

NATURAL HAZARDS RISK MANAGEMENT

# POST DISASTER RECOVERY FROM EARTHQUAKES

Natural disasters such as large earthquakes often lead to significant structural damage, loss of life and disruption to operations. When an earthquake occurs, our first priority is to make sure that all personnel and their families are safe and secure.

Once this critical step has been taken, it is time to focus on recovery and restoration of operations. As a trusted safety and risk management advisor, ABS Group has over 40 years of experience assisting organizations with earthquake recovery. Our Extreme Loads and Structural Risk division offers a range of technical solutions to help your company return to routine operations in a safe and compliant manner.

## **Our natural hazards risk management services include:**

- Initial damage assessment to determine if a structure can be safely occupied on a short or long-term basis
- Detailed seismic evaluation of commercial/ industrial structures to determine potential seismic deficiencies, emergency repair and structural shoring
- Evaluation of structures for potential relocation
- Development of potential mitigation strategies
- Earthquake retrofit design engineering to strengthen structures and address nonstructural (equipment and architectural elements) hazards
- Probable maximum loss estimates to quantify the financial risk from future seismic events

Our team of licensed structural and civil engineers have investigated over 100 major earthquakes. We routinely assist both commercial and government clients in evaluating their buildings and providing cost-effective earthquake retrofits when it is justified. We are prepared to mobilize to your site on short notice.

Contact us for more information and/or immediate assistance.



## Earthquakes Investigated by ABS Group

- 1983 Borah Mt., Idaho (M6.9)
- 1984 Morgan Hill, CA (M6.2)
- 1985 Santiago, Chile (M7.8 and 7.2)
- 1985 Mexico City, Mexico (M8.1 and 7.5)
- 1986 Painesville, Ohio (M5.0)
- 1986 Adak Island, Alaska (M7.7 and 6.5)
- 1986 North Palm Springs, CA (M6.0)
- 1986 Chalfant Valley, CA (M6.0 and 5.5)
- 1986 San Salvador, El Salvador (M5.4)
- 1986 Northern Taiwan (M6.8)
- 1987 Cerro Prieto, Mexico (M5.4)
- 1987 Bay of Plenty, New Zealand (M6.2)
- 1987 Whittier, CA (M5.9)
- 1987 Superstition Hills, CA (M6.3)
- 1988 Gorman, CA (M5.2)
- 1988 Alum Rock, CA (M5.1)
- 1988 Saguenay, Quebec (M6.0)
- 1988 Armenia, USSR (M6.9)
- 1989 Acapulco, Mexico (M6.8)
- 1989 Loma Prieta, CA (M7.1)
- 1989 Newcastle, Australia (M5.5)
- 1990 Upland, California (M5.5)
- 1990 Bishop's Castle, Wales (M5.4)
- 1990 Manjil, Iran (M7.7)
- 1990 Central Luzon, Philippines (M7.7)
- 1991 Valle de la Estrella, Costa Rica (M7.4)
- 1991 Sierra Madre, CA (M5.8)
- 1992 Erzincan, Turkey (M6.8)
- 1992 Roermond, Netherlands (M5.8)
- 1992 Desert Hot Springs, CA (M6.1)
- 1992 Cape Mendocino, CA (M7.0, 6.0 and 6.5)
- 1992 Landers-Big Bear, CA (M7.6 and 6.7)
- 1992 Cairo, Egypt (M5.9)
- 1993 Scotts Mill, OR (M5.3)
- 1993 Nansei-oki Hokkaido, Japan (M7.8)
- 1993 Agana, Guam (M8.2)
- 1993 Klamath Falls, OR (M5.7)
- 1994 Northridge, CA (M6.6)
- 1994 Tohoko-oki, Hokkaido, Japan (M8.1)



- 1995 Great Hanshin (Kobe), Japan (M7.2)
- 1995 Pereira, Colombia (M6.5)
- 1995 Sakhalin Islands, Russia (M7.2)
- 1995 Antofagasta, Chile (M7.4)
- 1995 Manzanillo, Mexico (M7.6)
- 1996 Duvall (Seattle), WA (M5.3)
- 1997 Calico, CA (M5.0)
- 1997 Umbria, Italy (M5.5)
- 1998 Adana-Ceyhan, Turkey (M6.2)
- 1999 Armenia, Colombia (M5.0)
- 1999 Puerto Escondido, Mexico (M7.5)
- 1999 Western Washington (M5.8)
- 1999 Izmit, Turkey (M7.4)
- 1999 Duzce, Turkey (M7.2)
- 1999 Central Taiwan (M7.6)
- 1999 Athens, Greece (M5.9)
- 1999 Algeria (M5.5)
- 1999 Hector Mine, California (M7.1)
- 2000 Napa, CA (M5.2)
- 2000 Tottori, Japan (M6.7)
- 2001 Gujarat, India (M7.6)
- 2001 Seattle, WA (M6.8)
- 2002 San Simeon (Paso Robles), CA (M6.5)
- 2003 Tokachi-oki, Japan (M7.9)
- 2004 Nigata, Japan (M6.8)
- 2007 West Sumatra, Indonesia (M6.3)
- 2007 Noto Hanto, Japan (M6.9)
- 2007 Niigata-ken Chuetsu-oki, Japan (M6.8)
- 2008 Pisco, Peru (M8.0)
- 2008 Chino Hills, Los Angeles, CA (M5.4)
- 2009 San Pedro Sula, Honduras (M7.3)
- 2009 L'Aquila, Italy (M6.3)
- 2010 Haiti (M6.9)
- 2010 Chile (M8.8)
- 2010 Baja California, Mexico and CA (M7.2)
- 2011 Christchurch, New Zealand (M6.3)
- 2011 Japan - Sendai, Tohoku Region (M9.0)
- 2014 Napa (American Canyon), CA (M6.0)
- 2016 Coastal Ecuador, Ecuador (M7.8)
- 2017 Puebla, Mexico (M7.1)
- 2018 Anchorage, AL (M7.0)
- 2019 Luzon, Philippines (M6.1)
- 2019 Rigecrest, CA (M7.1)
- 2020 Puerto Rico (M6.4)