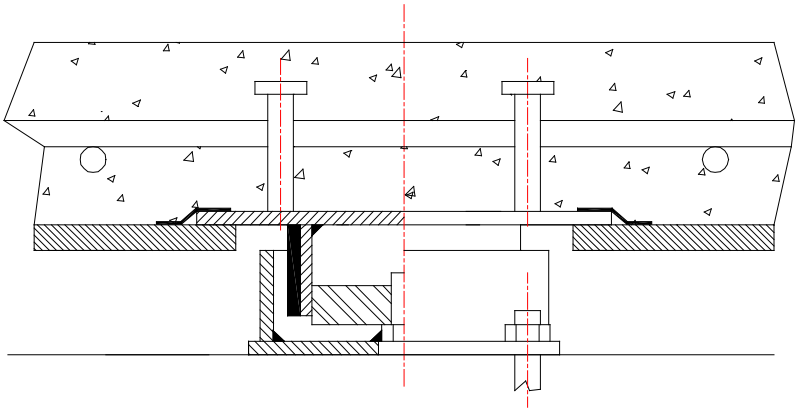

Figure 4. Internal Restraint for Roll-Out System.

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