DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

BIBLIOGRAPHY ON LANDSLIDES, SOIL LIQUEFACTION, AND RELATED GROUND FAILURES IN SELECTED HISTORIC EARTHQUAKES

By

David K. Keefer and Nancy E. Tannaci

Open File Report 81-572

May 1981

This report is preliminary
and has not been reviewed
for conformity with
U.S. Geological Survey
editorial standards

INTRODUCTION

The purpose of this bibliography is to provide citations to original sources of data on ground failures in 40 selected earthquakes. The bibliography was compiled as part of a review of earthquake-induced ground-failure occurrence. A preliminary review paper has been published[1], and a final review paper is in preparation. Earthquakes covered by the review and bibliography constitute a sample of well-documented events with Richter magnitudes greater than 5 from most of the earth's major seismic regions. Significant ground failures occurred in each of these earthquakes. The bibliography, thus, provides a broad catalog of literature citations for researchers working on earthquake-induced landslides, soil liquefaction, and related phenomena. Citations are given for 10 earthquakes in California, 2 in Alaska, 7 elsewhere in the United States, 8 in mainland Asia or the Middle East, 5 in Central or South America, 4 in Japan, and 1 each in Italy, Canada, New Guinea, and New Zealand (Table 1).

The citations include (1) general post-earthquake reports in which ground failures are described with other earthquake effects such as the nature of ground shaking, surface faulting, and damage to civil works, (2) intensity reports, in which ground failures are used as evidence to determine ground-shaking

[1] Keefer, D. K., Wieczorek, G. F., Harp, E. L., and Tuel, D. H., 1978, Preliminary assessment of seismically induced landslide susceptibility: International Conference on Microzonation, 2d San Francisco, Proceedings, v. 1, p. 279-290, reprinted in Brabb, E. E., ed., 1979, Progress on seismic zonation in the San Francisco Bay region: U.S. Geological Survey Circular 807, p. 49-60.

TABLE 1: TYPES OF GROUND FAILURES IN HISTORIC EARTHQUAKES

(1) M_S = Surface wave magnitude
M_L = Local magnitude
m_b = Body wave magnitude
(2) X = Numerous or significant ground failures reported
m = Small numbers of ground failures of minor significance reported
(3) Includes landslides in man-made fill
(4) C = Compaction and settlement of ground
F = Fissuring not caused by soil liquefaction or surface faulting
T = Cracks or falls in tunnels, mines, or other underground structures
H = Subsidence over caverns, mines, karstic sinkholes, or other underground openings
A = Snow avalanches

Earthquake Name/Location	Date	Magnitude (1)	Landslides in Rock (2)	Landslides in Soil (2, 3)	Soil Liquefaction Phenomena (2)	Other Ground Failures (4)
New Madrid, Missouri	16 Dec. 1811	7.2 $(m_b)^5$				
	23 Jan. 1812	7.1 $(m_b)^5$	m	X	X	
	7 Feb. 1812	7.4 $(m_b)^5$				
Charleston, South Carolina	1 Sept. 1886	6.8 $(m_b)^6$	m	X	X	C,F
San Francisco, Calif.	18 April 1906	8.25 (M_S)	X	X	X	C,F
Kansu(Haiyun), China	16 Dec. 1920	8.5 (M_S)		X		F
Bihar, India-Nepal	15 Jan. 1934	8.3 (M_S)	X	X	X	F
Imperial Valley, Calif.	19 May 1940	7.1 (M_S)		X	X	C,F
Vancouver Island, British Columbia, Canada	23 June 1946	7.2 (M_S)	X	X	X	C,F
Fukui, Japan	28 June 1948	7.2 (M_L)	m	X	X	
Puget Sound, Washington	13 April 1949	7.0 (M_L)	X	X	X	C,F,A
Khait, Tadjikistan, USSR	10 July 1949	7.6 (M_S)	X	X	X	
Assam, India	15 Aug. 1950	8.6 (M_S)	X	X	X	C,F
Daly City, California	22 March 1957	5.3 (M_L)		X	m	C,F
Southeastern Alaska	10 July 1958	7.9 (M_S)	X	X	X	F,A
Hebgen Lake, Montana	18 Aug. 1959	7.1 (M_L)	X	X	m	F
Chile	22 May 1960	8.3-8.5 (M_S)	X	X	X	
Alaska	27 March 1964	8.4 (M_S)	X	X	X	C,F,A
Niigata, Japan	16 June 1964	7.25-7.5 (M_L)	X	X	X	C,F,T
Puget Sound, Washington	29 April 1965	6.5 (M_S)	m	X	m	C,F
Parkfield-Cholame, Calif.	28 June 1966	6.2 (M_S)		X	m	C,F,H
Inangahua, New Zealand	23 May 1968	7.1 (M_S)	X	X	m	C,F,T,H
Peru	31 May 1970	7.8 (M_S)	X	X	X	C,F,A
Madang, Papua New Guinea	31 Oct. 1970	7.0 (M_S)	X	X	X	C,H
San Fernando, California	9 Feb. 1971	6.5 (M_S)	X	X	X	C,F
Honomu, Hawaii	26 April 1973	6.1 (M_S)	X	X		C,H
Indus-Kohistan, Pakistan	28 Dec. 1974	6.2 (M_S)	X	X		
Kilauea, Hawaii	29 Nov. 1975	7.1-7.2 (M_S)	X			
Guatemala	4 Feb. 1976	7.5 (M_S)	X	X	X	
Khulm, Afghanistan	19 March 1976	5.5 (M_S)	X	X		C,F
Friuli, Italy	6 May 1976	6.5 (M_S)	X	X	X	F
	15 Sept. 1976	6.0 (M_S)				
Panama	11 July 1976	7.0 (M_S)	X	X		
Tangshan, China	27 July 1976	7.7-7.9 (M_S)	m	X	X	H
Khurgu, Iran	21 March 1977	6.9 (M_S)	X	m	m	F,T
San Juan Province, Argentina	23 Nov. 1977	7.2-7.4 (M_S)	X	X	X	C,F
Izu-Oshima Kinkai, Japan	14 Jan. 1978	6.8 (M_S)	X	X	X	C,F
Miyagi-Ken-Oki, Japan	12 June 1978	7.4 (M_S)	X	X	X	C,F,H
Santa Barbara, Calif.	13 Aug. 1978	5.6 (M_S)	X	m	m	T,C,F
Homestead Valley, Calif.	15 March 1979	5.2 (M_L)	m	m		C,F
Coyote Lake, California	6 Aug. 1979	5.4 (M_S)	X	m		F
Mount Diablo, California	24 Jan. 1980	5.8 (M_S)	X	m		C
	26 Jan. 1980	5.2 (M_S)				
Mammoth Lakes, California	25 May 1980 (16:33 GMT)	6.1 (M_S)				
	25 May 1980 (16:49 GMT)	6.0 (M_L)	X	X	X	C, A
	25 May 1980 (19:44 GMT)	5.8 (M_S)				
	27 May 1980	6.0 (M_S)				

(5) Magnitude estimated by Nuttli (1973) from relations involving attenuation of Modified Mercalli Intensity, attenuation of particle velocity, and magnitude
(6) Magnitude estimated by Bollinger (1977) from relations involving attenuation of Modified Mercalli Intensity, attenuation of particle velocity, and magnitude

intensities, (3) reports specifically describing ground-failure types and distribution throughout all or part of the region affected by an earthquake, and (4) reports of detailed geological and geotechnical studies at individual ground failure sites. In addition, the bibliography contains a few selected references that do not contain ground-failure information, but rather seismic information (magnitude, hypocenter location, source zone location and parameters, ground-motion characteristics, and intensities). These references are identified by an "(s)" in the left margin. In some cases, several citations are published in one document. In such cases a general reference is given to the entire document, and individual citations are listed under the document reference.

In the bibliography, citations are grouped by earthquake. Table 1 shows the earthquakes for which bibliographic information is compiled and the general types of ground failures that occurred in each earthquake. The four general types of ground failures are landslides in rock, landslides in soil, soil liquefaction phenomena, and other ground failures. Landslides in rock involve the failure and subsequent movement of material from slopes that, prior to failure, were composed of intact bedrock. Landslides in soil involve failure and movement of material from slopes made up of unconsolidated or poorly consolidated aggregates of mineral grains with or without organic constituents. Overlap exists between the landslides in soil category and the soil liquefaction phenomena category because some landslides in soil are caused by liquefaction.

Liquefaction occurs when dynamic loading of a saturated sand or silt causes pore-water presssures to increase to levels where grain-to-grain contacts are lost and the material temporarily behaves as a viscous fluid. In addition to some types of landslides, liquefaction causes settlement of the ground surface, settlement and tilting of engineering structures, flotation of bouyant, buried structures such as tanks and timber piles, fissuring of the ground surface, and flow of soil into water wells. A common manifestation of liquefaction is the formation of sand boils--short-lived fountains of soil and water that emerge from fissures or vents and leave freshly-deposited, conical mounds of soil on the ground surface.

Other types of ground failures are identified individually in Table 1. Among the most common of these are ground settlements caused by vibrational compaction of loose materials and ground fissures of non-tectonic origin[2].

2 Ground fissures caused by surface faulting are excluded from this category.

BIBLIOGRAPHY

NEW MADRID, MISSOURI	16 December 1811	m_b = 7.2
	23 January 1812	m_b = 7.1
	7 February 1812	m_b = 7.4

Broadhead, G. C., 1902, The New Madrid earthquake: The American Geologist, v. 30, p. 76-87.

Coffman, J. L., and von Hake, C. A., 1973, Earthquake history of the United States: Washington, D.C., U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Publication 41-1, 208 p.

Fuller, M. L., 1912, The New Madrid earthquake: U.S. Geological Survey Bulletin 394, reprint edition, 117 p.

King, J. E., 1978, New evidence on the history of the St. Francis Sunk Lands, northeastern Arkansas: Geological Society of America Bulletin, v. 89, p. 1719-1722.

Lyell, C., 1849, A second visit to the United States of North America: New York, Harper & Brothers Publishing Company, v. 2, 287 p.

McGee, W. J., 1893, A fossil earthquake: Geological Society of America Bulletin, v. 4, p. 411-414.

Mitchill, S. L., 1815, A detailed narrative of the earthquake which occurred on the 16th day of December, 1811: Literary and Philosophical Society of New York, Transactions, v. 1, p. 281-307

Morse, W. C., 1941, New Madrid earthquake craters: Seismological Society of America Bulletin, v. 31, no. 4, p. 309-320.

(s) Mosaic Magazine, 1976, Quakes in search of a theory: Washington, D.C., National Science Foundation, v. 7, no. 4, p. 2-11.

Nuttli, O. W., 1973, The Mississippi Valley earthquakes of 1811 and 1812: intensities, ground motion, and magnitudes: Seismological Society of America Bulletin, v. 63, no. 1, p. 227-248.

Penick, J., Jr., 1976, The New Madrid earthquakes of 1811-1812: University of Missouri Press, 181 p.

Sampson, F. A., 1913, The New Madrid and other earthquakes of Missouri: Seismological Society of America Bulletin, v. 3, no. 2, p. 57-71.

Saucier, R. T., 1977, Effects of the New Madrid earthquake series in the Mississippi alluvial valley: Vicksburg, Mississippi, Soils and Pavements Laboratory, U.S. Army Engineer Waterways Experiment Station, Miscellaneous Paper S-77-5, 10 p.

Shepard, E. M., 1905, The New Madrid earthquake: Journal of Geology, v. 13, p. 45-62.

Usher, F. C., 1837, On the elevation of the banks of the Mississippi, in 1811: The American Journal of Science and Arts, v. 31, p. 294-296.

(s) Zoback, M. D., Hamilton, R. M., Crone, A. J., Russ, D. P., McKeown, F. A., and Brockman, S. R., 1980, Recurrent intraplate tectonism in the New Madrid seismic zone: Science, v. 209, no. 4460, p. 971-976.

CHARLESTON, SOUTH CAROLINA 1 September 1886 m_b = 6.8

Dutton, C. E., 1889, The Charleston earthquake of August 31, 1886: U.S. Geological Survey Ninth Annual Report 1887-1888, p. 203-528.

Rankin, D. W., ed., 1977, Studies related to the Charleston, South Carolina, earthquake of 1886--a preliminary report: U.S. Geological Survey Professional Paper 1028, 204 p.

Ground-failure or seismic information in:

Bollinger, G. A., Reinterpretation of the intensity data for the 1886 Charleston, South Carolina earthquake, p. 17-32.

(s) Rankin, D. W., Studies related to the Charleston, South Carolina, earthquake of 1886--introduction and discussion, p. 1-15.

SAN FRANCISCO, CALIFORNIA 18 April, 1906 M_s = 8.25

(s) Bolt, B. A., 1968, The focus of the 1906 California earthquake: Seismological Society of America Bulletin, v. 50, no. 1, p. 457-471.

(s) Boore, D.M., 1977, Strong-motion recordings of the California earthquake of April 18, 1906: Seismological Society of America Bulletin, v. 67, no. 3, p. 561-577.

Carey, E. P., 1906, The great fault of California and the San Francisco earthquake, April 18, 1906: Journal of Geography, v. 5, no. 7, p. 289-301.

Clough, G. W., and Chameau, J. L., 1979, A study of the behavior of the San Francisco waterfront fills under seismic loading: The John A. Blume Earthquake Engineering Center, Department of Civil Engineering, Stanford University, Report No. 35, 125 p.

Davison, C., 1906, The San Francisco earthquake of April 18: Scientific American Supplement no. 1586, p. 25416, May 26, 1906.

Derleth, C., Jr., 1906a, Report by Prof. C. Derleth, Jr.: Engineering News, v. 55, no. 18, p. 503-504.

_____1906b, Some effects of the San Francisco earthquake on water-works, streets, sewers, car tracks, and buildings: Engineering News, v. 55, no. 20, p. 548-554.

_____1906c, Additional examples of street subsidence in San Francisco: Engineering News, v. 55, no. 21, p. 580-581.

_____1906d, The destructive extent of the San Francisco earthquake: Engineering News, v. 55, no. 26, p. 707-713.

Duryea, E., Jr., and others, 1907, The effects of the San Francisco earthquake of April 18, 1906, on engineering constructions: American Society of Civil Engineers Transactions, v. 59, paper no. 1056, p. 208-329.

Gilbert, G. K., Humphrey, R. L., Sewell, J. S., and Soule, F., 1907, The San Francisco earthquake and fire of April 18, 1906 and their effects on structures and structural materials: U.S. Geological Survey Bulletin 324, 170 p.

Himmelwright, A. L. A., 1906, The San Francisco earthquake and fire: New York, The Roebling Construction Co., 270 p.

Hyde, C. G., 1906a, The structural, municipal and sanitary aspects of the central California catastrophe, pt. III: Engineering Record, v. 53, no. 24, p. 737-740.

_____1906b, The structural, municipal and sanitary aspects of the central California catastrophe, pt. IV: Engineering Record, v. 53, no. 25, p. 765-769.

(s) Jennings, P. C., and Kanamori, H., 1979, Determination of local magnitude, M_L, from seismoscope records: Seismological Society of America Bulletin, v. 69, no. 4, p. 1267-1288.

Jordan, D. S., ed., 1907, The California earthquake of 1906: San Francisco, A. M. Robertson, 360 p.

Ransome, F. L., 1906, The probable cause of the San Francisco earthquake: The National Geographic Magazine, v. 17, no. 5, p. 280-296.

Schlocker, J., and Bonilla, M. G., 1963, Engineering geology of the proposed nuclear power plant site on Bodega Head, Sonoma County, California: U.S. Geological Survey TEI-844, prepared on behalf of the U.S. Atomic Energy Commission, 37 p.

Schussler, H., 1906, The water supply of San Francisco, California before, during, and after the earthquake of April 18, 1906, and the subsequent conflagration: San Francisco, Spring Valley Water Company, July 23, 1906, 48 p.

Weatherbe, D., 1906, Effects of the earthquake: Mining and Science Press, v. 92, no. 24, p. 402.

Youd, T. L., and Hoose, S. N., 1976, Liquefaction during 1906 San Francisco earthquake: American Society of Civil Engineers, Journal of the Geotechnical Division, v. 102, no. GT5, p. 425-439.

_____1978, Historic ground failures in northern California triggered by earthquakes: U.S. Geological Survey Professional Paper 993, 177 p.

KANSU(HAIYUN), CHINA 16 December 1920 M_S = 8.5

(s) Bolt, B. A., 1974, Earthquake studies in the People's Republic of China: Eos, v. 55, no. 3, p. 108-117.

(s) Chen, W., and Molnar, P., 1977, Seismic moments of major earthquakes and the average rate of slip in central Asia: Journal of Geophysical Research, v. 82, no. 20, p. 2945-2969.

Close, U., and McCormick, E., 1922, Where the mountains walked: The National Geographic Magazine, v. 41, no. 5, p. 445-464.

Saita (Saida), T., 1938, The peculiarity of Chinese earthquake disasters and the seismic intensities as deduced from remaining pagodas: Bulletin of the Earthquake Research Institute, Tokyo Imperial University, v. 16, p. 407-414 (in Japanese with English abstract).

(s) Seismological Brigade of Lanzhou, National Seismological Bureau, the Seismological Brigade of the Ningxia Hui Nationality Autonomous Region, 1976, Great Haiyuan earthquake on December 16, 1920: Acta Geophysica Sinica, v. 19, no. 1, p. 42-49 (in Chinese with English abstract).

Willis, B., 1922, The Chinese earthquake of December, 1920: Seismological Society of America Bulletin, v. 12, no. 4, p. 227-230.

BIHAR(INDIA)-NEPAL 15 January 1934 M_s = 8.3

Geological Survey of India, 1939, The Bihar-Nepal earthquake of 1934, with a section on Seismometric study, by S. C. Roy: Memoirs of the Geological Survey of India, v. 73, 391 p.

IMPERIAL VALLEY, CALIFORNIA 19 May 1940 M_s = 7.1

Clark, T. A., 1940, Report of earthquake damage in Imperial Valley May 18, 1940: U.S. Department of Interior, Bureau of Reclamation, All-American Canal Project, unpublished report, 42 p.

(s) Richter, C. F., 1958, Elementary Seismology: San Francisco, W.H. Freeman and Co., 768 p.

Sylvester, A. G., 1979, Earthquake damage in Imperial Valley, California May 18, 1940, as reported by T.A. Clark: Seismological Society of America Bulletin, v. 69, no. 2, p. 547-568.

(s) Trifunac, M. D. and Brune, J. N., 1970, Complexity of energy release during the Imperial Valley, California, earthquake of 1940: Seismological Society of America Bulletin, v. 60, no. 1, p. 137-160.

Ulrich, F. P., 1941, Imperial Valley earthquakes of 1940: Seismological Society of America Bulletin, v. 31-32, p. 13-31.

VANCOUVER ISLAND, BRITISH COLUMBIA, CANADA 23 June 1946 M_s = 7.2

Hodgson, E. A., 1946, British Columbia earthquake June 23, 1946: Journal of the Royal Astronomical Society of Canada, v. 40, no. 8, p. 285-319.

Mathews, W. H., 1979, Landslides of central Vancouver Island and the 1946 earthquake: Seismological Society of America Bulletin, v. 69, no. 2, p. 445-450.

Rogers, G. C., 1980, A documentation of soil failure during the British Columbia earthquake of 23 June, 1946: Canadian Geotechnical Journal, v. 17, p. 122-127.

(s) Rogers, G. C., and Hasegawa, H. S., 1978, A second look at the British Columbia earthquake of June 23, 1946: Seismological Society of America Bulletin, v. 68, no. 3, p. 653-676.

(s) Slawson, W. F., and Savage, J. C., 1979, Geodetic deformation associated with the 1946 Vancouver Island, Canada, earthquake: Seismological Society of America Bulletin, v. 69, no. 5, p. 1487-1496.

FUKUI, JAPAN 28 June 1948 M_L = 7.2

Collins, J. L., and Foster, H. L., 1949, The Fukui earthquake Hokuriku Region, Japan 28 June 1948 volume I, geology: U.S. Army Office of the Engineer, General Headquarters, Far East Command, 81 p.

Design Branch, Engineering and Operations Division, 1949, The Fukui earthquake Hokuriku Region, Japan 28 June 1948 volume II, engineering: U.S. Army Office of the Engineer, General Headquarters, Far East Command, 205 p.

(s) Kanamori, H., 1973, Mode of strain release associated with major earthquakes in Japan: Annual Review of Earth and Planetary Science, v. 1, p. 213-239.

Kuribayashi, E., and Tatsuoka, F., 1975, Brief review of liquefaction during earthquakes in Japan: Soils and Foundations, v. 15, p. 81-92.

_____1977, History of earthquake-induced soil liquefaction in Japan: Japan, Ministry of Construction, Public Works Research Institute Bulletin, v. 31, 26 p.

Tsuya, H., ed., 1950, The Fukui earthquake of June 28, 1948: Tokyo, Japan Science Council, Report of the Special Committee for the Study of the Fukui Earthquake, 197 p.

Ground-failure or seismic information in:

(s) Inouye, W., Seismometrical features, p. 29-36.
Kanai, K., and Takahasi, R., Damage to building and civil engineering structures, p. 185-197.
(s) Kawasumi, H., General description, p. 1-28.
Miyabe, N., Kishinouye, K., and Shimozuru, D., Macroseismic features, p. 131-166.
(s) Nasu, N., and Rikitake, T., Crustal deformations, p. 93-130.

PUGET SOUND, WASHINGTON 13 April 1949 M_L = 7.0

Hopper, M., unpublished data.

Murphy, L. M., and Ulrich, F. P., 1951, United States earthquakes 1949: Washington, D.C., U.S. Department of Commerce, Coast and Geodetic Survey, Serial 748, 64 p.

(s) Nuttli, O. W., 1952, The western Washington earthquake of April 13, 1949: Seismological Society of America Bulletin, v. 42, no. 1, p. 21-28.

KHAIT(CHAIT), TADJIKISTAN, USSR 10 July 1949 M_S = 7.6

Sarna-Wojcicki, A. M., unpublished data.

(s) Savarenskii, E. F., Gubin, I. E., and Kharin, D. A., 1961, Earthquakes in the USSR: U.S. Atomic Energy Commission Translation Series Publication AEC-tr-5424, Book 1, p. 170.

Seed, H. B., 1968, Landslides during earthquakes due to soil liquefaction: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundation Division, v. 94, no. SM5, p. 1053-1122, reprinted in American Society of Civil Engineers, 1974, Terzhagi lectures 1963-1972: New York, p. 191-261.

Solonenko, V. P., 1977, Landslides and collapses in seismic zones and their prediction: International Association of Engineering Geology Bulletin, no. 15, p. 4-8.

ASSAM, INDIA 15 August 1950 M_S = 8.6

Poddar, M. C., 1952, Preliminary report of the Assam earthquake, 15th August, 1950: Geological Survey of India Bulletin, series B, no. 2, 39 p.

Ramachandra Rao, M. B., 1953, A compilation of papers on the Assam earthquake of August 15, 1950: Hyperabad, India, National Geophysical Research Institute, The Central Board of Geophysics Publication no. 1, 112 p.

- Ground-failure information in:

Boileau, V. H., The Assam earthquake of 15th Aug., 1950--Results of the preliminary geological investigations, p. 50-55.

Corps, E. V., Assam earthquake of 15th Aug., 1950 as experienced at Digboi, Upper Assam, p. 43-49.

Garg, G. R., Earthquake of August 15 and its effect on the topography, the regimes of the rivers in north-east Assam, and damage to roads, p. 65-75.

Gee, E. P., The Assam earthquake of 1950, p. 101-107, extracted from Journal of the Bombay Natural History Society, v. 50, no. 3, p. 629-635.

Kingdon-Ward, F., Notes on the Assam earthquake, p. 97-100, extracted from Nature, 1951, v. 167, p. 130-131.

Mathur, L. P., Assam earthquake of 15th Aug., 1950--A short note on factual observations, p. 56-60.

Poddar, M. C., A short note on the Assam earthquake of Aug. 15, 1950, p. 38-42.

Pramanik, S. K., and Mukherjee, S.M., The Assam earthquake of 1950, p. 26-34.

Tandon, A. N., The very great earthquake of Aug. 15, 1950, p. 80-89, extracted from Science and Culture, October 1950, p. 147-155.

Tillotson, E., The great Assam earthquake of Aug. 15, 1950, p. 94-96, extracted from Nature, 1951, v. 167, p. 128-130.

DALY CITY, CALIFORNIA 22 March 1957 M_L = 5.3

Bonilla, M. G., 1960, Landslides in the San Francisco South Quadrangle, California: U.S. Geological Survey Open-File Report, 44 p.

Oakesnott, G. B., ed., 1959, San Francisco earthquakes of March 1957: California Division of Mines Special Report 57, 125 p.

Ground-failure or seismic information in:

Bonilla, M. G., Geologic observations in the epicentral area of the San Francisco earthquake of March 22, 1957, p. 25-37.

(s) Cloud, W. K., Intensity and ground motion of the San Francisco earthquake of March 22, 1957, p. 49-57.

Steinbrugge, K. V., Bush, V. R., and Zacher, E. G., Damage to buildings and other structures by the San Francisco earthquake of March 22, 1957, p. 73-106.

(s) Tocher, D., Seismographic results from the San Francisco earthquakes of 1957, p. 59-71.

SOUTHEASTERN ALASKA 10 July 1958 M_S = 7.9

Brazee, R. J., and Cloud, W. K., 1960, United States earthquakes 1958: Washington, D.C., U.S. Department of Commerce, Coast and Geodetic Survey, 76 p.

Brazee, R. J., and Jordan, J. N., 1958, Preliminary notes on southeastern Alaska earthquake: Earthquake Notes, v. 29, no. 3, p. 36-40.

Miller, D. J., 1960, Giant waves in Lituya Bay, Alaska: U.S. Geological Survey Professional Paper 354-C, 35 p.

Seismological Society of America Bulletin, 1960, The Alaska earthquake of July 10, 1958: v. 50, no. 2, p. 217-322.

Ground-failure or seismic information in:

Davis, T. N., and Sanders, N. K., Intensity distribution and field investigation of the northern epicentral region, p. 221-252.
Miller, D. J., Giant wave in Lituya Bay, p. 253-266.
(s) Stauder, W. S. J., Seismic studies, p. 293-322.
Tocher, D., Movement on the Fairweather fault and field investigation of the southern epicentral region, p. 267-292.

Tocher, D., and Miller, D. J., 1959, Field observations on effects of Alaska earthquake of July 10, 1958: Science, v. 129, no. 3346, p. 394-395.

HEBGEN LAKE, MONTANA 18 August 1959 M_L = 7.1

Campau, D. E., and Anisgard, H. W., eds., 1960, Annual Field Conference, 11th, Billings [Montana] Geological Society, West Yellowstone--Earthquake Area Guidebook, 316 p.

Ground-failure information in:

Hadley, J. B., The Madison landslide, p. 45-48.
Kirk, C. H., The earthquake damage to Hebgen Dam and the necessary repair program, p. 67-70.
Marler, G. D., The 1959 Hebgen Lake earthquake alters Yellowstone's hot springs, p. 61-66.
McAleer, J. F., A rotational fault block in the Madison earthquake area, p. 56-61.
Nile, S. W., The Hebgen Lake earthquakes, p. 24-30.
Witkind, I. J., The Hebgen Lake, Montana, earthquake of August 17, 1959, p. 31-44.
Woodard, F. W., Red Canyon fault Hebgen Lake, Montana, earthquake, August 17, 1959, p. 49-55.

Fischer, W. A., 1960, Highlights of Yellowstone geology with an interpretation of the 1959 earthquakes and their effects in Yellowstone National Park: Yellowstone Park, Wyoming, Yellowstone National Park, 62 p.

Hadley, J. B., 1978, Madison Canyon rockslide, Montana, U.S.A.,

in Voight, B., ed., Rockslides and avalanches, 1, natural phenomena: New York, Elsevier Scientific Publishing Co., p. 167-180.

Seismological Society of America Bulletin, 1962, The Hebgen Lake, Montana, earthquake of August 17, 1959, MST: v. 52, no. 2, 277 p.

Ground-failure or seismic information in:

Steinbrugge, K. V., and Cloud, W. K., Epicentral intensities and damage in the Hebgen Lake, Montana, earthquake of August 17, 1959, p. 181-234.
(s) Ryall, A., The Hebgen Lake, Montana, earthquake of August 18, 1959: P waves, p. 235-271.
Witkind, I. J., Myers, W. B., Hadley, J. B., Hamilton, W., Fraser, G. D., Geologic features of the earthquake at Hebgen Lake, Montana, August 17, 1959, p. 163-180.

U.S. Department of Commerce, Coast and Geodetic Survey, 1961, Abstracts of earthquake reports for the Pacific Coast and the Western Mountain Region: Coast and Geodetic Survey Publication MSA-103, 209 p.

U.S. Geological Survey, National Park Service, Coast and Geodetic Survey, and U.S. Forest Service, 1964, The Hebgen Lake, Montana earthquake of August 17, 1959: U.S. Geological Survey Professional Paper 435, 241 p.

Ground-failure or seismic information in:

Hadley, J. B., Landslides and related phenomena accompanying the Hebgen Lake earthquake of August 17, 1959, p. 107-138.
(s) Murphy, L. M., and Brazee, R. J., Seismological investigations of the Hebgen Lake earthquake, p. 13-17.
Swenson, F. A., Ground-water phenomena associated with the Hebgen Lake earthquake, p. 159-165.
Witkind, I. J., Structural damage in the Hebgen Lake-West Yellowstone area, p. 5-11.

CHILE 22 May 1960 M_S = 8.3-8.5

Davis, S., and Karzulovic K., J., 1961, Deslizamientos en el valle del rio San Pedro Provincia de Valdivia, Chile [Landslides in the valley of the San Pedro River Province of Valdivia, Chile]: Publication no. 20, Anales de la Facultad de Ciencias Fisical y Matematicos, University of Chile, Institute of Geology, Santiago, Chile, p. 53-108, (in Spanish).

Fuenzalida P., R., and Skarmeta M., J., 1976, El deslizamiento del Valle del Murta: un colchon de aire como mechanismo de transporte [The landslides in the Murta river valley: a cushion of air as the mechanism of transport]: Revista Geologica de Chile, no. 3, p. 57-60, (in Spanish with English abstract).

(s) Plafker, G., 1972, Alaskan earthquake of 1964 and Chilean earthquake of 1960: implications for arc tectonics: Journal of Geophysical Research, v. 77, no. 5, p. 901-925.

Ruiz F., C., and Saint-Amand, P., eds., 1961, Observations concerning the Chilean earthquakes of May 1960: Copenhagen, International Geological Congress, 21st, Report of the Session Norden 1960, Part XXVI, Proceedings of Section 1-21, supplementary volume, p. 116-133.

Seismological Society of America Bulletin, 1963a, An engineering report on the Chilean earthquakes of May 1960: v. 53, no. 2, p. 219-480.

Ground-failure information in:

Duke, C. M., and Leeds, D. J., Response of soils, foundations, and earth structures to the Chilean earthquakes of 1960, p. 309-357.
Housner, G. W., Preface, p. 219-223.
Steinbrugge, K. V., and Flores A., R., The Chilean earthquakes of May, 1960: A structural engineering viewpoint, p. 225-307.

Seismological Society of America Bulletin, 1963b: v. 53, no. 6, p. 1123-1438.

Ground-failure information in:

Alvarez S., L., Studies made between Arauco and Valdivia with respect to the earthquakes of 21 and 22 May 1960, p. 1315-1330
Davis, S. N., and Karzulovic K., J., Landslides at Lago Rinihue, Chile, p. 1403-1414.
Dobrovolny, E., Lemke, R., Bowes, W., Thomas, H., and Bravo S., N., Relation between geology and the damage in Puerto Montt, Chile, caused by the earthquake of 22 May 1960, p. 1299-1314.
Doyel, W. W., Moraga B., A., Falcon M., E., Relation between the geology of Valdivia, Chile, and the damage produced by the earthquake of 22 May 1960, p. 1331-1345.
Galli O., C., and Sanchez R., J., Relation between geology and the effects of the earthquakes of May 1960 in the city of Castro and vicinity, Chiloe, p. 1263-1271.
_____, Relation between the geology and the effects of the earthquakes of May 1960 in the city of Ancud and vicinity, Chiloe, p. 1273-1280.

_____, Effects of the earthquakes of May 1960 in Concepcion and vicinity, p. 1281-1297.
Saint-Amand, P., Preface, p. 1123-1124.
Thomas, H., Bowes, W., and Bravo S., N., Geologic report on the effects of the earthquake of 22 May 1960 in the city of Puerto Varas, p. 1347-1352.
_____, Field observations made between Puerto Montt and Maullin, p. 1353-1356.
_____, Geologic report on the effects of the earthquake of 22 May 1960 on the city of Llanquihue, p. 1357-1359.
_____, Effects of the earthquakes of May 1960 and geologic relations in Rio Negro, p. 1361-1366.
Weischet, W., Further observations of geologic and geomorphic changes resulting from the catastrophic earthquake of May 1960, in Chile, p. 1237-1257.
_____, The distribution of the damage caused by the earthquake in Valdivia in relation to the form of the terrane, p. 1259-1262.
Wright, C., and Mella, A., Modifications to the soil pattern of south-central Chile resulting from seismic and associated phenomena during the period May to August 1960, p. 1367-1402.

Veblen, T. T., and Ashton, D. H., 1978, Catastrophic influences on the vegetation of the Valdivian Andes, Chile: Vegetatio, v. 36, no. 3, p. 149-167.

ALASKA 27 March 1964 M_S = 8.4

Coulter, H. W., and Migliaccio, R. R., 1966, Effects of the earthquake of March 27, 1964 at Valdez, Alaska: U.S. Geological Survey Professional Paper 542-C, 36 p.

Eckel, E. B., 1967, Effects of the earthquake of March 27, 1964, on air and water transport, communications, and utilities systems in south-central Alaska: U.S. Geological Survey Professional Paper 545-B, 27 p.

Engineering Geology Evaluation Group, 1964, Geologic report--27 March 1964 earthquake in Greater Anchorage area: Prepared for and published by Alaska State Housing Authority and the City of Anchorage, Anchorage, Alaska, 34 p.

Ferrians, O. J., Jr., 1966, Effects of the earthquake of March 27, 1964 in the Copper River Basin area, Alaska: U.S. Geological Survey Professional Paper 543-E, 28 p.

Field, W. O., 1965, Avalanches caused by the Alaska earthquake of March 1964, in International Symposium on Scientific Aspects of Snow and Ice Avalanches: Gentbrugge, Belgium, International Association of Scientific Hydrology

Publication 69, p. 326-331.

Foster, H. L., and Karlstrom, T. N. V., 1967, Ground breakage and associated effects in the Cook Inlet area, Alaska, resulting from the March 27, 1964, earthquake: U.S. Geological Survey Professional Paper 543-F, 28 p.

Grantz, A., Plafker, G., and Kachadoorian, R., 1964, Alaska's Good Friday earthquake, March 27, 1964, a prelimnary geologic evaluation: U.S. Geological Survey Circular 491, 35 p.

Hackman, R. J., 1965, Interpretation of Alaskan postearthquake photographs: Photogrammetric Engineering, v. 31, p. 604-610.

Hansen, W. R., 1966, Effects of the earthquake of March 27, 1964 at Anchorage, Alaska: U.S. Geological Survey Professional Paper 542-A, 68 p.

Hansen, W. R., Eckel, E. B., Schaem, W. E., Lyle, R. E., George, W., and Chance, G., 1966, The Alaska earthquake March 27, 1964: field investigations and reconstruction effort: U.S. Geological Survey Professional Paper 541, 111 p.

Hoyer, M. C., 1971, Puget Peak avalanche, Alaska: Geological Society of America Bulletin, v. 82, p. 1267-1284.

Kachadoorian, R., 1965, Effects of the earthquake of March 27, 1964 at Whittier, Alaska: U.S. Geological Survey Professional Paper 542-B, 21 p.

_____1968, Effects of the earthquake of March 27, 1964, on the Alaska Highway System: U.S. Geological Survey Professional Paper 545-C, 66 p.

Kachadoorian, R., and Plafker, G., 1967, Effects of the earthquake of March 27, 1964 on the communities of Kodiak and nearby islands: U.S. Geological Survey Professional Paper 542-F, 41 p.

Kerr, P. F., and Drew, I. M., 1968, Quick-clay slides in the U.S.A.: Engineering Geology, v. 2, no. 4, p. 215-238.

(s) Leipold, L. E., and Wood, F. J., eds., 1967, The Prince William Sound, Alaska, earthquake of 1964 and aftershocks: U.S. Department of Commerce, Environmental Science Services Adminstration, Coast and Geodetic Survey Publication 10-3, 3 volumes, 1166 p.

Lemke, R. W., 1967, Effects of the earthquake of March 27, 1964 at Seward, Alaska: U.S. Geological Survey Professional Paper 542-E, 43 p.

Logan, M. H., 1967, Effect of the earthquake of March 27, 1964, on the Eklutna hydroelectric project, Anchorage, Alaska: U.S. Geological Survey Professional Paper 545-A, 30 p.

Long, E., and George, W., 1967, Buttress design earthquake-induced slides: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundation Division, v. 93, no. SM4, p. 595-609.

_____1967, Turnagain slide stabilization, Anchorage, Alaska: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundation Division, v. 93, no. SM4, p. 611-627.

McCulloch, D. S., 1967, Slide-induced waves, seiching, and ground fracturing caused by the earthquake of March 27, 1964, at Kenai Lake, Alaska: U.S. Geological Survey Professional Paper 543-A, 41 p.

McCulloch, D. S., and Bonilla, M. G., 1967, Railroad damage in the Alaska earthquake: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundation Division, v. 93, pt. 1, no. SM5, p. 89-100.

_____1970, Effects of the earthquake of March 27, 1964, on the Alaska Railroad: U.S. Geological Survey Professional Paper 545-D, 161 p.

McSaveney, M. J., 1978, Sherman Glacier rock avalanche, Alaska, U.S.A., in Voight, B., ed., Rockslides and avalanches, 1, natural phenomena: Amsterdam-Oxford-New York, Elsevier Publishing Company, p. 197-258.

National Academy of Sciences, Committee on the Alaska Earthquake of the Division of Earth Sciences, National Research Council, 1971, The great Alaska earthquake of 1964--engineering: Washington, D.C., National Academy of Sciences, 1190 p.

Ground-failure information in:

Mitchell, J. K., Houston, W. N., and Yamane, G., Sensitivity and geotechnical properties of Bootlegger Cove clay, p. 157-178.
Scott, R. F., Behavior of soils during the earthquake, p. 49-72.
Seed, H. B., and Wilson, S. D., Turnagain Heights landslide, p. 120-143.
Shannon, W. L., and Hilts, D. E., Submarine landslide at Seward, p. 144-156.

National Academy of Sciences, Committee on the Alaska Earthquake of the Division of Earth Sciences, National Research Council, 1971, The great Alaska earthquake of 1964--

geology: Washington, D.C., National Academy of Sciences, 834 p.

Ground-failure information in:

Coulter, H. W., and Migliaccio, R. R., Effects at Valdez, p. 359-394.
Hansen, W. R., Effects at Anchorage, p. 289-356.
Hansen, W. R., and Eckel, E. B., Setting and effects of the earthquake, p. 5-43.
Kachadoorian, R., Effects at Whittier, p. 439-459.
Lemke, R. W., Effects at Seward, p. 395-437.
Plafker, G., and Kachadoorian, R., Geologic effects on the Kodiak Island area, p. 177-226.
Plafker, G., Kachadoorian, R., Eckel, E. B., and Mayo, L. R., Effects on various communities, p. 489-538.
Reimnitz, E., and Marshall, N. F., Effects of the earthquake and tsunami on recent deltaic sediments, p. 265-278.
Waller, R. M., Effects in the Homer area with a section on Beach changes on Homer Spit, by K. W. Stanley, p. 461-488.

National Academy of Sciences, Committee on the Alaska Earthquake of the Division of Earth Sciences, National Research Council, 1971, The great Alaska earthquake of 1964--hydrology: Washington, D.C., National Academy of Sciences, 441 p.

Ground-failure information in:

Bull, C., and Marangunic, C., Glaciological effects of debris slide on Sherman Glacier, p. 309-317.
Hackman, R. J., Interpretation of Alaskan postearthquake photographs, p. 40-46.
Johnson, N. M., and Ragle, R. H., Analysis of flow characteristics of Allen II slide from aerial photographs, p. 369-373.
LaChapelle, E. R., The character of snow avalanching induced by the Alaska earthquake, p. 355-361.
Marangunic, C., and Bull, C., The landslide on the Sherman Glacier, p. 383-394.
McCulloch, D. S., Slide-induced waves, seiching, and ground fracturing at Kenai Lake, p. 47-81.
Plafker, G., Source areas of the Shattered Peak and Pyramid Peak landslides at Sherman Glacier, p. 374-382.
Post, A. S., Effects on glaciers, p. 266-308.
Shreve, R. L., Sherman landslide, p. 395-401.
Tuthill, S. J., Earthquake-triggered rock avalanches and glacial stagnation in south central Alaska, p. 362-368.
Tuthill, S. J., Field, W. O., and Clayton, L., Postearthquake studies at Sherman and Sheridan Glaciers, p. 318-328.
Waller, R. M., Water-sediment ejections, p. 97-116.

(s) National Academy of Sciences, Committee on the Alaska Earthquake of the Division of Earth Sciences, National Research Council, 1971, The great Alaska earthquake of 1964--seismology and geodesy: Washington, D.C., National Academy of Sciences, 596 p.

(s) Plafker, G., 1972, Alaskan earthquake of 1964 and Chilean earthquake of 1960: implications for arc tectonics: Journal of Geophysical Research, v. 77, no. 5, p. 901-925.

Plafker, G., and Kachadoorian, R., 1966, Geologic effects of the March 1964 earthquake and associated seismic sea waves on Kodiak and nearby islands Alaska: U.S. Geological Survey Professional Paper 543-D, 46 p.

Plafker, G., Kachadoorian, R., Eckel, E. B., and Mayo, L. R., 1969, Effects of the earthquake of March 27, 1964 on various communities: U.S. Geological Survey Professional Paper 542-G, 50 p.

Post, A., 1965, Alaskan glaciers: recent observations in respect to the earthquake-advance theory: Science, v. 148, p. 366-368.

_____1967, Effects of the March 1964 Alaska earthquake on glaciers: U.S. Geological Survey Professional Paper 544-D, 42 p.

Ragle, R. H., Sater, J. E., and Field, W. O., 1965, Effects of the 1964 Alaskan earthquake on glaciers and related features: Washington, D.C., Arctic Institute of North America Research Paper 32, p. 31-42.

Reimnitz, E., 1971, Effects in the Copper River delta, in National Academy of Sciences, Committee on the Alaska Earthquake of the Division of Earth Sciences, National Research Council, The great Alaska earthquake of 1964--oceanography and coastal engineering: Washington, D.C., National Academy of Sciences, p. 290-302.

Reimnitz, E., and Marshall, N. F., 1965, Effects of the Alaska earthquake and tsunami on recent deltaic sediments: Journal of Geophysical Research, v. 70, no. 10, p. 2363-2375.

Seed, H. B., and Wilson, S. D., 1967, The Turnagain Heights landslide, Anchorage, Alaska: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundations Division, v. 93, no. SM4, p. 325-353.

Shannon and Wilson, Inc., 1964, Report on Anchorage area soil studies, Alaska, to U.S. Army Engineer District, Anchorage, Alaska: Seattle, Washington, 109 p.

Shreve, R. L., 1966, Sherman landslide, Alaska: Science, v. 154,

p. 1639-1643.

Tuthill, S. J., and Laird, W. M., 1966, Geomorphic effects of the earthquake of March 27, 1964 in the Martin-Bering Rivers area, Alaska: U.S. Geological Survey Professional Paper 543-B, 29 p.

Waller, R. M., 1966, Effects of the earthquake of March 27, 1964 in the Homer area, Alaska with a section on Beach changes on Homer Spit, by K. W. Stanley: U.S. Geological Survey Professional Paper 542-D, 28 p.

Wilson, S. D., 1967, Landslides in the city of Anchorage, in Wood, F. J., ed., The Prince William Sound, Alaska, earthquake of 1964 and aftershocks: U.S. Department of Commerce, Environmental Science Services Adminstration, Coast and Geodetic Survey Publication 10-3, v. 2, pt. A, p. 253-297.

NIIGATA, JAPAN 16 June 1964 M_L = 7.25-7.5

(s) Kanamori, H., 1973, Mode of strain release associated with major earthquakes in Japan: Annual Review of Earth and Planetary Science, v. 1, p. 213-239.

Kawasumi, H., ed., 1968, General report on the Niigata earthquake: Tokyo, Tokyo Electrical Engineering College Press, 550 p.

Ground-failure or seismic information in:

Goto, H., Airport, p. 499-502.
_____, Railway bridges, p. 451-461.
Hakuno, M., Harbor facilities, p. 483-497.
(s) Hirono, T., Seismometrical features, p. 47-62.
Horii, K., Highway bridges, p. 431-450.
Ichihara, M., River structures, p. 503-515.
(s) Iida, K., Tsunami, p. 97-127.
Kawakami, F., Highways, p. 405-430.
(s) Kawasumi, H., Introduction, p. 1-6.
(s) Kawasumi, H., and Sato, Y., Intensity of Niigata earthquake as determined from questionnaires, p. 175-179.
(s) Kayano, I., and Hagiwara, T., Aftershocks of the Niigata earthquake of June 16, 1964, p. 63-86.
Kobayashi, H., General reports on damage to buildings in disastered area, p. 183-211.
Nagumo, S., Field investigations of earthquake phenomena, p. 157-173.
Ohsaki, Y., Building damage and soil condition, p. 355-383.
Ono, K., Railroads p. 463-482.

Kuribayashi, E., and Tatsuoka, F., 1975, Brief review of

liquefaction during earthquakes in Japan: Soils and Foundations, v. 15, p. 81-92.

_____, 1977, History of earthquake-induced soil liquefaction in Japan: Japan, Ministry of Construction, Public Works Research Institute Bulletin, v. 31, 26 p.

(s) Lee, K. L., Marcuson, W. F., III, Stokoe, K. H., II, and Yokel, F. Y., eds., 1977, Research needs and priorities for geotechnical earthquake engineering applications: Report of workshop at University of Texas, Austin, NSF Grant No. AEN77-09861, 134 p.

Seed, H. B., and Idriss, I. M., 1966, An analysis of soil liquefaction in the Niigata earthquake: University of California, Berkeley, Soil Mechanics and Bituminous Materials Research Laboratory, unpublished report, 30 p.

_____1967, Analysis of soil liquefaction: Niigata earthquake: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundation Division, v. 93, no. SM3, p. 83-108.

PUGET SOUND, WASHINGTON 29 April 1965 M_S = 6.5

Hopper, M., unpublished data.

Mullineaux, D. R., Bonilla, M. G., and Schlocker, J., 1967, Relation of building damage to geology in Seattle, Washington, during the April 1965 earthquake, in Geological Survey Research 1967: U.S. Geological Survey Professional Paper 575-D, p. 183-191.

U.S. Department of Commerce, Coast and Geodetic Survey, 1965, The Puget Sound, Washington earthquake of April 29, 1965: Washington, D.C., 51 p.

Ground-failure or seismic information in:

(s) Algermissen, S. T., and Harding, S. T., Preliminary seismological report, p. 1-26.
Steinbrugge, K. V., and Cloud, W. K., Preliminary engineering report, p. 27-51.

von Hake, C. A., and Cloud, W. K., 1967, United States earthquakes 1965: U.S. Department of Commerce, Coast and Geodetic Survey, 91 p.

PARKFIELD-CHOLAME, CALIFORNIA 28 June 1966 M_S = 6.2

Brown, R. D., Jr., Vedder, J. G., Wallace, R. E., Roth, E. F., Yerkes, R. F., Castle, R. O., Waananen, A. O., Page, R. W., and Eaton, J. P., 1967, The Parkfield-Cholame, California, earthquakes of June-August, 1966--surface geologic effects, water-resources aspects, and preliminary seismic data: U.S. Geological Survey Professional Paper 579, 66 p.

Ground-failure information in:

Brown, R. D., Jr., and Vedder, J. G., Surface tectonic fractures along the San Andreas fault, p. 2-23.
Yerkes, R. F., and Castle, R. O., Engineering geology aspects, p. 40-53.

Coffman, J. L., ed., 1966, The Parkfield, California, earthquake of June 27, 1966: Washington, D.C., U.S. Department of Commerce, Coast and Geodetic Survey, 65 p.

Ground-failure or seismic information in:

Cloud, W. K., Preliminary engineering seismological report, p. 17-65.
(s) Harding, S. T., and Rinehart, W., Preliminary seismological report, p. 1-16.

Goldis, H. B., 1966, Maps and photographic record of the Parkfield-Cholame, California, earthquakes of June-August, 1966: Menlo Park, California, U.S. Geological Survey unpublished report, unpaginated.

Ross, G. A., 1969, Incipient failures of stream banks, Parkfield-Cholame, California, earthquakes of June, 1966: International Conference on Soil Mechanics and Foundation Engineering, 7th, Mexico City, Mexico, August, 1969, Proceedings of Specialty Session 2, p. 132-135.

Seismological Society of America Bulletin, 1967, The Parkfield, California, earthquakes of 1966: v. 57, no. 6., p. 1131-1266.

Ground-failure information in:

Cloud, W. K., Intensity map and structural damage, Parkfield, California earthquake of June 27, 1966, p. 1161-1178.
McEvilly, T. V., Bakun, W. H., and Casaday, K. B., The Parkfield, California earthquakes of 1966, p. 1221-1244.

INANGAHUA, NEW ZEALAND 23 May 1968 M_S = 7.1

New Zealand Department of Scientific and Industrial Research, 1968, Preliminary reports on the Inangahua earthquake, New

Zealand, May 1968: New Zealand Department of Scientific and Industrial Research Bulletin 193, 39 p.

Ground-failure information in:

Adams, R. D., Eiby, G. A., and Lowry, M. A., Inangahua earthquake--preliminary seismological report, p. 7-16.
Lensen, G. J., and Suggate, R. P., Inangahua earthquake--preliminary account of the geology, p. 17-36.

New Zealand Society for Earthquake Engineering Bulletin, 1968, The 1968 Inangahua earthquake (conference seminar papers): v. 1, no. 2, 119 p.

Ground-failure information in:

Douglas, J. S., Damage to state highways, p. 49-60.
Duckworth, W. J. H., Damage on railways, p. 13-21.
Hitchcock, H. C., Electricity services, p. 4-11.
Hollings, J. P., and Fraser, I. A. N., Damage to three railway bridges, p. 22-48.

New Zealand Society for Earthquake Engineering Bulletin, 1969, The 1968 Inangahua earthquake: v. 2, no. 1, 148 p.

Ground-failure information in:

Anderson, P., and Osborne, T. W. J., Greymouth to Hokitika, p. 147.
Anderson, P., Smith, F. R., and Quin, F. E., Greymouth, p. 139-142.
Chandler, T. N., and Bennett, J. R., Westport, p. 128-129.
Douglas, J. S., State highways, p. 47-58.
Duckworth, W. J. H., Railway track, p. 59-61.
Evans, G. L., Damage to works, and civil defense problems, p. 39-44.
Falconer, B. H., and Lensen, G. J., Immediate field damage reconnaissance, p. 27-33.
Moss, P. J., Christchurch, p. 143-147.

Shepherd, T. A., Dodd, T. A. H., Sutherland, A. J., Moss, P. J., Carr, A. J., Gordon, D. R., and Bryant, A. H., 1970, The 1968 Inangahua earthquake: Report of the University of Canterbury survey team: Seismological Society of America Bulletin, v. 60, no. 5, p. 1561-1606.

PERU 31 May 1970 $M_S = 7.8$

Browning, J. M., 1973, Catastrophic rockslide, Mt. Huascaran, north-central Peru, May 31, 1970: American Association of Petroleum Geologists Bulletin, v. 57, no. 7, p. 1335-1341.

Earthquake Engineering Research Insitute, Earthquake Report Committee, 1970, Peru earthquake of May 31, 1970, preliminary report: Berkeley, California, 55 p.

Mencl, V., 1974, Engineering-geological importance and possible origin of the stress relief of the rocks of the Cordillera Blanco, Peru: International Association of Engineering Geology Bulletin, no. 9, p. 69-74.

Plafker, G., and Ericksen, G. E., 1978, Nevados Huascaran avalanches, Peru, in Voight, B., ed., Rockslides and avalanches, 1, natural phenomena: New York, Elsevier Scientific Publishing Company, p. 277-314.

Plafker, G., Ericksen, G. E., and Fernández Concha, S., 1970, Preliminary report on the geologic events associated with the May 31, 1970, Peru earthquake: U.S. Geological Survey Circular 639, 25 p.

Seismological Society of America Bulletin, 1971, Special papers on the May 31, 1970 Peru earthquake: v. 61, no. 3, p. 511-633.

Ground-failure information in:

Cluff, J. S., Peru earthquake of May 31, 1970; engineering geology observations, p. 511-533.
Enkeboll, W., Soil behavior and related effects in the Peru earthquake of May 31, 1970, p. 579-590.
Lomnitz, C., The Peru earthquake of May 31, 1970: some preliminary seismological results, p. 535-542.
Plafker, G., Ericksen, G. E., and Fernández Concha, J., Geological aspects of the May 31, 1970; Perú earthquake, p. 543-578.

MADANG, PAPUA NEW GUINEA 31 October 1970 M_s = 7.0

Ellison, B. K., 1971, Earthquake damage to roads and bridges Madang, T.P.N.G., November 1970: New Zealand Society for Earthquake Engineering Bulletin, v. 4, no. 2, p. 243-257.

Everingham, I. B., 1974, The major Papua New Guinean earthquakes near Madang (1970) and beneath the North Solomon Sea (1971): World Conference on Earthquake Engineering, 5th, Rome, 1974, Proceedings, v. 1, p. 3-6.

_____, 1975, Seismological report on the Madang earthquake of 31 October 1970 and aftershocks: Canberra, Australia, Department of Minerals and Energy, Bureau of Mineral Resources, Geology and Geophysics Report no. 176, 45 p.

Pain, C. F., 1972, Characteristics and geomorphic effects of earthquake-initiated landslides in the Adelbert Range, Papua New Guinea: Engineering Geology, v. 6, no. 4, p. 261-274.

Pain, C. F., and Bowler, J. M., 1973, Denudation following the November 1970 earthquake at Madang, Papua New Guinea: Zeitschrift fur Geomorphologie, Supplementband 18, p. 92-104.

SAN FERNANDO, CALIFORNIA 9 February 1971 M_S = 6.5

Clark, B. R., Leighton, F. B., Cann, L. R., and Gaffey, J. T., 1979, Surficial landslides triggered by seismic shaking, San Fernando earthquake of 1971: Irvine, California, Leighton and Associates, Inc., Final Technical Report, U.S. Geological Survey Contract #14-08-001-16810, 42 p.

Dixon, S. J., and Burke, J. W., 1973, Liquefaction case history: American Society of Civil Engineers, Journal of the Soil Mechanics and Foundations Division, v. 99, no. SM11, p. 921-937.

Murphy, L. M., ed., 1973, San Fernando, California, earthquake of February 9, 1971, volume III: geological and geophysical studies: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 432 p.

Ground-failure information in:

Fallgren, R. B., and Smith, J. L., Ground displacement at San Fernando Valley Juvenile Hall during San Fernando earthquake, p. 189-196.
Yerkes, R. F., Effects of San Fernando earthquake as related to geology, p. 137-154.
Youd, T. L., Ground movements in Van Norman Lake vicinity during San Fernando earthquake, p. 197-206.

Oakeshott, G. B., ed., 1975, San Fernando, California, earthquake of 9 February 1971: California Division of Mines and Geology Bulletin 196, 463 p.

Ground-failure or seismic information in:

(s) Allen, C. R., Hanks, T. C., and Whitcomb, J. H., Seismological studies of the San Fernando earthquake and their tectonic implications, p. 257-262.
Barrows, A. G., Surface effects and related geology of the San Fernando earthquake in the foothill region between Little Tujunga and Wilson Canyons, p. 97-117.
(s) Bolt, B. A., and Gopalakrishnan, B. S., Magnitudes, aftershocks, and fault dynamics, p. 263-272.
California Division of Highways, Highway damage in the San

Fernando earthquake, p. 369-379.
Evans, J. R., Geologic effects of the San Fernando earthquake in the Newhall-Saugus-Valencia-Solemint area, p. 137-144.
Kahle, J. E., Surface effects and related geology of the Lakeview fault segment of the San Fernando fault zone, p. 119-135.
Morton, D. M., Seismically triggered landslides in the area above the San Fernando Valley, p. 145-154.
Saul, R. B., Geology of the southeast slope of the Santa Susana Mountains and geologic effects of the San Fernando earthquake, p. 53-70.
Smith, J. L., and Fallgren, R. B., Ground displacement at San Fernando Valley Juvenile Hall and the Sylmar Converter Station, p. 157-163.

Seed, H. B., Lee, K. L., Idriss, I. M., and Makdisi, F. I., 1975, The slides in the San Fernando dams during the earthquake of February 9, 1971: American Society of Civil Engineers, Journal of the Geotechnical Engineering Division, v. 101, no. GT7, p. 651-688.

U.S. Geological Survey, and U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1971, The San Fernando, California, earthquake of February 9, 1971: U.S. Geological Survey Professional Paper 733, 254 p.

Ground-failure or seismic information in:

(s) Allen, C. R., Engen, G. R., Hanks, T. C., Nordquist, J. M., and Thatcher, W. R., Main shock and larger aftershocks of the San Fernando earthquake, February 9 through March 1, 1971, p. 17-20.
Kachadoorian, R., An estimate of the damage, p. 5.
Morton, D. M., Seismically triggered landslides in the area above the San Fernando Valley, p. 99-104.
Nason, R. D., Shattered earth at Wallaby Street, Sylmar, p. 97-98.
(s) U.S. Geological Survey staff, Surface faulting, p. 55-76.
(s) Wesson, R. L., Lee, W. H. K., and Gibbs, J. F., Aftershocks of the earthquake, p. 24-29.
Youd, T. L., Landsliding in the vicinity of the Van Norman Lakes, p. 105-109.
Youd, T. L., and Olsen, H. W., Damage to constructed works associated with soil movements and foundation failures, p. 126-132.

Yen, B. C., and Trotter, J. R., 1978, Shallow slides due to 1971 San Fernando earthquake, in Earthquake engineering and soil dynamics: Pasadena, California, American Society of Civil Engineers, Geotechnical Engineering Division Specialty Conference, 1978, Proceedings, v. 2, p. 1076-1096.

HONOMU, HAWAII 26 April 1973 M_S = 6.1

Coffman, J. L., von Hake, C. A., Spence, W., Carver, D. L., Covington, P. A., Dunphy, G. J., Irby, W. L., Person, W. J., and Stover, C. W., 1975, United States earthquakes, 1973: Boulder, Colorado, U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Geological Survey, 112 p.

Nielsen, N. N., Furumoto, A. S., Lum, W., and Morrill, B. J., 1977, The Honomu, Hawaii, earthquake, report of inspection: Washington, D.C., National Academy of Sciences, 79 p.

(s) Unger, J. D., and Ward, P. L., 1974, Travel time delays and tectonic stress from a subcrustal Hawaiian earthquake (abs.): Eos [Transactions, American Geophysical Union], v. 54, no. 12, p. 1150.

INDUS-KOHISTAN, PAKISTAN 28 December 1974 M_S = 6.2

(s) Coffman, J. L., and Stover, C. W. eds., 1976, United States earthquakes, 1974: Boulder, Colorado, U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Geological Survey, 125 p.

Hewitt, K., 1976, Earthquake hazards in the mountains: Natural History, v. 85, no. 5, p. 30-37.

KILAUEA, HAWAII 29 November 1975 M_S = 7.1-7.2

Coffman, J. L., and Stover, C. W. eds., 1977, United States earthquakes, 1975: Boulder, Colorado, U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Geological Survey, 136 p.

(s) Rojahn, C., and Morrill, B. J., 1977, The island of Hawaii earthquakes of November 29, 1975: strong-motion data and damage reconnaissance report: Seismological Society of America Bulletin, v. 67, no. 2, p. 493-515.

Tilling, R. I., 1976, The 7.2 magnitude earthquake, November 1975, island of Hawaii: Earthquake Information Bulletin, v. 8, no. 6, p. 5-13.

Tilling, R. I., Koyanagi, R. Y., Lipman, P. W., Lockwood, J. P., Moore, J. G., and Swanson, D. A., 1976, Earthquake and related catastrophic events, island of Hawaii, November 29, 1975: a preliminary report: U.S. Geological Survey Circular

740, 33 p.

GUATEMALA 4 February 1976 M_S = 7.5

Harp, E. L., Wieczorek, G. F., and Wilson, R. C., 1978, Earthquake-induced landslides from the February 4, 1976, Guatemala earthquake and their implications for landslide hazard reduction: International Symposium on the February 4th, 1976 Guatemalan Earthquake and the Reconstruction Process, Guatemala City, 1978, v. 1, unpaginated.

Harp, E. L., Wilson, R. C., and Wieczorek, G. F., 1981, Landslides from the February 4, 1976, Guatemala earthquake: U.S. Geological Survey Professional Paper [in press].

Harp, E. L., Wilson, R. C., Wieczorek, G. F., and Keefer, D. K., 1978, Landslides from the February 4, 1976, Guatemala earthquake--implications for seismic hazard reduction in the Guatemala City area: International Conference on Microzonation, 2d, San Francisco, Proceedings, v. 1, p. 353-366.

Hoose, S. N., Wilson, R. C., and Rosenfeld, J. H., 1978, Liquefaction-caused ground failure during the February 4, 1976, Guatemala earthquake: International Symposium on the February 4th, 1976 Guatemalan Earthquake and the Reconstruction Process, Guatemala City, 1978, v. 2, unpaginated.

(s) Jennings, P. C., and Kanamori, H., 1979, Determination of local magnitude, M_L, from seismoscope records: Seismological Society of America Bulletin, v. 69, no. 4, p. 1267-1288.

Seed, H. B., Arango, I., Chan, C. K., Gomez-Masso, A., and Ascoli, R. G., 1979, Earthquake-induced liquefaction near Lake Amatitlan, Guatemala: University of California, Berkeley, Earthquake Engineering Research Center, Report UCB/EERC-79/27, 16 p., reprinted in American Society of Civil Engineers Journal of the Geotechnical Engineering Division, vol. 107, no. GT4, p. 501-518.

KHULM, AFGHANISTAN 19 March 1976 M_S = 5.5

Saleem, A. S., 1977, The Khulm(Tashqurghan) earthquake of March 19, 1976, Samangan province, Afghanistan: Earthquake Notes, v. 48, nos. 1-2, p. 25-33.

FRIULI, ITALY 6 May 1976 M_S = 6.5
15 September 1976 M_S = 6.0

Ambraseys, N. N., 1976, Part II: The Gemona di Friuli earthquake of 6 May 1976: Paris, United Nations Educational, Scientific, and Cultural Organization Restricted Technical Report RP/1975-76/2.222.3, Part 2, 144 p.

(s) Cagnetti, V., and Pasquale, V., 1979, The earthquake sequence in Friuli, Italy, 1976: Seismological Society of America Bulletin, v. 69, no. 6, p. 1797-1818.

(s) Cipar, J., 1980, Teleseismic observations of the 1976 Friuli, Italy earthquake sequence: Seismological Society of America Bulletin, v. 70, no. 4, p. 963-983.

CNEN-ENEL Commission on Seismic Problems Associated with the Installation of Nuclear Plants, 1976, Contribution to the study of Friuli earthquake of May 1976: Rome, CNEN-ENEL, 135 p.

Govi, M., 1977, Photo-interpretation and mapping of the landslides triggered by the Friuli earthquake (1976): International Association of Engineering Geology Bulletin, no. 15, p. 67-72.

Martinis, B., ed., 1977, Studio geologico dell'area maggiormente colpita dal terremoto friulano del 1976 [Geology of the Friuli area primarily involved in the earthquake, 1976]: Milan, Italy, National Research Council, Geological and Mining Sciences Committee, Italian Geodynamics Project, 393 p.

Ground-failure information in:

Cavallin, A., Martinis, B., and Sfondrini, G., Effetti geologici del terremoto: Fenditure nel terreno e vulcanelli de sabbia [Geologic effects of the earthquake: ground cracks and sand mounds], p. 369-393, (in Italian with English abstract).

Govi, M., and Sorzana, P. F., Effetti geologici del terremoto: Frane [Geologic effects of the earthquake: landslides], p. 329-368, (in Italian with English abstract).

Observatorio Geofisica Sperimantale, 1976, International Meeting on the Friuli Earthquake, Proceedings: Trieste, Italy, Bollettino di Geofisica Teorica ed Applicata, v. 19, no. 72, partes 1 and 2, 1626 p.

Ground-failure or seismic information in:

Brisighella, L., Damages to bridges and roads in the 1976 Friuli earthquake, parte 2, p. 1150-1202.

(s) Giorgetti, F., Isoseismal map of the May 6, 1976 Friuli earthquake, parte 1, p. 707-714.
Siro, L., Liquefaction of sands in Friuli during th May 6 and September 15, 1976 earthquake, parte 1, p. 909-932.

Stratta, J. L., and Wyllie, L. A., Jr., 1979, Friuli, Italy earthquakes of 1976: Berkeley, California, Earthquake Engineering Research Institute Reconnaissance Report, 97 p.

PANAMA 11 July 1976 M_S = 7.0

(s) Coffman, J. L., and Stover C. W. eds., 1978, United States earthquakes, 1976: Boulder, Colorado, U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Geological Survey, 94 p.

Garwood, N. C., unpublished data.

Garwood, N. C., Janos, D. P., and Brokaw, N., 1979, Earthquake-caused landslides: a major disturbance to tropical forests: Science, v. 205, no. 4410, p. 997-999.

TANGSHAN, CHINA 27 July 1976 M_S = 7.7-7.9

(s) Butler, R., Stewart, G. S., and Kanamori, H., 1979, The July 27, 1976 Tangshan, China earthquake--a complex sequence of intraplate events: Seismological Society of America Bulletin, v. 69, no. 1, p. 207-220.

Chang, K. T., 1979, Notes from lecture on Baihe dam given at Stanford University, August 16, 1979.

Daily Texan, 1977, China reveals earthquake most severe in 400 years: June 3, 1977, p. 6.

Jennings, P. C., ed., 1980, Earthquake engineering and hazards reduction in China: Washington, D.C., National Academy of Sciences, 190 p.

Liu, L., Li, K., and Bing, D., 1979, Earthquake damage of Baihe earth dam and liquefaction characteristics of sand and gravel materials: Beijing, Research Institute of Water Conservancy and Hydroelectric Power unpublished report, 19 p.

Liu, Z., Wang, W., Yang, X., Yu, P., and Gao, F., 1979, Preliminary investigation of damages in the earth dam of

Douhe Reservoir caused by Tangshan earthquake of 1976: Beijing, Haihe River Design Institute and Research Institute of Water Conservancy and Hydroelectric Power, unpublished report, 10 p.

Tsing-hua Design Section, Design Department of Earthquake Resistant and Flood Control Command of Miyun Reservoir, 1978, An analysis of damage of slope sliding by earthquake of the Paiho main dam and its earthquake resistant strengthening, May, 1978: unpublished report, 37 p.

U.S. National Conference on Earthquake Engineering, 2nd, 1979, Stanford, California: Additional papers on the 1976 Tangshan earthquake, 59 p., reprinted in Earthquake Engineering Research Institute, 1980, The 1976 Tangshan, China earthquake: Berkeley, California, 101 p.

Ground-failure information in:

Jin, G., Damage in Tianjin during Tangshan earthquake, p. 39-59.
Sun, S., Earthquake damage to pipelines, p. 23-38.
Ye, Y., and Liu, X., Experience in engineering from earthquake in Tangshan and urban control of earthquake disaster, p. 1-22.

U.S. National Conference on Earthquake Engineering, 2nd, 1979, Stanford, California: Special session on earthquake engineering in China, 37 p., reprinted in Earthquake Engineering Research Institute, 1980, The 1976 Tangshan, China earthquake: Berkeley, California, 101 p.

Ground-failure information in:

Chen, D., Field phenomena in meizoseismal area of the 1976 Tangshan earthquake, p. 23-37.
Hu, Y., Some engineering features of the 1976 Tangshan earthquake, p. 1-9

KHURGU, IRAN 21 March 1977 M_S = 6.9

Berberian, M., and Papastamatiou, D., 1978, Khurgu (North Bandar Abbas, Iran) earthquake of March 21, 1977: a preliminary field report and seismotectonic discussion: Seismological Society of America Bulletin, v. 68, no. 2, p. 411-428.

(s) Coffman, J. L., and Stover, C. W., eds., 1979, United States earthquakes, 1977: Boulder, Colorado, U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Geological Survey, 81 p.

SAN JUAN PROVINCE, ARGENTINA 23 November 1977 M_s = 7.2-7.4

Algermissen, S. T., ed., 1981, The earthquake in San Juan Province, Argentina, November 23, 1977: U.S. Geological Survey Professional Paper [in press].

Ground-failure information in:

Brogan, G. E., and Slemmons, D. B., Liquefaction.
Keefer, D. K., Slemmons, D. B., Brogan, G. E., and Youd, T. L., Slope failures.
Youd, T. L., and Keefer, D. K., Liquefaction--site and regional studies.

(s) Coffman, J. L., and Stover, C. W., eds., 1979, United States earthquakes, 1977: Boulder, Colorado, U.S. Department of Commerce, National Oceanic and Atmospheric Administration and U.S. Geological Survey, 81 p.

Idriss, M., Arango, I., and Brogan, G., 1979, Study of liquefaction in November 23, 1977 earthquake San Juan Province, Argentina--final report: San Francisco, Woodward-Clyde Consultants unpublished report, 112 p.

Instituto Nacional de Prevencion Sismica [INPRES], 1977, El terremoto de San Juan del 23 Noviembre de 1977, informe preliminar [The San Juan earthquake of November 23, 1977, preliminary report]: San Juan, Argentina, 103 p., (in Spanish).

Linkletter, G. O., Brogan, G. E., and Arango, I., 1979, The influence of paleochannels on the distribution of liquefaction produced by the November 23, 1977 Caucete, Argentina earthquake [abs.]: Geological Society of America Abstracts With Programs, v. 11, no. 7, p. 467.

Youd, T. L., and Keefer, D. K., 1978, Liquefaction and landslides in the November 23, 1977 earthquake in San Juan, Argentina [abs.]: Geological Society of America Abstracts with Programs, v. 10, no. 7, p. 521.

IZU-OSHIMA KINKAI, JAPAN 14 January 1978 M_s = 6.8

Geographical Survey Institute (Japan), 1978, 1978 Near Izu-Oshima earthquake, relationship between damage and topography: scale 1:50,000, 1 sheet (legend in Japanese).

Kuribayashi, E., Tazaki, T., and Hadate, T., 1978, Preliminary report of investigations on the relief and rehabilitation in the Izu-Oshima Kinkai earthquake of 1978: Tokyo, Ministry of Construction, Public Works Research Institute (Japan)

Technical Memorandum No. 1344, 64 p.

Nakazawa, K., Iwasaki, T., Kawashima, K., Watabe, M., Yamanouchi, H., and Yamazaki, Y., 1978, Damage features of engineering structures due to the near Izu-Ohshima earthquake of January 14, 1978: Joint Meeting, U.S.-Japan Program in Natural Resources, Panel on Wind and Seismic Effects, 10th, Washington, D.C., 1978, Report, 36 p.

Okusa, S., and Anma, S., 1980, Slope failure and tailings dam damage in the 1978 Izu-Oshima-Kinkai earthquake: Engineering Geology, v. 16, no. 3/4, p. 195-224.

(s) Shimazaki, K., and Somerville, P., 1979, Static and dynamic parameters of the Izu-Oshima, Japan earthquake of January 14, 1978: Seismological Society of America Bulletin, v. 69, no. 5, p. 1343-1378.

Tsuneishi, Y., Ito, T., and Kano, K., 1978, Slope collapses along the main roads of the Izu Peninsula caused by the 1978 Izu-Oshima-kinkai earthquake: University of Tokyo Earthquake Research Institute Bulletin, v. 53, pt. 3, p. 1069-1084 (in Japanese with English abstract).

World Conference on Earthquake Engineering, 7th, Istanbul, 1980, Proceedings, v. 3, Geotechnical aspects, 486 p.

Ground-failure information in:

Okusa, S., Anma, S., and Maikuma, H., Liquefaction of mine tailings in the 1978 Izu-Oshima-Kinkai earthquake, central Japan, p. 89-96.

Okusa, S., Tatsuoka, F., Taniguchi, E., and Ohkochi, Y., Natural slope failures during earthquakes: a case study, p. 49-56.

MIYAGI-KEN-OKI, JAPAN 12 June 1978 M_S = 7.4

Ellingwood, B. R., ed., 1980, An investigation of the Miyagi-ken-oki, Japan, earthquake of June 12, 1978: Washington, D.C., U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 592, 225 p.

Ground-failure information in:

Keefer, D. K., Liquefaction and damage to dikes, p. 195-208.
Harp, E. L., Seismic-induced landslides, p. 209-223.

Ishihara, K., Kawase, Y., and Nakajima, M., 1980, Liquefaction characteristics of sand deposits at an oil tank site during the 1978 Miyagiken-Oki earthquake: Soils and Foundations,

v. 20, no. 2, p. 97-111.

Kuribayashi, E., Tazaki, T., Hadate, T., and Hagiwara, R., 1979, Functional damage and rehabilitation of lifelines in the Miyagiken-Oki earthquake of 1978: Earthquake Engineering Division, Earthquake Disaster Prevention Department, Public Works Research Institute, Ministry of Construction, Japan, Technical Memorandum no. 1438, 98 p.

Okubo, T., and Ohashi, M., 1979, Miyagi-ken-oki, Japan earthquake of June 12, 1978, general aspects and damage: Report distributed at 2nd U.S. National Conference on Earthquake Engineering, Stanford, California, 15 p.

Tatsuoka, F., Ohkochi, Y., Fukushima, S., Igarashi, H., and Yamada, S., 1979, Soil liquefaction and damage to soil structure during the earthquake off Miyagi Prefecture on June 12, 1978: University of Tokyo, Institute of Industrial Science, Earthquake Resistant Structure Research Center Bulletin, no. 12, p. 3-13.

Tohoku University, Institute of Geology and Paleontology, 1979, Phenomena and disasters associated with the Miyaki-ken-Oki earthquake of 1978 in the east-central part of northeast Honshu, Japan: Tohoku University, Institute of Geology and Paleontology Contributions, no. 80, p. 1-97, (in Japanese with English abstract).

U.S. National Conference on Earthquake Engineering, 2nd, Stanford, California, 1979, Proceedings, 1171 p.

Ground-failure information in:

Kubo, K., Effect of the Miyagi-Oki, Japan earthquake of June 12, 1978 on lifeline systems, p. 343-352.

Kuribayashi, E., Shioi, Y., Tazaki, T., and Kawashima, K., Damage to highway bridges and other lifeline systems from the Miyagi-ken-oki, Japan earthquake of June 12, 1978, p. 353-362.

World Conference on Earthquake Engineering, 7th, Istanbul, 1980, Proceedings, v. 3, Geotechnical aspects, 486 p.

Ground-failure information in:

Asada, A., Kawakami, F., and Yanagisawa, E., Geological and soil mechanical studies on damage to housing sites by the Miyagiken-Oki earthquake, 1978, p. 219-226.

Iwasaki, T., and Tokida, K., Studies on soil liquefaction observed during the Miyagi-ken-oki earthquake of June 12, 1978, p. 195-202.

Tsuchida, H., Iai, S., and Hayashi, S., Analysis of liquefactions during the 1978 off Miyagi Prefecture

earthquake, p. 211-218.

Yamamura, K., Iwasaki, T., Sasaki, Y., Koga, Y, Taniguchi, E., and Tokida, K., 1979, Ground failures and damage to soil structures from the Miyagi-ken-oki, Japan earthquake of June 12, 1978: Report distributed at 2nd U.S. National Conference on Earthquake Engineering, Stanford, California, 16 p.

Yanev, P. I., ed., 1979, Miyagi-ken-oki, Japan earthquake, June 12, 1978: Berkeley, California, Earthquake Engineering Research Institute Reconnaissance Report, 165 p.

Ground-failure or seismic information in:

(s) Blume, J. A., Introduction, p. 1-4.
Keefer, D. K., Liquefaction and damage to dikes, p. 29-44.
Harp, E. L., Landslides resulting from the earthquake, p. 45-54.

Yoshimi, Y., Tohno, I., and Tokimatsu, K., 1978, A report on the Miyagi-ken-oki, Japan, earthquake of June 12, 1978: Part II: Geotechnical aspects of damage: International Conference on Microzonation, 2nd, San Francisco, 1978, Proceedings, v. 1, p. 600-605.

SANTA BARBARA, CALIFORNIA 13 August 1978 M_S = 5.6

Harp, E. L., Keefer, D. K., and Wilson, R. C., 1980, A comparison of artificial and natural slope failures, the Santa Barbara earthquake of August 13, 1978: California Geology, v. 33, no. 5, p. 102-105.

(s) Lee, W. H. K., Johnson, C. E., Henyey, T. L., and Yerkes, R. F., 1978, A preliminary study of the Santa Barbara earthquake of August 13, 1978, and its major aftershocks: U.S. Geological Survey Circular no. 797, 11 p.

Miller, R. K., and Felszeghy, S. F., 1978, Engineering features of the Santa Barbara earthquake of August 13, 1978: Earthquake Engineering Research Institute Special Report UCSB-ME-78-2, unpaginated.

HOMESTEAD VALLEY, CALIFORNIA 15 March 1979 M_L = 5.2

(s) Ebel, J. and Hill, R., 1979, Strong ground motions from the Homestead Valley, California, earthquake of March 1979 (abs.): Earthquake Notes, v. 50, no. 3, p. 20-21.

Hawkins, H. G., and McNey, J. L., 1979, Homestead Valley

earthquake swarm San Bernardino County, California: California Geology, v. 32, no. 10, p. 222-224.

Hill, R. L., Pechmann, J. C., Treiman, J. A., McMillan, J. R., Given, J. W., and Ebel, J. E., 1980, Geologic study of the Homestead Valley earthquake swarm of March 15, 1979: California Geology, v. 33, no. 3, p. 60-67.

(s) Hutton, L. K., Johnson, C. E., Pechmann, J. C., Ebel, J. E., Given, J. W., Cole, D. M., and German, P. T., 1980, Epicentral locations for the Homestead Valley earthquake sequence, March 15, 1979: California Geology, v. 33, no. 5, p. 110-114.

COYOTE LAKE, CALIFORNIA 6 August 1979 M_S = 5.4

Keefer, D. K., Wilson, R. C., and Tannaci, N. E., 1980, Reconnaissance report on ground failures and ground cracks resulting from the Coyote Lake, California, earthquake of August 6, 1979: U.S. Geological Survey Open-File Report 80-139, 14 p.

(s) Lee, W. H. K., Herd, D. G., Cagnetti, V., Bakun, W. H., and Rapport, A., 1979, A preliminary study of the Coyote Lake earthquake of August 6, 1979 and its major aftershocks: U.S. Geological Survey Open-File Report 79-1621, 43 p.

(s) Porcella, R. L., Matthiesen, R. B., McJunkin, R. D., and Ragsdale, J. T., 1979, Compilation of strong-motion records from the August 6, 1979 Coyote Lake earthquake: U.S. Geological Survey Open-File Report 79-385 and California Division of Mines and Geology Preliminary Report 25, 71 p.

Wilson, R. C., and Keefer, D. K., 1980, Dynamic analysis of a slope failure from the Coyote Lake, California earthquake using strong-motion records [abs.]: Earthquake Notes, v. 50, no. 4, p. 64.

MOUNT DIABLO(LIVERMORE), CALIF. 24 January 1980 M_S = 5.8
26 January 1980 M_S = 5.2

(s) Bonilla, M. G., Lienkaemper, J. J., and Tinsley, J. C., 1980, Surface faulting near Livermore, California associated with the January 1980 earthquakes: U.S. Geological Survey Open-File Report 80-523, 27 p.

Wilson, R. C., Keefer, D. K., Harp, E. L., and Wieczorek, G. F., unpublished data.

MAMMOTH LAKES, CALIFORNIA	25 May 1980 (16:33 GMT)	M_S = 6.1
	25 May 1980 (16:49 GMT)	M_S = 6.0
	25 May 1980 (19:44 GMT)	M_S = 5.8
	27 May 1980	M_S = 6.0

Geological Society of America, 1981, Abstracts with Programs: v. 13, no. 2, 119 p.

Ground-failure information in:

Harp, E. L., Bennett, M. J., and Keefer, D. K., Lateral-spread landslides from the May 25-27, 1980, Mammoth Lakes, California earthquake sequence--a geotechnical investigation, [abs.], p. 59.
Harp, E. L., and Keefer, D. K., Rock falls and rock slides near Mammoth Lakes, California triggered by the May 25-27, 1980, earthquake sequence, [abs.], p. 59.
Wieczorek, G. F., Rock falls in Yosemite Valley from the Mammoth Lakes, California, earthquake sequence of May 25-27, 1980, [abs.], p. 114.

Earthquake Engineering Research Institute Newsletter, 1980, v. 14, no. 4., 154 p.

Ground-failure information in:

Saint-Amand, P., Preliminary geologic report near Mammoth Elementary School, earthquakes of May 1980, p. 103-109.
Sylvester, A. G., The Mammoth Lakes, California, earthquakes, 25-31 May, 1980, p. 93-102.

McJunkin, R. D., and Bedrossian, T. L., 1980, Mammoth Lakes earthquakes May 25-27, 1980, Mono County, California: California Geology, v. 33, no. 9, p. 194-201.