

2011 Tōhoku Earthquake & Tsunami, Japan [HIC]

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 07.09.20 V1.1

Topic: Impacts and human responses as evidenced by contrasting recent seismic events.



Background Information:

On Friday March 11 2011, the Japanese Eastern seaboard was hit by a 6 minute magnitude 9.0 (Richter Scale) undersea megathrust Earthquake, with an epicenter 70km to the east. Whilst the direct impacts of the shaking were significant, most casualties were owing to the secondary Tsunami, of upthrust between 6-8m, which inundated a total area of 561km². Following the earthquake, over 1,000 aftershocks were measured, with several at over magnitude 7.0. This has been measured as the most powerful Earthquake in Japan, and 4th most powerful in the world, and in part caused the level 7 meltdowns of three reactors at the Fukushima Daiichi Nuclear Power Plant.

Short-Term Responses:

- Japan Meteorological Agency (JMA) advanced tsunami warning enacted 3 minutes after earthquake.
- Emergency contingency planning enacted; Prime Minister set up emergency command centre & 100,000 members of the Self-Defence force to the disaster zone.
- 163 countries and regions and 43 international organisations offered assistance, and over \$4.5 B was donated. NGOs such as the Red Cross & Red Crescent were pledged millions in financial and material support.
- 930,000 people contributed to disaster recovery efforts.

Long-Term Responses:

- 2015 Report – 220,000 still displaced and living in away from their homes, in temporary or permanent housing, most of which are from the Fukushima area, where widespread evacuations post-meltdown is still in force.
- The 'Japan move forward committee' focused on improving disaster response through youth input – preparing for future hazards.
- Work has been completed on ¾ of improved coastal defenses such as seawalls, which failed to keep the tsunami at bay.

Local Impacts:

- 15,900 dead, 6,100 injured, 2,500 people missing.
- The tsunami caused nuclear accidents in Fukushima.
- Heavy damage to infrastructure, road and railway transport arteries, including the Tōhoku shinkansen high speed railway.
- Due to the rapid onset, there was limited time to evacuate 400,000 people, so many were stranded along the coast.

Wider-Scale Impacts:

- 121,000 buildings “totally collapsed”, 280,000 “half collapsed”, 700,000 “partially damaged.”
- \$235 B in total damages owing to the disaster.
- 4.4 million houses left without electricity, 1.5 million without working water.
- Land subsidence and abnormally high tides felt as far away as Chile.
- All Japanese ports, and most airports were closed across Japan except for emergency movements.

'SEEP' Tracker – positive effects:

● Social ● Economic ● Environmental ● Political

Japan Dashboard:

HDI 2011 0.89	Life Expectancy 2011 82.6	GDP p.c. 2011 \$40,500	Population 2011 127.8 m
2018 0.915 +	2018 84.1 +	2018 \$39,300 —	2018 126.5 m —

Japan's Disaster Planning | An Insight:

Preparation:

As one of the best prepared nations on earth, Japan engages in plenty of preparative work. This includes Earthquake Proofing Buildings (around 75% are these.)

Over 1 million survival kits have been prepared in advance for transferal to an earthquake impact zone.

Education:

The first primary stage of dealing with seismic events actively in Japan is through educational practices. The country engages in regular earthquake drills from a young age at school and work, where everyone is taught the best methods to seek protection and stay safe.

Warning Systems:

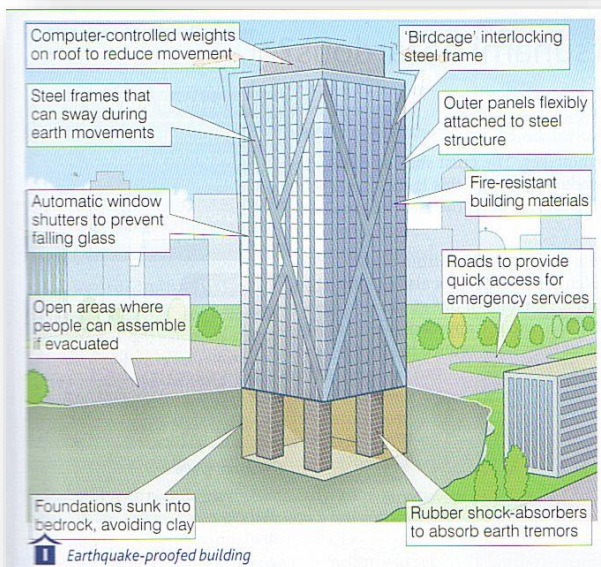
The advanced JMA warnings are sent to all mobile phones in Japan, TVs, Radio Stations and more in a matter of minutes.

Japanese bullet trains 'Shinkansen' also have emergency alarms which halt all services within 30 seconds of an earthquake warning being triggered.



Evacuations:

Warning system allow people to evacuate to higher or open ground, where they are less vulnerable to the impacts of such hazards. Around 60% of residents were able to escape the path of the tsunami through these systems, vastly reducing the impact of the 2011 Earthquake and Tsunami.



Links & References:



Which Case Studies Can This Be Linked To?

Seismic Hazards:

You must know at least two recent seismic event case studies, advisably one in a HIC and one a LIC. SUGGESTED HAITI & JAPAN

- [Haiti \[Multi-Hazard Environment\] w/ 2010 Earthquake](#)



Extended Reading:

Japan Earthquake Tsunami Warnings: <https://www.theguardian.com/world/2011/mar/11/japan-earthquake-miyagi-tsunami-warning>

Japan Earthquake Article From 2011 : <https://www.bbc.co.uk/news/world-asia-pacific-12709598>

Nat Geo Earthquake Information Factfile: <https://www.nationalgeographic.org/thisday/mar11/tohoku-earthquake-and-tsunami/>

'Can you earthquake-proof a country?': <https://www.bbc.co.uk/news/magazine-12711173>

8-Ways Japan Prepares For Earthquakes: <https://theculturetrip.com/asia/japan/articles/8-ways-japan-prepares-for-earthquakes/>

Have A Go At Practice Exam Questions:

[9 MARKER \(AO1 & 2\) QUESTION #1](#)

"Earthquakes are the most devastating natural hazards." With reference to at least one named example, to what extent do you agree with this statement?



[9 MARKER \(AO1 & 2\) QUESTION #3](#)

To what extent do you agree that "The Human Development Index [HDI] of the affected area gives us the best indication of how severe the impacts of a seismic event will be"?



Many questions will have exemplar answers and mark schemes available on the geographyportal.co.uk, feel free to look at them for more information.