HYSEA Newsletter

Improving Hydrogen Safety for Energy Applications (HySEA) through pre-normative research on vented deflagrations

Newsletter

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Sabato, 28 Novembre 2015

EDITORIAL

The HySEA project started on 1 September 2015 and will continue for three years. The consortium partners will conduct pre-normative research on vented hydrogen deflagrations in ISO containers and smaller enclosures. The motivation behind the project is to facilitate the safe and successful introduction of hydrogen as an energy carrier through improvement and harmonization of international standards for sizing explosion vents for hydrogen installations. The research partners in the HySEA consortium will perform dedicated experiments and develop engineering models as well as improved models in the computational fluid dynamics (CFD) tools OpenFOAM and FLACS. Stakeholders can follow the project through the website or by subscribing to the HySEA newsletters. Trygve Skiold

Trygve Skiold (R&D Director Gexcon AS)
HYSEA Coordinator
with
Bert De Colvenaer (Executive director of the Fuel Cells and Hydrogen Joint Undertaking)
at ICHS2015 Conference in Yokohama

HYSEA WEB SITE

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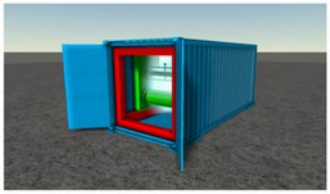
PARTNERS

The partners in the HySEA consortium are Gexcon (coordinator), University of Warwick, Universita di Pisa, Impetus, Fike Europe and University of Science and Technology of China (USTC).



Glass side view

Test side view

OVERVIEW

The partners in the HySEA consortium have extensive experience from experimental and numerical investigations of hydrogen explosions. The experimental program features full-scale vented deflagration experiments in standard ISO containers, including the effect of obstacles representative of industrial systems. The project also entails the development of a hierarchy of predictive models, ranging from empirical engineering models to sophisticated computational fluid dynamics (CFD) and finite element (FE) tools. The specific objectives of HySEA are:

- To generate experimental data of high quality for vented deflagrations in real-life enclosures and containers with congestion levels representative of industrial situations;
- To characterize different strategies for explosion venting, including hinged doors, natural vent openings, and commercial vent panels;
- To invite the larger scientific and industrial safety community to submit blind-predictions for the reduced explosion pressure in selected well-defined explosion scenarios;
- To develop, verify and validate engineering models and CFD-based tools for reliable predictions of pressure loads in vented explosions;
- To develop and validate predictive tools for overpressure (P) and impulse (I), and produce P-I diagrams for typical structures with relevance for hydrogen energy applications;
- To use validated CFD codes to explore explosion hazards and mitigating measures in larger enclosures, such as warehouses; and
- To formulate recommendations for improvements to European (EN-14994), American (NFPA 68), and other relevant standards for vented explosions.

ORGANIZATION

The scope of the work includes full-scale experiments in containers with obstacles representative of industrial systems, development and validation of engineering and CFD models, and formulation of recommendations for international standards. The figure on the left illustrates the relation between the five work packages.

EVENTS

1 September 2015 Official start-up of the HySEA project. The project duration is three years.

14-16 September 2015 Gexcon hosted the kick-off meeting for the HySEA project in Bergen, Norway, on 14-16 September 2015.

19-21 October 2015 Partners from the HySEA project presented the project during the Sixth International Conference on Hydrogen Safety (ICHS) in Yokohama, Japan. The dissemination activities included a poster, flyers and mentioning during oral presentations during the conference.

23 October 2015 Gexcon presented the status for the HySEA project during the International Energy Agency Hydrogen Implementation Agreement (IEA-HIA) Task 37 on Hydrogen Safety meeting in Tokyo.

The HySEA project is co-funded by the Horizon 2020 programme of the European Union through the Fuel Cells and Hydrogen 2 Joint Undertaking