

# GEER Focal Points for Geotechnical Engineering Reconnaissance of Extreme Events

## A. CONTEXT

1. Areal extent
2. Societal setting
3. Antecedent conditions
4. Geological setting
5. Seismological aspects
6. Meteorological aspects
7. Multi-event considerations
8. Scale effects

## B. DEMAND

1. Wind and wind-driven surge
2. Rainfall/Snowfall/Snowmelt/hail intensity and flooding
3. Drought and temperature extremes
4. Surface fault rupture/tectonic deformation and ground displacement/strain
5. Tsunami/seiches or drawdown/run-up effects
6. Earthquake ground shaking characteristics
7. Volcanic eruptions (lava flows and ash fall) and solidification/accumulation effects
8. Landslides, rock fall, debris flows, and lahars
9. Geology-related ground movements, e.g., karst subsidence, collapse, expansive soils/piping
10. Human-induced ground movements, e.g., mining subsidence, excavations

## C. EFFECTS

1. Disruption or sedimentation of waterways
2. Scour and erosion effects
3. Impacts to infrastructure from landslides, rock fall, and debris flows, including burial
4. Impacts to infrastructure from other ground movements
5. Local amplification effects of ground shaking (e.g., site and topographic effects)
6. Liquefaction and its effects, including lateral spreading, settlement, and ejecta
7. Earth and waste structures, e.g., dams, tailing dams, levees, landfills, and retaining systems
8. Ports, harbors, and waterfront structures
9. Transportation systems, e.g., bridges, tunnels, highways, and railroads
10. Lifeline systems, e.g., water, wastewater, power, natural gas, and communications
11. Industrial facilities and storage tanks
12. Infrastructure damage, especially anomalous or localized damage and collateral damage
13. Acceptable to excellent performance of infrastructure despite intense demands
14. Impacts on emergency management and emergency response and recovery

## D. TOOLS

1. Remote sensing, e.g., satellites, drones
2. Wireless sensors
3. LIDAR, photogrammetry, and other survey tools
4. Geophysical methods, e.g., MASW, SASW
5. Penetration tests, e.g., Swedish Weight Sounding, Dynamic Cone Penetration