

6.5 Furniture, Fixtures, Equipment and Contents

6.5.6 Miscellaneous Contents

6.5.6.1 Shelf-Mounted Items

Loose items stored on bookshelves, shelves of storage racks or cabinets, and store display racks are all vulnerable during earthquakes. This includes retail merchandise, pharmaceutical and medical supplies, laboratory supplies, stored inventory as well as shelved items found in every home, school or office.

Typical Causes of Damage

- Items may slide, break, or fall. Inventory may be damaged, library books and medical records may be scrambled or damaged; broken glass and spilled chemicals may be hazardous for occupants.
- Items falling from shelves can pose a safety hazard for occupants.

DAMAGE EXAMPLES



Figure 6.5.6.1-1 Merchandise fallen from drug store shelving in the 1979 magnitude-6.4 Imperial Valley Earthquake (NGDC, 2009).



Figure 6.5.6.1-2 Items fallen from kitchen cabinets in townhouse near Northridge Fashion Center in the 1994 magnitude-6.7 Northridge Earthquake. An occupant cut her foot on glass when she ran into the kitchen area in the dark when the power was out (NGDC, 2009).

Seismic Mitigation Considerations

- Unless each item is packed tightly or individually restrained, loose material will slide around during an earthquake. Thoughtful organization of shelved items can reduce the potential for damage. For instance,
 - Keep items in their original packaging
 - Place larger and heavier items on lower shelves and lighter and smaller items on upper shelves
 - Provide edge restraints with wood, clear plastic or wire as shown
 - Provide individual restraints for especially toxic or costly items
 - Purchase storage racks or shelving units with shelving that slopes 3–4 degrees towards the back; or attach a thin wedge to each shelf sloping towards the back as this prevents many items from falling to the floor
 - Provide positive latches to prevent cabinet doors or drawers from opening; baby proof latches are one example. Don't keep loose shelved items above a bed, desk or other location that is occupied for long periods of time.
 - In industrial settings, shrink wrapping of goods on pallets may reduce the risk of falling hazards

MITIGATION EXAMPLES



Figure 6.5.6.1-3 High school lab supplies protected on shelving with edge restraints (Photo courtesy of EQE for the Salt Lake City School District).



Figure 6.5.6.1-4 Shelf restraint example; shock cord made of wire and springs used to restrain liquor bottles (Photo courtesy of Robert Reitherman).



Figure 6.5.6.1-5 Plexiglass lip provides restraint for pharmaceuticals (Photo courtesy of Degenkolb Engineers).

MITIGATION DETAILS

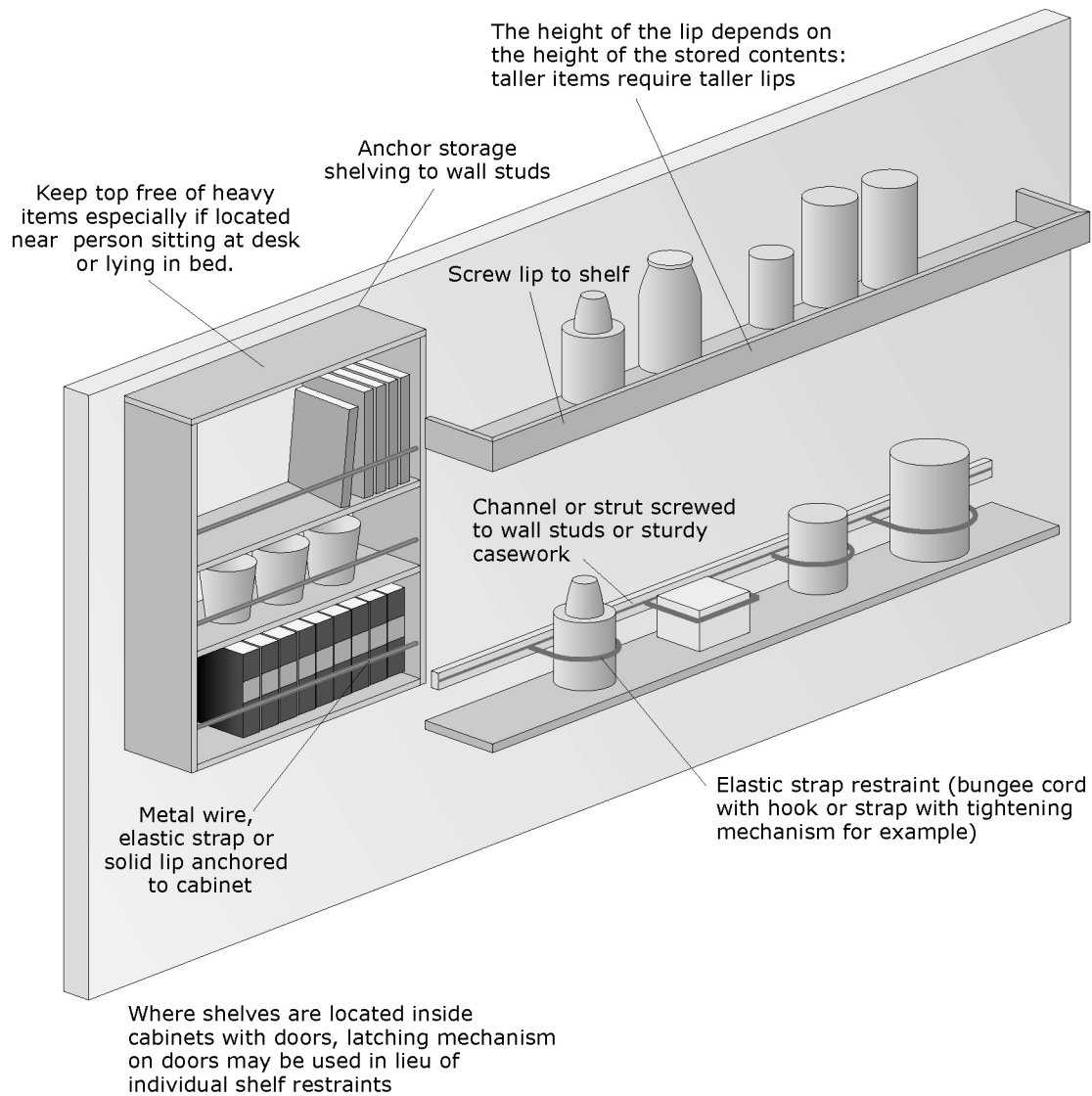


Figure 6.5.6.1-6 Shelf-mounted items (NE).