

European hydrogen emergency response training programme for first responders

HyResponse
(325348)

www.hyresponse.eu



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HyResponse - PROJECT OVERVIEW

- Call topic SP1-JTI-FCH.2012.5.3
- First responder educational and practical hydrogen safety training
- 01/06/2013 -> 30/09/2016 (75% project duration passed)
- Total budget : 2 640 284 €
- FCH JU contribution : 1 858 453 €



HyResponse - Abstract (overview project)

- Hydrogen and Fuel Cell (FCH) technologies and applications both in transport and energy sectors arrive to the market today
- **Fire authorities' and First Responders'** awareness and knowledge of these new technologies are limited
- An adequate training is therefore required to provide knowledge and essential skills on:
 - how to handle potential incidents/accidents at FCH systems and infrastructures;
 - how to protect the public with minimum First Responders' own life risk exposure.
- Overall HyResponse project objectives
 - Support the successful implementation of FCH installations into the market by providing **educational and practical hydrogen safety training to First Responders**
 - Facilitate project approval

PROJECT TARGETS AND ACHIEVEMENTS

| Programme objective/target | Project objective/target | Project achievements to-date | Expected final achievement |
|--|--|--|---|
| MAIP | | | |
| <p>Develop first-responder hydrogen safety educational materials in Europe</p> | <p>Develop a comprehensive training for First Responders dealing with all safety aspects of FCH transport and stationary applications:</p> <ul style="list-style-type: none"> • Educational training • Operational training • Virtual Reality training | <ul style="list-style-type: none"> • Content of the educational material almost finalized <ul style="list-style-type: none"> • Curriculum • Hydrogen safety lectures • RCS training materials • Intervention strategies and tactics • Pedagogical scenarios for the virtual and reality training identified and under development | <p>Full educational , operational and virtual reality training tested by up to 70 FRs from 18 countries</p> |

PROJECT TARGETS AND ACHIEVEMENTS

| Programme objective/target | Project objective/target | Project achievements to-date | Expected final achievement |
|--|---|--|---|
| MAIP | | | |
| <p>Install an European Hydrogen Training Platform on which will be realized full scale exercises</p> | <p>Conception and construction a FCH transport and stationary training platform:</p> <ul style="list-style-type: none"> • operational training platform • virtual reality training platform | <ul style="list-style-type: none"> • Operational platform in construction (to be commissioned in January 2016) • Virtual Reality platform developed • More than 109 scenarios | <p>Full training tested by up to 70 FRs from 18 countries</p> |
| <p>Develop first-responder intervention guide</p> | <p>Deliver an Emergency Response Guide</p> | <p>Intervention methodology developed for transport and stationary FCH applications</p> | <p>Emergency response guide validated by up to 70 FRs from 18 countries and freely accessible</p> |

PROJECT TARGETS AND ACHIEVEMENTS

| Programme objective/target | Project objective/target | Project achievements to-date | Expected final achievement |
|--|---|---|---|
| MAIP | | | |
| Disseminate first-responder hydrogen safety training materials in Europe | Organize 3 training sessions in a face-to-face mode | <ul style="list-style-type: none">• Training sessions planned• Training program taking into account an increase of complexity during the week• Contact initiated to train | About 70 FRs to be trained from 18 EU countries |

PROJECT TARGETS AND ACHIEVEMENTS

| Programme objective/target | Project objective/target | Project achievements to-date | Expected final achievement |
|--|---|---|--|
| MAIP | | | |
| Disseminate best practices using online tools | <ul style="list-style-type: none"> • Free online interactive hydrogen safety training • Free access to the emergency response guide | <ul style="list-style-type: none"> • Web-based course including educational material on FCH application, their safety concepts, scenarios and related intervention strategies and tactics • Interactive Virtual Reality exercises (on-going work) | Web-based course publicly available in September 2016 |
| Dissemination of the program results through public awareness events and initiatives | <ul style="list-style-type: none"> • Organization of an international workshop for European FR • Participations to international events | <ul style="list-style-type: none"> • Organization of the 1st International Workshop in 2014 • Participation to several international events | <ul style="list-style-type: none"> • Organization of 2 international workshop • Wide dissemination |

PROJECT TARGETS AND ACHIEVEMENTS

- Web-based course

Fuel Cell Vehicles - Windows Internet Explorer provided by AREVA

C:\Users\fverbecke\Desktop\FVe\Docs_travail\HyResponse\WP3\Online - training\fuel_cell_vehicles.html

Favoris AREVA - Corp AREVA - Intranet

Fuel Cell Vehicles

« Précédent Suivant »


HyResponse

Fuel Cell Vehicles

**EDUCATIONAL MATERIALS:
INTERVENTION STRATEGIES
AND TACTIC FOR FIRST
RESPONDERS**

- Hydrogen Basics
- Hydrogen Stationary Storage and Distribution
- Stationary Applications
- Refueling Stations
- Fuel Cell Vehicles**
 - Description and safety measures
 - Scenarios
 - Strategies and tactic of emergency response
 - Exercise
- Videos

- Description and safety measures
- Scenarios
- Strategies of emergency response

PROJECT TARGETS AND ACHIEVEMENTS

- Operational training platform
 - 2500 m² platform
 - More than 109 scenarios
 - Fuel comparison:
 - H2 (700, 350, 200 bar)
 - CNG (200 bar)
 - LPG (20 bar)



PROJECT TARGETS AND ACHIEVEMENTS

- Virtual Reality training platform



PROJECT TARGETS AND ACHIEVEMENTS

- Face-to-face training sessions
 - About 70 firefighters trainees from about 18 countries
 - Three training sessions
 - 14th-18th of March 2016
 - 9th-13th of May 2016
 - 6th-10th of June 2016

| |
|-----------------------------|
| Educational training |
| Strategies and intervention |
| Operational training |
| Virtual reality training |

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|-------------|--|--|---|---|---|
| 8h00- 9h45 | FCH application and safety | Safety of storage | Harm and damage criteria | Hazards of H2 use indoors | Ignition sources and prevention |
| | Hydrogen properties | Methodology and response guide | Unignited H2 releases and their mitigation | Dealing with hydrogen explosions | Motorway accident involving a H2 trailer and hazmat truck |
| 10h15-12h00 | H2 fires RCS for First Responders | FC vehicles (car, bus, forlift, etc.) | Refuelling stations, storage and FC systems | Stationary and mobile applications | |
| 12h00-14h00 | Lunch | | | | |
| 14h00-15h30 | VR tour for presentation of the operational platform | Multi-vehicle accident - FC car in a fire | H2 leak at a refuelling station | Multi-vehicle accident - H2 jet fire from H2 trailer | |
| | CNG and H2 explosions at various concentrations | Multi-vehicle accident – CNG/LPG car in a fire | FC system default - H2 leak | H2 leak from storage – urban refuelling station | |
| 16h00-17h30 | H2, CNG, LPG jet fires | FC bus in a fire on a small road | FC car in a fire at a refuelling station | Urban accident - FC bus in a fire - urban environment | |
| | Firefighting exercises | Forklift in a fire inside a warehouse | H2 jet fire from industrial storage | Fire in an industrial environment with FC system | |
| 17h30-18h00 | Debrief | Debrief | Debrief | Debrief | |

RISKS AND MITIGATION

- Due to major organizational changes in ASE and ENSOSP during year 2014:
 - The consortium asked for a 4 month extension of the project duration up to 2016, September 30th.

SYNERGIES WITH OTHER PROJECTS AND INITIATIVES

- Collaboration with the International Association of Fire and Rescue Services (CTIF)
 - Commission “Extrication and New Technologie”
- International collaboration
 - USA with DOE and Pacific Northwest National Laboratory
 - Japan with Technova and HySUT
- European Fire Services
 - Germany, UK, France, Belgium, Denmark, Italy, Poland, Netherlands, Spain, Norway, Sweden, Swiss, Ireland, Greece, Czech, Romania
- Fire services outside Europe
 - USA, Japan, Taiwan (on-going discussion), China (on-going discussion)
- Automotive car manufacturer
 - Toyota, Hyundai

HORIZONTAL ACTIVITIES

- Training activities organised by the project
 - 1st International workshop on hydrogen safety training for first responders workshop, 3-4/09/2014, Aix-en-Provence, France
 - 1st training session: 14th-18th of March 2016
 - 2nd training session: 9th-13th of May 2016
 - 3rd training session: 6th-10th of June 2016
 - 2nd International workshop on hydrogen safety training for first responders workshop, 29-30/06/2016, Aix en Provence, France
- Project work in safety, regulations, codes, standards, general public awareness
 - Recommendations for RCS to be finalized at the end of the project
 - Standardization regarding rescue sheet (CTIF)
 - ISO draft standards regarding harmonized signs and symbols for alternate energy carriers (CTIF)

DISSEMINATION ACTIVITIES

- 1st International Workshop on Hydrogen Safety training for first responders workshop in 09/2014, Aix-en-Provence, France
- European Technical School on Hydrogen and Fuel Cells, June 23-27, 2014 - Crete, Greece, « Safety of hydrogen and fuel cell technologies: industrial research perspective »
- HySafe International Workshop on hydrogen safety, « Hydrogen Emergency Response Training Program for First Responders - HyResponse », 11/11/2014
- New Energy Carriers in Tunnels and undergrounds systems, 11/03/2014, Marseille, "Safety aspects of new energy carriers (focus on Hydrogen) from Firefighter's point of view"
- Busworld Turkey 2014, « Fuel Cell Bus and Hydrogen Safety Training for First Responders », Istanbul, Turkey, April 24-27, 2014
- International Conference on Hydrogen Safety training, “European Hydrogen Emergency Response training programme for First Responders”, October 19-21, 2015 Yokohama (Japan)
- Conference of the International Association for Fire and Rescue Services (CTIF), Rome (Italy), 09/12/2015
- WHEC 2016 - Spain
- 2nd International workshop on hydrogen safety training for first responders workshop, Aix en Provence (29-30/06/2016)

EXPLOITATION PLAN/EXPECTED IMPACT

- What has your project changed in the panorama of FCH technology development and/or commercialisation?
 - Support the successful implementation of FCH installations into the market by providing **educational and practical hydrogen safety training to First Responders**
 - Facilitate project approval
- Project's results to be exploited by the European First responders community:
 - Free online access to teaching materials
 - Web-based course and interactive virtual reality exercises
 - European Emergency Response Guide freely accessible
- 2nd stage of the European emergency response training program: “Train tomorrow's First Responder Trainers and Hazmat Officers”
 - Train tomorrow's European First Responder trainers and hazmat officers who will then further replicate the European Hydrogen Safety Training Program in their country and in their language