

When to Use Separate Isolator/Restraints

As mentioned in the previous section, most isolated equipment can be restrained independently of resilient supports or by devices that include both resilient support and seismic restraint capabilities. This document will focus on those applications where independent isolators and restraints are preferable to combined units. Below are listed reasons for using separate support and restraint hardware.

- 1) Probably the most common reason for using separate restraints is for applications involving high level seismic applications. Typical combined isolator/restraint units are designed for a particular lateral force as compared to their weight. For example, a 1g rated seismic isolator will laterally restrain a force approximately equal to the load it will support.

Today's applications, however, involve applications where possibly as many as 4 or 5 g's might be required. The selection of combined isolator/restraint components that can work in this range is extremely limited. In these applications, independent isolators appropriate for the support load and snubbers appropriate for the lateral seismic load are often the most attractive alternative.

- 2) Anchorage is also an issue that can drive the need for separate restraints. Low profile restraints will typically withstand a higher lateral load than will high profile combination isolator/restraints. Where anchorage is critical it can frequently be optimized by using separate elements.
- 3) Access, adjustment, and visibility are frequently cited as conditions that make separated isolator/restraint elements preferable. In most combination devices the ability to "see" that there is clearance quickly and easily is questionable at best. Normally clearance is assured by shaking the unit, but sometimes this is not practical. Sometimes (but not always) with separate elements, this clearance can be "viewed" from a distance.
- 4) Depending on the installation, the support locations on the structure or the connections to the equipment are not rugged enough to withstand the seismic loads. In these cases, restraints can be relocated to areas where there is adequate capacity in the equipment and structure to ensure a good seismic load path.
- 5) Lastly, occasionally the equipment geometry or weight will make it possible to use fewer restraints if they are located remotely. For example, bases that are supported on 4 isolators and use 2 restraints are not uncommon.

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