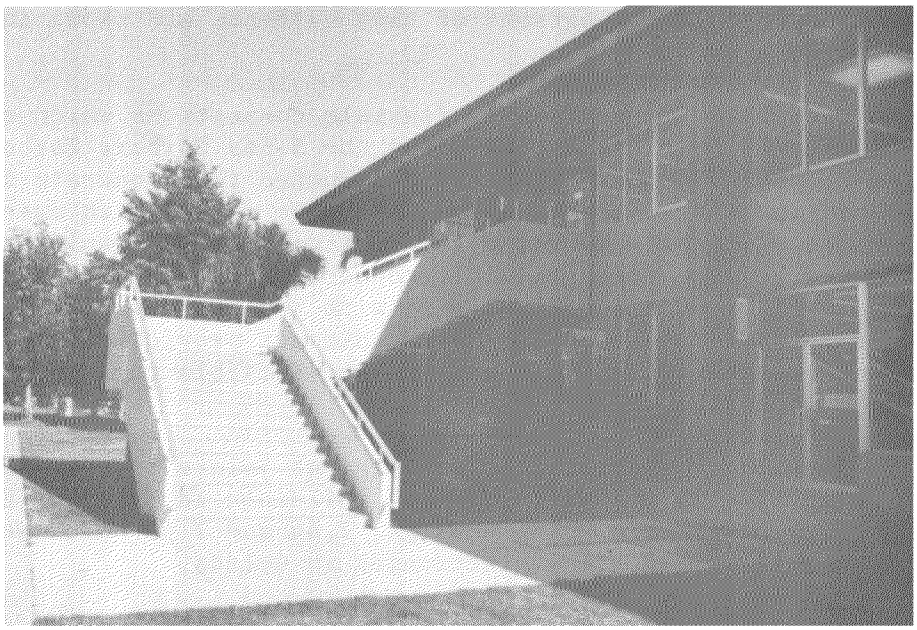

Fig. 11.7 Stairway from emergency exit on north side of UCSB Library I Building. Stairway and building are separated by a seismic joint.

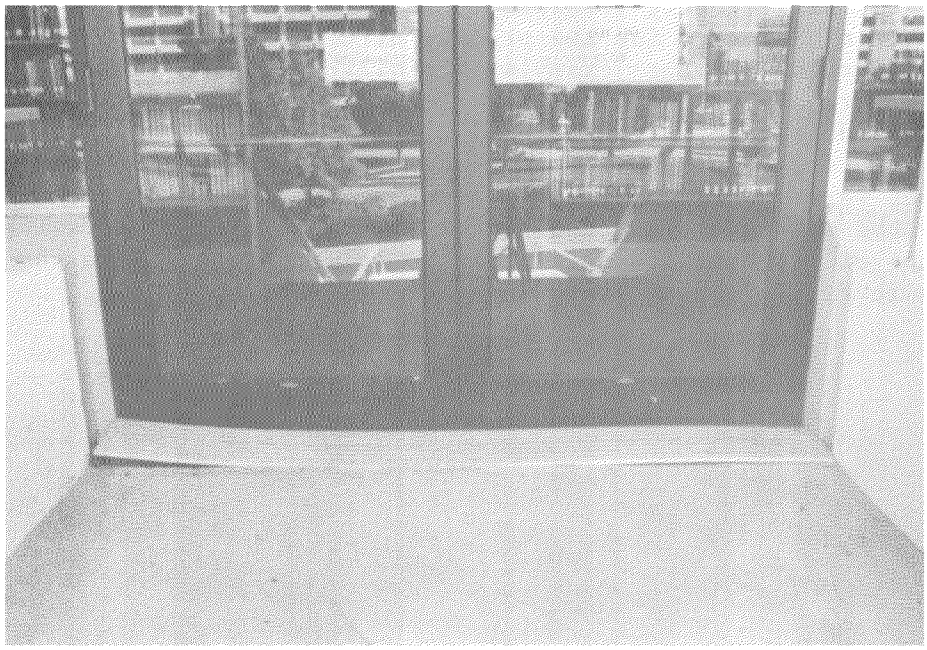

Fig. 11.8 Close-up of damage to seismic joint between stairway and building in Fig. 11.7. Note that damaged cover plate blocks the opening of emergency doors.

the bridge at Ward Memorial Boulevard and U.S. Highway 101, which is described in Chapter 5. Photographs of this evidence are shown in Figs. 5.13.

Another example of intentionally flexible connections which sustained earthquake damage is found at Marina #1 in the Santa Barbara Harbor. As described in Chapter 10, the marina is constructed from concrete floats whose alignment is maintained by rows of concrete piles which extend through holes in the floats to allow for vertical motion resulting from changes in water level. These flexible connections between floats and piles are achieved by providing each pile with a plywood gusset plate with a hole and guide rollers. The design did not provide adequate lateral resistance and extensive damage to the flexible connections resulted from the earthquake.

Locally nonlinear behavior also occurred at joints between reinforced concrete tilt-up panels in some industrial buildings in Goleta. Examples of this type of behavior are shown in Figs. 7.44 and 7.45 which were taken at the facilities of Delco Electronics in Goleta.

In contrast to the locally nonlinear behavior just described, nonlinear behavior distributed throughout many portions of a structural system also occurred in this earthquake. Such distributed nonlinear behavior resulted in many cases from damage to relatively stiff but weak secondary components distributed throughout the structural system. An example of such behavior is the architectural damage to plaster walls in relatively flexible modern multistory buildings. Photographs of this type of damage are shown in Chapters 7 and 8. The plaster walls are evidently not sufficiently flexible to sustain without damage the levels of deformation necessary for the primary structural frame to resist the earthquake forces. Another example of similar distributed nonlinear behavior occurred at the control tower of the Santa Barbara Municipal Airport. As described in Section 7.5, lateral reinforcement of the tower is provided by diagonal steel bracing tubes between columns. These tubes were not strong enough to resist the lateral deformations caused by the earthquake and consequently yielded at many locations. Photographs of structural damage at a typical location within the tower are shown in Figs. 7.60 to 7.63.