

Master Thesis - Risk Assessment for Alkaline Fuel Cell

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Figure 1: The H2 ENSAD in its Excel form.

Abstract

In this thesis the risk assessment of the Hydrogen energy chain and of an Alkaline Fuel Cell system, the *Kore System* of the POWER-UP consortium, have been performed.

For the Hydrogen energy chain, first a data collection of accidents related to its stages has been performed in order to build the new ENSAD for H2 energy chain. Second, the risk indicator, fatality rate, has been estimated and compared to those of other energy chains. It has been found that the H2 energy chain has a higher rate than the new renewable energy chains (PV, Wind Onshore and EGS). Furthermore, it is very likely that the fatality rates of the fossil energy chains (Coal, Oil and Natural Gas) are larger than the Hydrogen one.

Concerning the *Kore System*, which is an electricity generation unit having a maximal power of 250 kWe out of by-product hydrogen, four building materials have been analyzed in order

to assess the risk: hydrogen, potassium hydroxide, nickel and palladium. The risk indicators related to them have been successfully calculated. The results show a non-negative fatality rate for hydrogen and nickel only, with the former significantly higher than the latter.