

Battery, fuel cells and hybrid vehicles update



Subgroup “USERS”



Team

“Users” are parties which make use of these vehicles, that comprises the ADR roles

- Consignors
- Consignees
- Fillers
- Carriers
- Unloaders

In practice the group includes chemical/oil/gas industry and carrier associations, and a number of country delegates

- 14 Meetings in total
- 3 meetings F2F, 11 virtual
- 5 meetings together with manufacturers
- 1 site visit to Scania demo center



Focus

- Identify at an early-stage situations and scenarios which can be concerning for users
- Where possible, discuss how to ensure that those concerns are dealt within the next versions of ADR



Scope

All the activities covered in ADR, that is

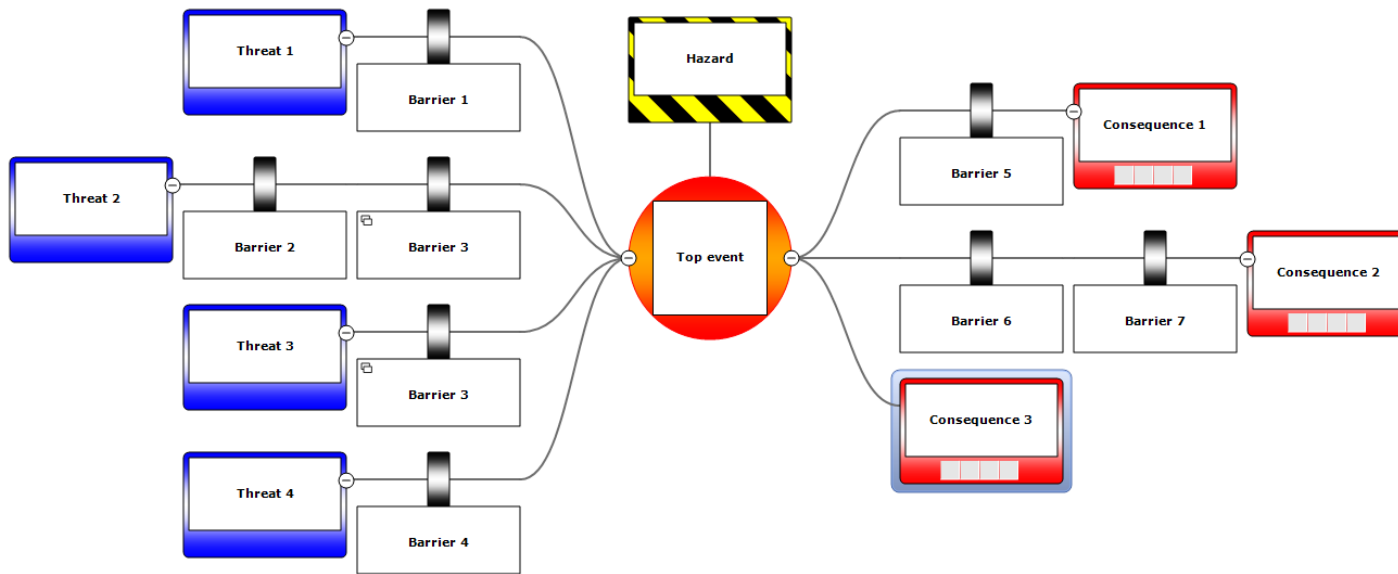
- consigning DG to carriers
- filling DG into tanks
- transporting DG from the loading to the unloading point

These activities also include

- intermediate stops
- battery charging/H2 filling
- incident management



Methodology



Barriers need to be

1. Effective
2. Independent
3. Auditable

1. Battery chemical energy/Battery runaway
2. High voltage electricity/High energy spark released
3. Temperature/High temperature
4. High pressure hydrogen/Loss of containment
5. Dangerous goods/Spill on battery
6. (Liquid hydrogen/Loss of containment) – not discussed yet



Results

Scenario	To be developed barriers
Release of a spark in an ATEX zone, leading to ignition of a possible vapor cloud in a loading/unloading area	Add a barrier to prevent ignition of a flammable gas cloud, to be technically developed.
Mechanical abuse of battery leading to battery runaway	To be technically developed. Difficulty here is that this has an "ADR consequence" but it should be captured in R100.
Low quality battery* leading to battery runaway	To be formally developed.
External fire leading to battery runaway	To be technically developed. Difficulty here is that this has an "ADR consequence" but it should be captured in R100.
Battery runaway leading to exposure of driver to toxic fumes	Ensure awareness of risks related to use of "alternative fueled" vehicles to be taken into the ADR driver training (8.2.2.3.2)
Battery runaway leading to BLEVE of a tank containing flammable gas	To be technically developed

** Quality is a very wide concept: in this context the group wants to warn against a production process which is not well designed, with the consequence that some debris may remain in the battery.*



Results

Other items not formally included in the bow-ties, but which are worth mentioning for possible ADR amendment:

- Require specific trainings for responsible roles (driver, filler, etc.)
- Develop specific checklists for BEV/HFCV
- Ensure vehicles are labeled
- Certificate of approval mentioning EV or H2
- Prevent a flammable gas from entering the battery pack



Way forward

1. Include bow tie on leak of DG into the final report
2. Develop a bow-tie for liquid hydrogen
3. Develop a bow-tie for use hydrogen in internal combustion engines
4. Verify if the proposals of the IWG to the WP15 are enough to reduce the identified risks to an acceptable level



Thank you.

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About Cefic

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