

Conditions of outbreaking of fires in residential areas for the case of the tsunami of the 2011 Great East Japan Earthquake

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Caused by the tsunami of the 2011 Great East Japan Earthquake, fires broke out at 159 points in total and among them 67 points broke out in residential areas just after the largest wave attacking. Fig. 1 shows the distribution of number of fires with classified by the thickness of flooding on the ground. In Fig. 1 we can recognize three eminent peaks: (1) the first group of 1.0 to 2.9 meters in which 37% of events were contained, (2) the second group of 4.0 to 5.9 meters, and (3) the third group of 8 to 13 meters. The events contained in the first peak were such cases that living houses were neither swept away nor broken, but only inundated above floor level by about one meter, and houses kept standing, and the upper part of those houses kept dry. Houses in this first peak were presumable that they began firing by drifting burning matter, such as a burning LP gas cylinder with its valve broken. On several aircapes taken the picture from the upper sky of Yuriage area in Natori city, Miyagi Prefecture, many independent fire balls were reflected on the sea water surface covering the ground. This type fires presumable to occurred in the tsunami attacking period. Firing houses contained in the second peak were presumable to be destroyed or swept away houses. It is suggested that they became pile of debris and after drawing of the tsunami wave, they began to fire. Fires of cars were reported at 10 points. We checked water thickness of car fires. It was clarified that car fires broke out in the cases that water thickness between 0.9 meter to 3.0 meters, which suggests that fires began by spark due to electric short-circulation of batteries. No fire was accompanied with the tsunami of 1896 Great Sanriku Earthquake. Fire broke out only three points in Kamaishi city in the case of the 1933 Showa Sanriku Earthquake Tsunami. Only a fire at one house broke out in the 1960 Chilean Tsunami. No fire broke out in the case of the 1983 Nihonkai Chubu earthquake tsunami. While those cases, a big fire broke out at Aonae in Oshushiri Island accompanied with the tsunami of the 1993 SW Hokkaido Earthquake. Those past fire events caused by tsunamis suggest that the cause of outbreaking of tsunami fires rapidly began from 1980's as;

1. Cars started to spread by ordinary homes from 1970's.
2. Propane gas cylinders started to spread by ordinary homes from 1970's.
3. Kerosene started to be stored by a petroleum tank by ordinary homes from 1970's.

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