

Water mist and NECs - SUVEREN Research Project

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ABSTRACT

Due to the fact of global warming and in order to reduce CO₂ emissions, new energy carrier vehicles (NECs) will gain increasing popularity. There have been already very rapid changes in the market shares of sold vehicles in some countries, which is mainly due by the political decisions. NECs typically utilize some alternative fuel with the internal combustion engine like LPG, CNG or are powered by the electrical motor where energy has been stored in batteries. Vehicles can have also combinations like having internal combustion engine and electric drive when they are called hybrids. Also hydrogen vehicles are coming to the market and it can be utilized in both vehicle types.

These new emerging technologies challenge also fire safety engineering. Today's safety concepts, guidelines and standards are based on design parameters like heat release rates, fire mitigation measures and evacuation concepts that result from the "old" conventional energy carrier risks of vehicles with internal combustion engines. NECs will lead to emerging risks like battery fires, potential jet flames from pressure vessels or distribution of inflammable or explosive gases. These new risks are affecting especially to underground and any other confined space area where the fire safety is especially important.

This paper presents the problems and challenges of underground facilities with NECs. New research project SUVEREN, Safety of underground structures with NEC, is also introduced. The research project includes surveying the changes needed for the fire safety when allowing NECs used underground facilities. Fire testing, especially with Li-on batteries, plays important role and IFAB is doing the fire tests. The measurement challenges of battery testing will be explained with this paper.

Water mist is seen as potential firefighting technology to tackle fire with NECs. This paper will present pros and cons of water mist in combination with NECs. Especially underground and confined space applications are introduced. Also some preliminary results with water mist and Li-on batteries will be presented (Note! Depends on the ongoing test program).