



Abstract

21 June 2012 in Willis Auditorium

Japanese Earthquakes and Tsunamis

Charles Scawthorn

The 11 March 2011 Mw 9.0 Eastern Japan Great Earthquake resulted in very high peak ground accelerations throughout northeastern Japan. Shaking damage was significant but most damage was caused by a massive tsunami that arrived approximately 30~40 minutes following the main shock, and was then been followed by literally thousands of aftershocks, the largest of which was a Mw 7.9 relatively close to Tokyo. The event caused approximately 19,000 deaths and missing persons, a nuclear disaster at Fukushima and subsequent shutdown of virtually all Japan's nuclear power plants, representing 30% of the total generation capacity. The economic cost of the disaster is difficult to assess, but may approach USD 1 trillion when direct damage, global indirect losses, debris, rebuilding, nuclear cleanup and loss of real estate is fully accounted for. Total insurance losses however are approximately USD 40 billion. Beyond the actual damage, the extensive damage and impacts on Japan's economy has resulted in science, nuclear power and the government being questioned in Japan in an unprecedented manner. The event is probably only the first of several major earthquakes affecting Tokyo and then western Japan that can be foreseen, that will be discussed in the talk.

Event Summary

M_w: 9.0
 Date: 11 March 2011
 Time: LT 2:45pm UTC 5:46am
 Name: 東北地方太平洋沖地震 (東日本大震災)
 Tohoku Region Pacific Offshore Earthquake
 (Eastern Japan Great Earthquake Disaster)
 Epicenter: 38.322°N 142.369°E
 Felt: Osaka
Killed: ~ 26,000
 (14,161 confirmed dead, 11,536 missing)
 Housing damage: 77,000 destroyed, 260,000 damaged
 Displaced: 160,000
Economic Loss: \$600 billion?

Comparison of Slip Fault Size
(Asahi Newspaper)

C. Scawthorn 2011



Abstract

22 June 2012

Old Library, Lloyd's Building

Fire Following Earthquake in California

Charles Scawthorn

Fire following earthquake(s) (FFE) is a significant problem in California. Historically, every significant earthquake in California has resulted in multiple simultaneous fires that have strained, and at least in 1906 overwhelmed, the fire service. In both the 1971 San Fernando and the 1994 Northridge earthquake, there were over 100 ignitions. Other disasters clearly demonstrate that massive fires are a problem in California under even non-earthquake ignitions, when only one or a few ignitions are involved; the numerous wild land/urban interface fires that occur in California almost every year are the most telling example of this. Another example is the 1988 First Interstate Bank Fire that destroyed four floors of the state's tallest building (at that time) and severely damaged the rest of the building through water and smoke damage.

This talk covers the following topics:

- Scenario analyses for M_w 7.8 southern San Andreas event affecting Southern California resulting in property loss worth as much as one hundred billion dollars, and analyses for the City of San Francisco for an event similar to 1906, resulting in tens of billions of dollars in losses.
- A current major review by San Francisco of its special fire protection water system (the "Auxiliary Water Supply System") the may result in major changes to that critical system.
- A major initiative and legislation by the State of California regarding water supply reliability for fire following earthquake.
- The role of insurance – the industry has played a key role in U.S. fire protection for over 100 years and continues to do so today. This is due in part to the enormous exposure of the industry—about 9.5 million residential and 1 million commercial property insurance policies were in force in California in 2009, with a total value of \$5.1 trillion, almost all of it exposed to FFE. Through its periodic review of fire departments and their water supplies, the insurance industry seeks to assure that fire departments remain well trained and equipped, and adequately supplied with water for normal firefighting conditions. However, guidance provided by the insurance industry for adequacy of public water supplies does not mention or consider earthquakes.