

## 6.5 FURNITURE, FIXTURES, EQUIPMENT AND CONTENTS

### 6.5.6 MISCELLANEOUS CONTENTS

#### 6.5.6.2 DESKTOP, COUNTERTOP ITEMS

Many types of office and laboratory equipment items rest on desktops, workbenches or countertops. This may range from microwaves, microscopes, lab and medical equipment to displayed items.

#### TYPICAL CAUSES OF DAMAGE

- Desktop and countertop items may be affected by movement of the surface on which they are supported; they may slide, bang, overturn, or fall. Equipment and glassware may be damaged or be broken.

## Damage Examples



Figure 6.5.6.2-1 Incubator in the microbiology lab at the University of Concepción was ruined in the 2010 magnitude-8.8 Chile Earthquake (Photo courtesy of Bill Holmes, Rutherford & Chekene).

## SEISMIC MITIGATION CONSIDERATIONS

- Provide bracing and anchorage for desks, work benches, and laboratory tables, if located near doors and exits, or if the supported items are required for post-earthquake operations.
- Provide bracing and anchorage for overhead items such as lights, air diffusers, ceilings, and piping that can fall and damage the desktop items.
- Provide tethers, anchors, bumpers, or other safety fasteners to keep desktop items from colliding with other items or falling. Many proprietary devices are available for this purpose; check the internet for seismic safety straps and devices. Many of these are the same as those used for computer equipment. Devices are also available that provide base isolation for individual pieces of delicate or valuable equipment.
- Ensure that any electrical cords or cables have sufficient slack to allow the item to travel to the end of any tether. Tangled cords and cables attached to one item that falls may pull other items down if the cords are tangled; use nylon ties to keep the cords and cables organized.
- Items must be anchored to structural wall or studs; do not use plaster or gypsum board for anchorage. Provide a continuous steel shape or wood 2x4 along the wall at a convenient height anchored to each stud or at 2 foot spacing to facilitate anchorage for multiple items.

## Mitigation Examples



Figure 6.5.6.2-2 Set-up for shake table testing at UC Irvine of typical laboratory bench and shelving with countertop equipment and shelved books and supplies. Testing was done in order to develop fragility curves for use in developing performance based design parameters (PEER Testbed Study on a Laboratory Building: Exercising Seismic Performance Assessment; Comerio, Editor. PEER 2005/12).

### Mitigation Details

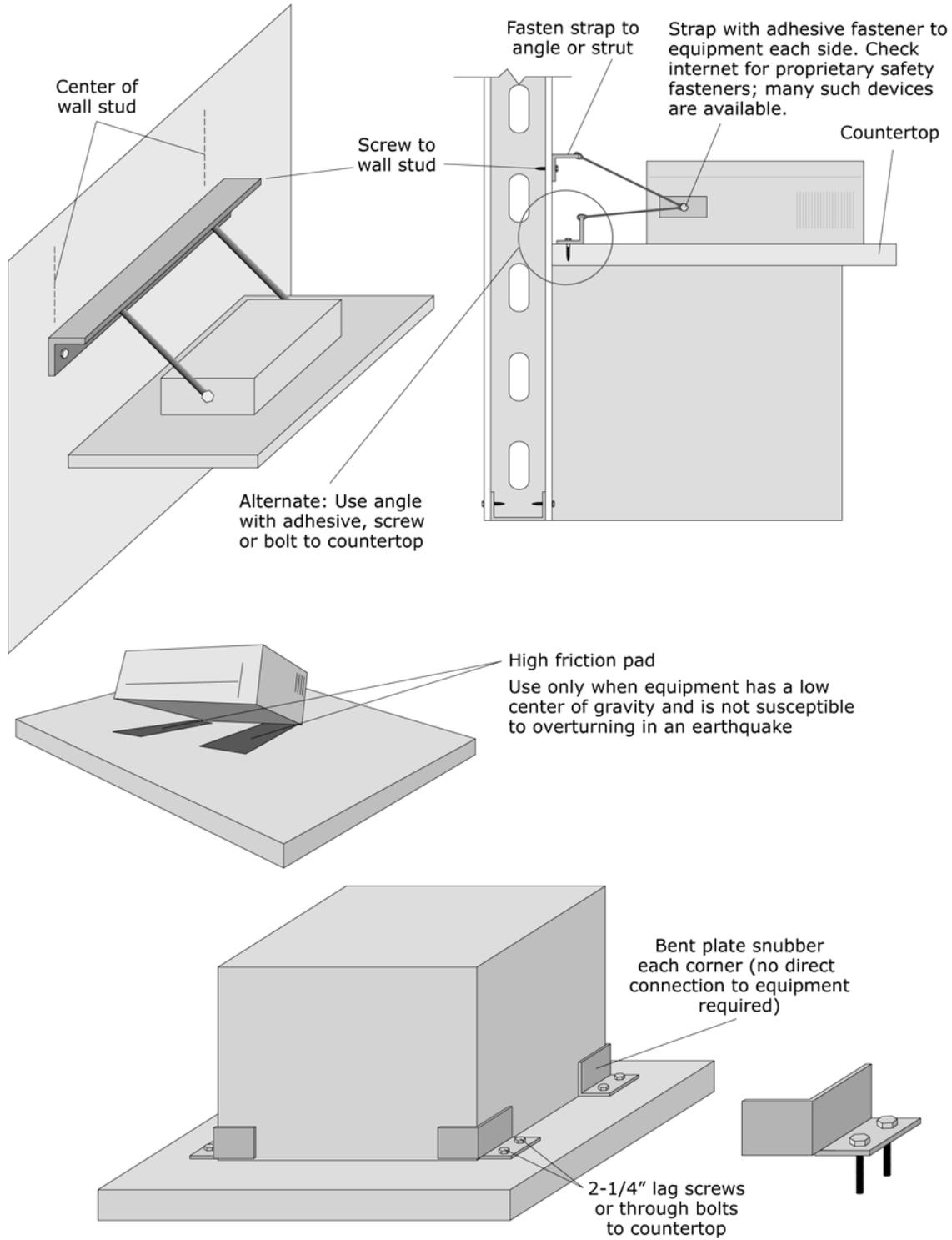


Figure 6.5.6.2-3 Desktop/countertop equipment restraints (NE).

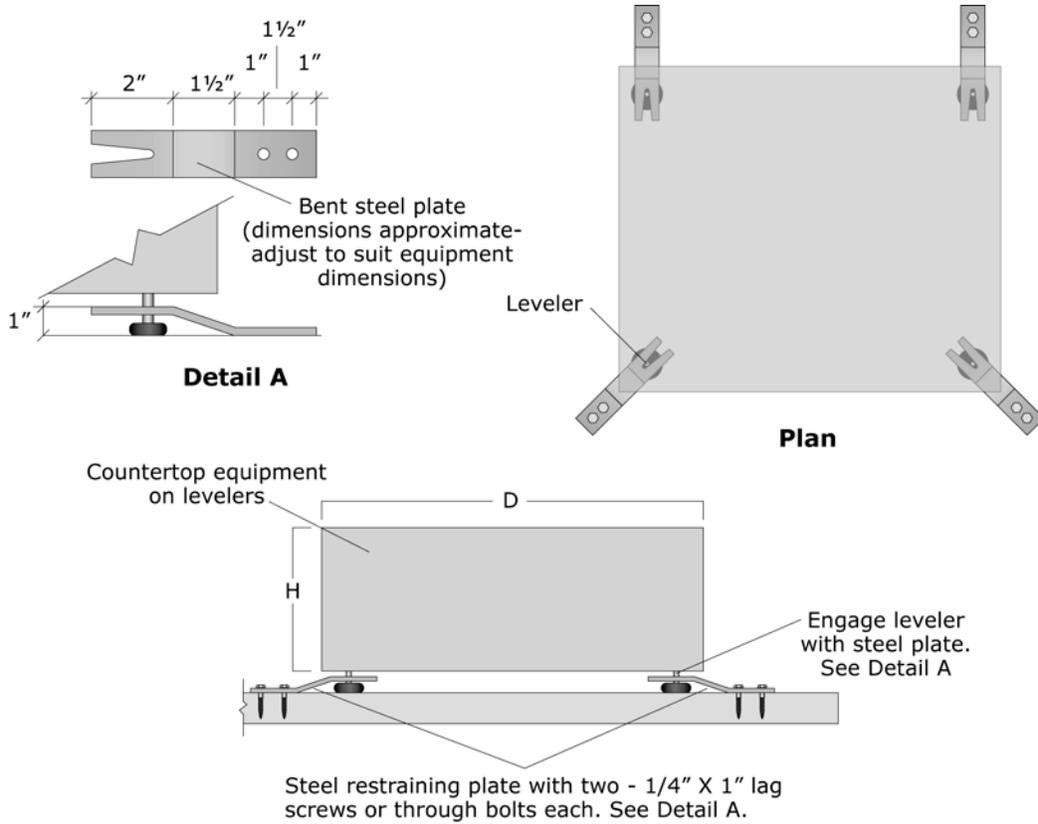


Figure 6.5.6.2-4 Desktop/countertop equipment restraining brackets (NE).

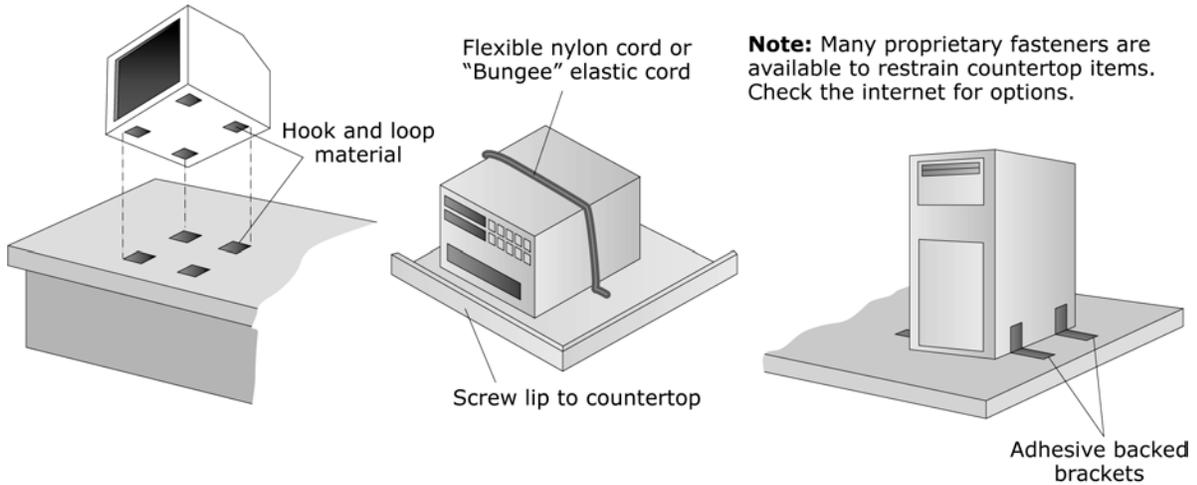


Figure 6.5.6.2-5 Desktop/countertop equipment restraining straps (NE).