

Figure 14.53 Control joint locations. (a) Wall elevation. (b) Balcony plan.

#### 14.9.4 Shrinkage strips

Shrinkage strips serve the same purpose as control joints. A strip of about 1 m width across a building is left during concreting, thus allowing the concrete on either side of the strip to shrink freely. After several weeks, when a significant amount of the drying shrinkage has occurred, the strips are poured and continuity is established.

The reinforcement crossing a shrinkage strip is usually continuous but is lapped or bent horizontally as shown in Figure 14.54 to allow unrestrained contraction on either side of the strip.

In long multistorey framed structures without stiff columns or walls, shrinkage strips are often placed in slabs at about 40 m centre. When there

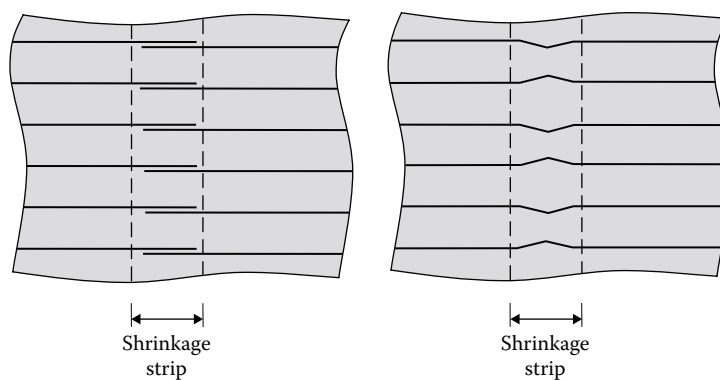


Figure 14.54 Alternative reinforcement details at shrinkage strips.

are stiff columns or walls, strips are required at much closer centres. Vertical shrinkage strips may also be used in long walls.

### 14.9.5 Expansion joints

Expansion joints separate two adjacent parts of a structure into completely independent units. They allow for expansion of concrete during curing and due to temperature rises, such as may occur in a fire or simply due to changes in the ambient temperature. By their nature, expansion joints also serve as contraction joints. Expansion joints are frequently located on a column line with double columns and beams, as shown in Figure 14.55a. Half joints or dapped-end joints (Figure 14.55b) also act as expansion joints.

The use of expansion joints in buildings is somewhat controversial. The contraction caused by shrinkage is usually several times greater than the expansion caused by ambient temperature rises. **Indeed, many large buildings have been built successfully without expansion joints.** Notwithstanding this, it is good practice to include expansion joints at abrupt changes in the plan dimensions of a building, as shown in Figure 14.55c, to avoid the stress concentrations and cracking that would otherwise occur at these locations.

It is important that movement joints in the concrete structure be accompanied by and be compatible with movement joints in the finishes, partitions and cladding attached to it. Movement in the concrete structure should not impose loads on the attached non-structural elements.

### 14.9.6 Structural joints

Structural joints allow free movement (translation and/or rotation) between two parts of a structure. The half joint of Figure 14.55b allows unrestrained

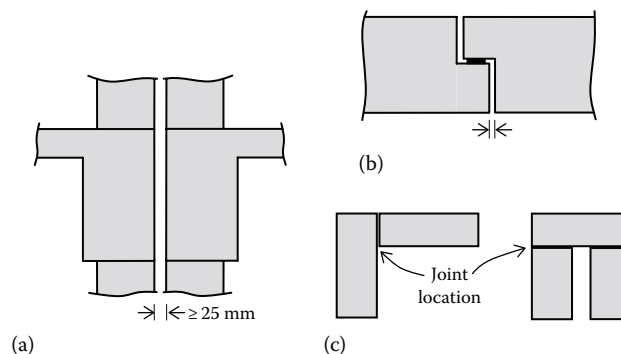


Figure 14.55 Expansion joint details. (a) Double column and beams. (b) Half joint. (c) Building plans – joint locations.