

Damage Situation after the 2016 Kumamoto Earthquakes

Japan Fire and Disaster Prevention Association

1 Overview of the Earthquake

At 21:26 on April 14 (Thu.), a magnitude 6.5 earthquake occurred, centered in the Kumamoto area of Kumamoto Prefecture at a depth of 11 kilometers. A seismic intensity of 7 was registered in Mashiki Town, Kumamoto Prefecture. Then at 01:25 on April 16 (Sat.), a magnitude 7.3 earthquake occurred, also centered in the Kumamoto area of Kumamoto Prefecture at a depth of 12 kilometers. The same seismic intensity of 7 was registered in Nishihara Village and Mashiki Town, Kumamoto Prefecture. A magnitude of 7.3 is the same as the Great Hanshin-Awaji Earthquake in 1995. Another larger, active-fault earthquake occurred after an earthquake with a magnitude of 6.5 or more for the first time since 1885, when earthquake observation began in Japan. It was also the first time that a seismic intensity of 7 was registered twice in succession.

The foreshock on April 14 was caused by activity along the northern edge of the Hinagu fault zone, while the earthquake in the early hours of April 16 was caused by activity in the Futagawa fault zone. These two earthquakes are seen as continuous earthquakes that occurred with the adjacent two linked fault zones.

In addition, after the main shock on April 16, aftershocks occurred one after the other between the Aso area in Kumamoto Prefecture, located in the northeast of the Kumamoto area in Kumamoto Prefecture, and western Oita

Prefecture as well as in central Oita Prefecture. Active seismic activity was detected in these three areas including the Kumamoto area.

From 21:00 on April 14 until May 31, 1,613 earthquakes that could be felt with a seismic intensity of 1 or more were observed in the Kumamoto area and the Aso area of Kumamoto Prefecture, as well as western and central Oita Prefecture. Of these, there were 369 earthquakes with a seismic intensity of 3 or more up until May 31. These earthquakes occurred at a pace which exceeded the Great Hanshin-Awaji Earthquake (1995) and the 2004 Chuetsu Earthquake.

2 Damage situation

○ Casualties

In this series of earthquakes, a total of 49 deaths were confirmed as caused by being buried under a collapsed house or being caught in a landslide, and one person was reported missing in Kumamoto Prefecture. Out of the 49 deaths, 37 deaths were caused by the collapse of houses and 9 deaths were caused by landslide disasters. In addition, there were 1,663 injured persons, and these injuries occurred not only in Kumamoto and Oita Prefectures but also in Fukuoka, Miyazaki and Saga Prefectures.

(persons)

Prefecture	Deaths	Serious injuries	Slight injuries
Fukuoka		1	17
Saga		4	9
Kumamoto	49	333	1,263
Oita		4	24
Miyazaki		3	5
Total	49	345	1,318

(Fire and Disaster Management Agency: FDMA, as of 09:30 on May 31, cumulative totals from April 14)

- Casualties including earthquake-related deaths and injuries associated with evacuation, etc.

As of May 31, there were 20 deaths caused by festering disaster injuries or diseases caused by the physical burden after the Earthquake (in Kumamoto Prefecture). In addition, there were 140 persons with injury whose degree was yet to be determined (in Kumamoto Prefecture).

There was a peak of 183,882 evacuees after the earthquake in the early hours of April 16. As of 12:00 on April 19, there was a total number of roughly 116,900 evacuees in Kumamoto Prefecture, and 812 in Oita Prefecture.

- Damage to buildings and facilities

According to an FDMA announcement, as of 09:30 on May 31, there were 6,990 fully-destroyed houses, 20,219 half-destroyed houses, and 85,635 partially-damaged houses. In addition, damage was confirmed to 241 public buildings.

Damage to houses was concentrated on old wooden houses built in and before 1981, when the Building Standards Act was amended. The heavy roof tiles used for most houses in Kyushu to prevent typhoon damage also multiplied the damage.

- Function relocation of local government offices

The functions of the following municipal offices in Kumamoto Prefecture were relocated out of the damaged or destroyed government office buildings:

- Yatsushiro City: To Sencho branch office
- Hitoyoshi City: To the annex to the government office building, Sports Palace and Culture Palace
- Uto City: To a civic gymnasium
- Ozu Town: To a nearby municipal facility
- Mashiki Town: To the central community center

- Damage to educational facilities

According to information from 09:00 on May 26 from the Ministry of Education, Culture, Sports, Science and Technology, broken braces, ceilings, glass and pipes, and cracked walls were found at 15 national school facilities, 684 public school facilities, 241 private school facilities, 393 social education, sports or culture facilities and 148 cultural assets in the six prefectures of Kyushu excluding Kagoshima, and stone walls collapsed at Kumamoto Castle.

- Impact estimates on social capital, houses and private company facilities

In the Cabinet Office announcement on May 23, the damage to houses, factories, roads, etc. was estimated at approx. 1.8–3.8 trillion yen in Kumamoto Prefecture, and 0.5–0.8 trillion yen in Oita Prefecture.

As a breakdown, damage to buildings including houses and company facilities amounted to approx. 1.6–3.1 trillion yen, damage to social infrastructure including roads and airports amounted to approx. 0.4–0.7 trillion yen, damage to electricity, gas, and water and sewerage utilities

amounted to approx. 0.1 trillion yen, and damage to other social capital including Kumamoto Castle and parks amounted to approx. 0.4–0.7 trillion yen.

○ **Landslide disasters**

Landslide disasters caused by the Earthquake and confirmed up until May 27 by the Ministry of Land, Infrastructure, Transport and Tourism were as follows: 57 debris flows (54 in Kumamoto and 3 in Oita), 9 landslides (in Kumamoto), 70 slope failures (1 in Saga, 1 in Nagasaki, 41 in Kumamoto, 5 in Oita, 11 in Miyazaki and 1 in Kagoshima).

In Tateno in Minamiaso Village, Kumamoto Prefecture, the Aso Ohashi Bridge collapsed near the junction of Route 57 and Route 325 due to a large-scale landslide.

○ **Others**

The lives of local residents were significantly affected by the enormous damage to the railways including the Kyushu Shinkansen and roads including Route 57, as well as damage to lifelines including water failures affecting up to 445,857 households, power outages affecting up to 477,000 households and gas supply interruptions affecting up to 105,000 households.

Prefecture	Housing damage (houses)			Non-housing damage (buildings)		Fires
	Fully-destroyed	Half-destroyed	Partially-damaged	Public buildings	Others	
Yamaguchi			3			
Fukuoka		1	230		1	
Saga			1		2	
Nagasaki			1			
Kumamoto	6,988	20,154	83,033	241	783	16
Oita	2	62	2,347		15	
Miyazaki		2	20			
Total	6,990	20,219	85,635	241	801	16