

EVS-GTR Protection against Water

EVS-GTR 18th

China

2019.06

1.1 New Accidents Found in Market



2018/09 Guangzhou China, EV caught fire due to soaking in rain*.

*<http://www.gg-ev.com/asdisp2-65b095fb-26641-.html>

1.2 Former Accident Found in Market



2016/07 Nanjing China, 2 parking (no charging) EV-buses caught fire due to pack (IP54) immersion in flooding water.

2 Usage scenario – Immersion vehicle in flooding events

Scenario 1: Driving during a flash water



■ Comments

Although it is not recommended to drive in case of flooding, it can be found around the world. There will be specific risks for EVs in case of flooding due to high-voltage battery pack onboard.

2 Usage scenario – Immersion vehicle in flooding events

Scenario 2: Vehicles parked in the underground parking garage



2019/4 Dallas USA



2018/12 Hochdorf Germany



2016/10 London UK

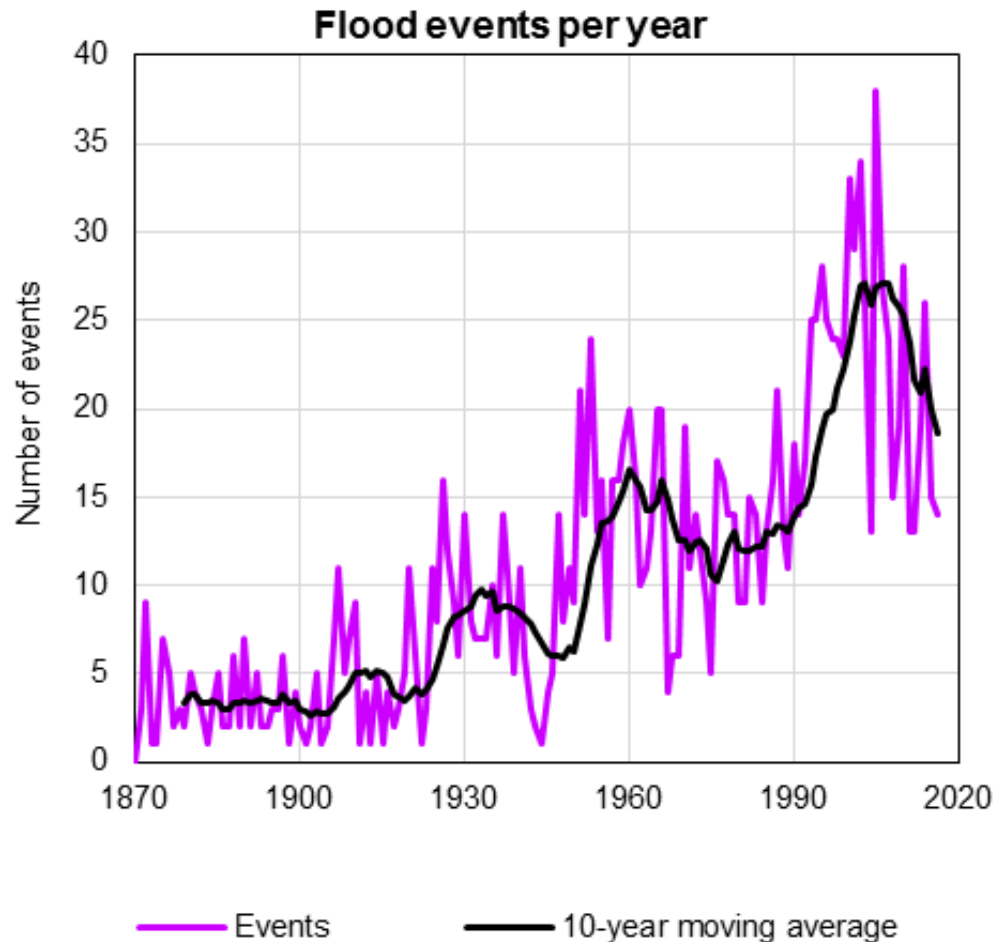
■ Comments

In this kind of flooding scenario EV could cause fire if it can't be protected against water, which would lead to the fire in the building.

Considering this kind of severe consequence, this scenario has to be taken into consideration by regulation and EV must be designed accordingly to avoid it.

Thanks for your attention!

Flood Events in European Countries



■ Comments

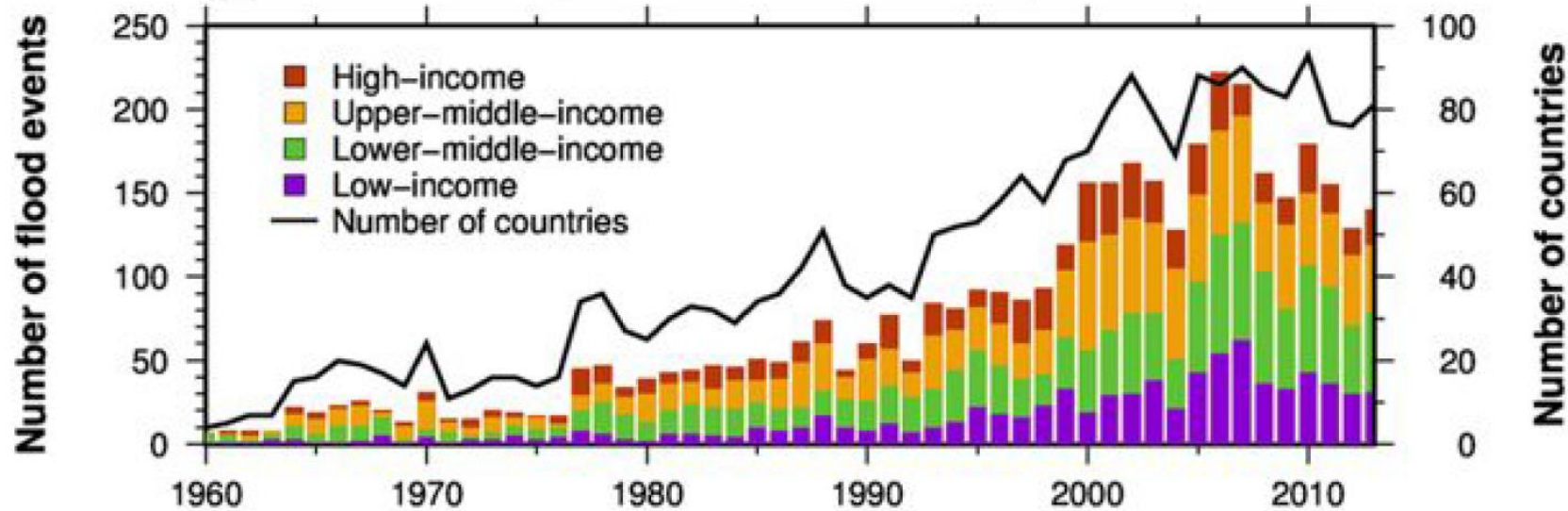
Although it seems flood events are rare and irrelevant to most of the majority, **an increasing trend of flood events** can be found in European countries .

Annual number of flood events in European countries*

*Paprotny , D., T. et al. Trends in European flood risk over the past 150 years. arXiv. 2017 Oct 26; 1710.11044

Flood Events Around the World

(a) Number of reported flood events by EM-DAT



(a) Number of flood events for each income level (bar) and number of countries in which a flood event was reported in the Emergency Events Database (EM-DAT) (solid line) from 1960 to 2013. The definition of income level was obtained from the World Bank (<http://data.worldbank.org/about/country-and-lending-groups>).*

*Tanoue, M., T. et al. Global-scale river flood vulnerability in the last 50 years. *Scientific Reports*. 2016 Oct 26;6:36021
<https://www.nature.com/articles/srep36021>

Requirements from OEM

No.	Requirement*
OEM1	The test shall be applied in accordance with [ISO 20653], Chapter 6 "Degrees of protection against water", second code element 7: "temporary immersion in water".
OEM2	The EES must comply with leak-tightness requirement IP67 (default: IP67) within the vehicle assembly.
OEM3	Requirement and testing of degree of protection (IP code) as per ISO 20653, High-voltage battery pack in installed condition fulfills the IPXXD/IP6K9K/IP6K7

■ Comments

IP67 is required by typical OEMs over the world .

*Only key relevant information is listed here, because of confidential contracts with OEMs.