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Damage to steel buildings after 2011 Tohoku earthquake in Japan

A reconnaissance team from Kobe University examined the damage to steel building structures caused by the 2011 Tohoku-oki earthquake. The focus of investigation was in Minamisanriku, Onagawa, Ishinomaki and Sendai. Despite the severe damage to timber residences, it was found that the majority of steel buildings performed well under ground motion, even in the cities of Sendai and Ishinomaki, where the peak horizontal ground acceleration exceeded 1 g. According to post-earthquake investigation, structural steel members and beam-to-column connections which were designed according to the current Japanese standards may withstand large tsunami forces. However, in most cases claddings were completely washed away by the tsunami. In Onagawa city that attacked by the violent tsunami which reached 15 meters in height, many steel buildings stood upright after the tsunami subsided, although these buildings lost much of their external finishes as well as contents inside the building. It is suspected that the early loss of claddings, alleviated the immense lateral load that the tsunami pressure otherwise would have delivered. A number of steel buildings were found to suffer from foundation failure. Such type of failure was likely resulted from scouring or liquefaction or a combination of both effects.

Biography

Mohammadreza Eslami has completed his PhD from Kobe University and Post-doctoral studies from Michigan State University and Clemson University. He is working in the Risk Engineering and System Analytics Center (RESA) and his current research focuses on vapour cloud explosion, risk assessment of accidental industrial explosions and intentional malicious blast attacks. He has published more than 10 papers in reputed journals.

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