cracking in all five stories. The cracks were often found to extend through the entire thickness of the walls. Shown in Figs. 7.27, 7.28 and 7.30 are some of the cracks in the north-south shear wall in the first story and in Fig. 7.29 in the east-west shear wall. Several parallel cracks extending diagonally from floor to ceiling occurred in each wall in the first story. On the third story considerable cracking also occurred in the header over a doorway in the north-south interior shear wall, as shown in Fig. 7.31. The cracks extended through the wall as indicated by the mirror image crack pattern on the other side of the doorway, shown in Fig. 7.32. Diagonal cracks also occurred in other portions of the north-south shear wall in the third story, as shown in Fig. 7.33. Similar cracks occurred in the second, fourth and fifth stories of the same north-south shear wall. Repairs by epoxy injection are planned.

Biological Sciences II

The Biological Sciences II building is a six story reinforced concrete structure which is relatively symmetric. The plan dimensions are 120 feet by 120 feet. A photograph of the structure is shown in Fig. 7.34. Resistance to earthquake forces is provided by concrete shear walls which enclose stairs, utility shafts and elevators. Most of these elements are located at the perimeter of the building. The stair and elevator towers function as a closed box and are considerably more rigid than isolated shear walls. The stair towers at the ends of the building are 50 feet long in the east-west direction. However, the north-south length of the north tower is 28 feet, while that of the south tower is 10 feet. Thus, it is possible that a significant torsional response was induced by the earthquake.

The design of the building was governed by the earthquake resistance provisions of the 1964 edition of the Uniform Building Code. The minimum compressive strength of the concrete mix is 3750 psi for beams, columns, walls, footings, caissons, etc., and 5000 psi for certain columns. The reinforcing steel meets the requirements of A.S.T.M. A-36.

The earthquake caused structural damage to shear walls in the stair towers at the ends of the building. Diagonal and horizontal cracks formed in the exterior walls in each tower in the lower stories. Some typical examples of these cracks are shown in Figs. 7.35-7.37. Again repair by epoxy injection is planned.

Library III and University Center

These and other multistory reinforced concrete buildings on campus received damage to shear walls which was similar to that just described in other buildings. The cracking, however, occurred mostly in the lower stories. A photograph of the eight story Library III building is shown in Fig. 7.38.

7.3 Effects on Commercial and Residential Buildings

Within a five mile radius of the UCSB campus there are a number of commercial buildings which received significant earthquake damage.

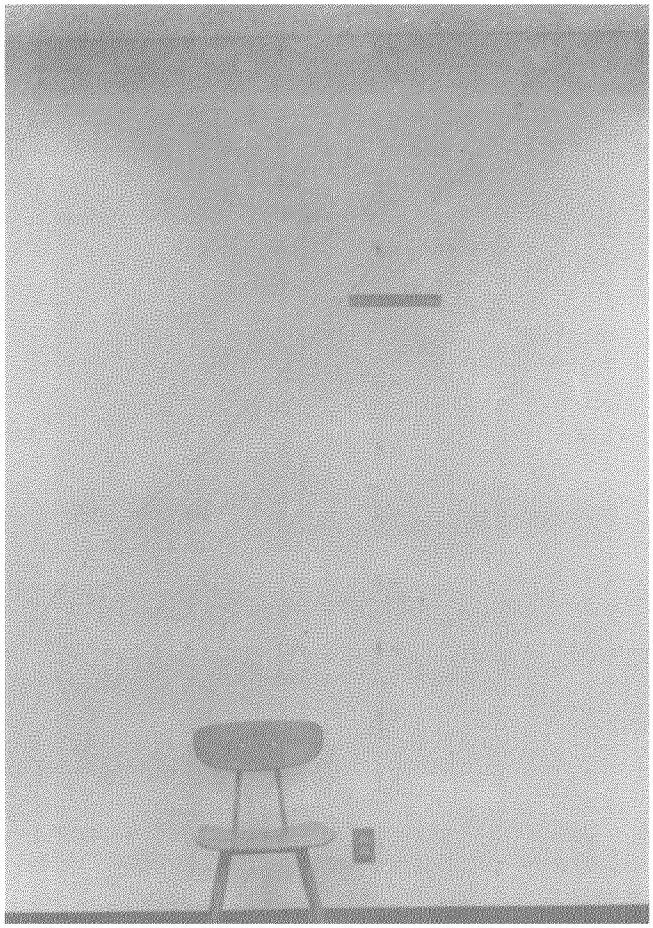

Fig. 7.27 Diagonal crack in north-south shear wall in first story of Engineering Building, UCSB. This crack extends through the thickness of the wall and is visible from the other side.

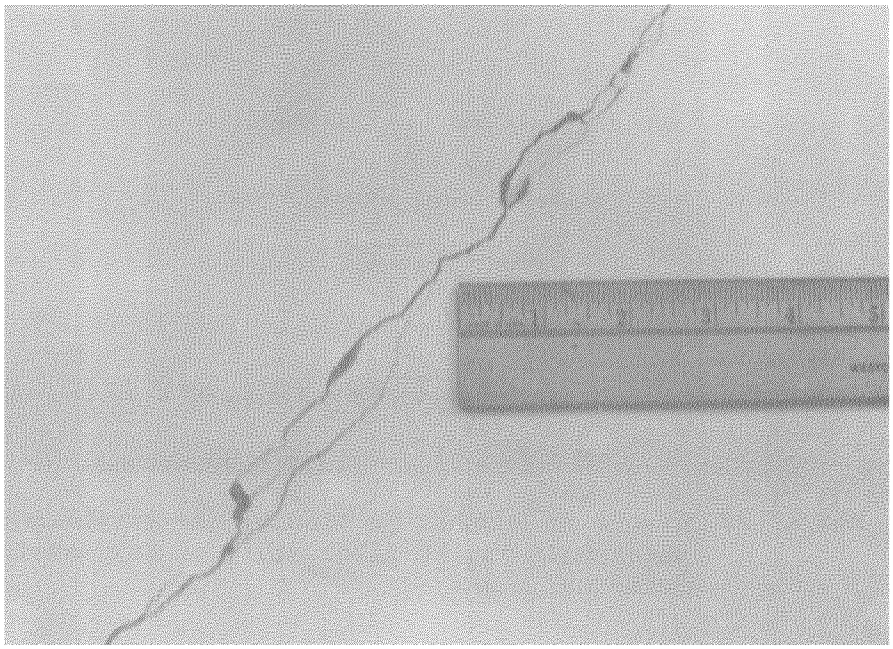

Fig. 7.28 Close up view of crack shown in Fig. 7.27.