PRELIMINARY FIELD NOTES
OF THE
GROUND SURFACE EFFECTS
ASSOCIATED WITH THE AUGUST 6, 1979
COYOTE LAKE EARTHQUAKE

by

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INTRODUCTION

The following field notes describe our preliminary assessment of the ground surface effects associated with the Coyote Lake earthquake of August 6, 1979. The field evaluation was conducted on the afternoon and early evening of August 6, and was confined to the portion of the Calaveras fault which extends from the southern end of Coyote Lake, south approximately 30 kilometers to the Town of Hollister, California. Additionally, our observations were confined primarily to paved roads that cross the mapped trace of the fault. The base map used for our field work was the 1974 Calaveras fault strip map prepared by Dorothy H. Radbruch-Hall entitled, "Map Showing Recently Active Breaks Along the Hayward Fault Zone and the Southern Port of the Calaveras Fault Zone, California" (MI-813). Portions of this map are included in order to show the locations of our field observations. It should be emphasized that these observations are based on a reconnaissance level field review conducted immediately following the earthquake, and therefore are preliminary. (See Figure 1.)
Figure 1. REGIONAL INDEX MAP

Position of location maps are shown along the trace of the Calaveras fault between Coyote Lake and Hollister

Topographic base from USGS 1:250,000
San Jose and Santa Cruz sheets

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Location 1 (12:46 p.m.) - Roop Road northeast of Gilroy (Gilroy Quadrangle, 7.5 minute) (See Map 1); near reported earthquake epicenter; master trace of Calaveras fault passes through the intersection of Roop Road, Gilroy Hot Springs Road and Leavesley Road; strike of the fault is approximately N30W; several tree limbs and a small amount of rock debris noted on Roop Road west of intersection; no fault-related surface displacement or ground cracking is noted at or near the intersection or within the first kilometer to the north along Gilroy Hot Springs Road, however, fresh slope failure cracks are found in the fill slope along the outside edge of Roop Road immediately west of the intersection.

Location 2 (1:02 p.m.) - Leavesley Road, approximately 0.3 kilometers south of the Roop Road intersection (Gilroy Quadrangle, 7.5 minute) (See Map 1); met Malcolm Clark and Andrei Sarna (U. S. Geological Survey), who have identified and are mapping a series of fresh, left-stepping, en echelon cracks in the asphalt pavement of Leavesley Road; cracking extends south along mapped fault trace for approximately 0.5 kilometers until the fault leaves the road; strike of the zone of cracking is generally N30W; cracks are commonly less than one meter in length with a maximum separation of 2 millimeters; although the pattern of surface cracking indicates right-lateral displacement, no cracks allow measurements of specific amounts of lateral displacement; many of the cracks appear to be older surface features that are most likely the result of aseismic creep; however, in many cases these cracks are widened and extended along their strike due to today's earthquake; the older sections of these cracks appear weathered and coated with dust, while the new breaks are characterized by fresh, shiny asphalt surfaces.

Location 3 (1:38 p.m.) - Leavesley Road, approximately 1 kilometer south of Location 2 (Gilroy Quadrangle, 7.5 minute) (See Map 1); no indication of fresh earthquake-related pavement cracks are noted in Leavesley Road; however, a well-defined set of left-stepping en echelon cracks with strikes ranging from N15E to N30E are found in the gravel driveway leading to the Frank Cota ranch house at the La Hoya Ranch, 3770 Leavesley Road; most cracks extend obliquely across the road and are characterized by 1 to 2 millimeter openings, and are less than 1 meter in length; some cracks are defined by faint, shallow depressions in the road base where the open cracks are "bridged" by gravel and dust; a second and more subtle set of cracks are located near where the gravel road turns west into the Cota yard; the strikes of these cracks are subparallel to the trace of the fault and range from N8W to N15W; the location of the fault, as defined by these cracks is along the east side of a low shutter ridge on which the Cota residence sits (Note: 8/8/79 ground cracks in driveway have been masked by traffic); location and trend of the zone of cracking coincides with the right-lateral deflection in a northeast-southwest trending picket fence that encloses the Cota yard; deflection in the result of aseismic creep, and measures approximately 0.5 meters (see Schematic Drawing, Figure 2); the chimney of the Cota home was thrown down, however, no other major damage is noted in the house or its contents.
FIGURE 2. SCHEMATIC DRAWING OF GROUND CRACKING OBSERVED AT THE LA HOYA RANCH (SEE MAP 1, LOCATION 3)

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Location 4 (2:23 p.m.) - Canada Road, approximately 2.5 kilometers northeast of the intersection of Canada Road and Pacheco Pass Highway 152, directly east of BM 414 (Gilroy Hot Springs Quadrangle, 7.5 minute) (See Map 2); no evidence of fault-related ground rupture cracks noted in road pavement; outer edge of road (i.e. downhill side) shows numerous old and a number of new settlement cracks; many of the older settlement cracks have been extended and widened by today's event.

Location 5 (3:18 p.m.) - Pacheco Pass Highway 152, immediately east of BM 160 and north of San Felipe Lake (i.e. Soap Lake) (San Felipe Quadrangle, 7.5 minute) (See Map 2); this location has the most dramatic fault-related surface features yet noticed; just east of BM 160, a very well-defined crack crosses the highway and extends beyond the pavement (See Figure 3); the crack strikes N20W and displays 2 to 3 millimeters of right-lateral displacement; this break appears to represent the main surface expression of the fault at this location (Note: 8/8/79 maximum right lateral displacement of 5 millimeters measured); extension of fault south of road would place the fault trace along the western edge of San Felipe Lake and through a series of sag ponds located south of the lake; this location is immediately west of the BLM monument array; Bob Sharp and Jim Lienkemper (U. S. Geological Survey) arrive; two relatively strong aftershocks are felt at 3:33 p.m. and 3:35 p.m.; to the east of the main break for a distance of approximately 0.7 kilometers, the pavement is crossed by a number of fresh cracks; these cracks are widely spaced, discontinuous, and northwest trending; the Hernandez residence, located about 0.5 kilometers east of the main break was severely shaken, although no structural damage is noted, all of the cupboards were emptied, and the china cabinet, TV console and refrigerator were overturned; west of the home a buried water pipe was broken; at the Fehlman residence (located northeast of the Hernandez home) the chimney was thrown to the east, cupboards were emptied, furniture and planter tubs displaced to the east; waterlines ruptured, several cracks noted in the dirt driveway along east side of house. Mrs. Fehlman reports that the bulge in the driveway formed as a result of the earthquake; the damage to the homes and cracking of the road east of the main break appears to be related to severe ground shaking; this area is underlain by a thin cover of alluvial materials which overlie the bedrock at the northern edge of the San Felipe Valley; these conditions intensified the shaking characteristics in this portion of the fault zone; residents west of the main break reported refrigerators overturned, fallen chimneys and water thrown out of cattle troughs (Bettencourt Dairy).

Location 6 (4:32 p.m.) - Shore Road near the Tequisquita Slough bridge (San Felipe Quadrangle, 7.5 minute) (See Map 3); a single well-developed crack crosses the pavement striking N20-25W; the crack crosses through a wide, heavily patched section of the road that forms a slight down-to-the-east ramp; no lateral offset is noted; however, at the southern edge of the road the east side is down approximately 1 centimeter.
FIGURE 3. CRACK MAP, PACHECO PASS
HIGHWAY 152 - Cracks represent main surface rupture. Right lateral displacement of asphalt curbs and painted lines are expressed in millimeters and measured on the dates indicated (See Map 2, Location 5).
Location 7 (5:04 p.m.) - Intersection of Bolsa Road and McConnell Road (San Felipe Quadrangle, 7.5 minute (See Map 3); no indication of new cracks in the pavement for a distance of several hundred meters along both McConnell Road and Bolsa Road.

Location 8 (5:31 p.m.) - Immediately east of the intersection of Wright Road and Southern Pacific Railroad (Hollister Quadrangle, 7.5 minute) (See Map 4); a few very small, fresh cracks are noted in the asphalt pavement of Wright Road; the center line of the road and the railroad tracks to the south show clear evidence of aseismic creep; this site is a government instrument location (i.e. alignment array and creep meter).

Location 9 (6:03 p.m.) - Town of Hollister (Hollister Quadrangle, 7.5 minute) (See Map 4); several stores with plate glass windows broken; no evidence of fresh cracks in pavement is noted along mapped trace of the fault.