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Hydrogen and Fuel Cell Education for Emergency Responders and Permitting Officials: Going Global

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Abstract

California has enjoyed the lead in the deployment of fuel cells and hydrogen; however, it is certainly not the only place in the US, or the world, where this technology is advancing. As such, emergency response personnel and permitting officials need a background and education on the topic not only to facilitate the growth of the industry, but to help with the public's acceptance. This was recognized early on by the auto maker members of the CaFCP as they put fuel cell vehicles into demonstration fleets, and is now being recognized around the world as hydrogen programs expand.

The California Fuel Cell Partnership's Emergency Responder Education Program for Hydrogen and Fuel Cell Vehicles has gained recognition in the recent past. The CaFCP program has also been requested for other hydrogen and fuel cell projects outside of California, hence expanding upon that recognition. Even more recently, CaFCP helped to develop curriculum and assists in the delivery for California State Fire Training and for the U.S. Department of Energy. The latter collaboration has resulted in interest from the International community, turning to CaFCP on topics related to first responder education.

Keywords: hydrogen, fuel cells, safety

1 Introduction

California has enjoyed the lead in the deployment of fuel cells and hydrogen for transportation and stationary power; however, fuel cell and hydrogen technology is advancing across the US and throughout Europe, Asia and South America. Years ago, California Fuel Cell Partnership's automaker members identified the importance of providing consistent, factual education and training to emergency response personnel and permitting officials. Reducing the unknowns of a new technology is vital to growing an industry and gaining public acceptance. As hydrogen programs around the world are expanding, so is the need for training. The California Fuel Cell Partnership's (CaFCP) Emergency Responder Education Program for Hydrogen and Fuel Cell Vehicles was designed specifically for CaFCP members' fuel cell vehicles in California. Every year, we educate 500-700 fire fighters in California about the vehicles and the fuel. In

addition, we work with 50-75 permitting officials each year so they know what to look for when approving building plans or conditional use permits. The program has been so well received by California emergency response professionals that CaFCP members expanded the program to include vehicles and stations in other states, and expanding to include fuel cell fork trucks.

1.1 Current activities

CaFCP's information is included in alternative fueled vehicle curriculum for the California State Fire Training and for the U.S. Department of Energy. CaFCP helps in delivering both programs. CaFCP's reach with the program continues to grow. We now participate in international fire training conferences and other countries' programs turn to CaFCP as a resource. We've learned that no matter the country or language, educating first responders has universal themes and tactics.

2 Delivery of information

To be effective, training has to consider the audience. First responders and permitting officials tend to receive information in different ways. First responders are more like end-users. They want to know first and foremost how to respond to an incident. The cause of the incident, properties of hydrogen and safety systems are important, but secondary to actions needed.

Permitting officials are more interested in the laws, codes and regulations that they will use to permit an installation. They want to understand the reasoning behind something and how an authority having jurisdiction might interpret various codes.

In training sessions, permitters do well with worksheets, papers, references and tables. They tend to be "book learners" who like to read and make notes. We design the presentations to have handouts, check lists and sources of more information. Fire fighters and first responders tend to be hands-on learners. A check list of things to look for at the scene of an FCV incident is not nearly as effective as pictures, sounds and video. When working with first responders, instructors need to use visual elements to covey the message. When first responders see how something reacts in a real-life setting, they have a level of assurance how that item will behave.

For hands-on learners, a long lecture can be difficult. We keep fire fighters engaged by being succinct in the lecture and being interactive. Our trainers ask lots of questions, many of them very obvious, because talking keeps the students active. We also regularly pass out props—pieces of fuel cells, hydrogen tanks and safety devices—during the lecture. This helps to hold the students' attention, gives some relevance to the item being discussed, and allows them to see and feel it first hand, lending to a level of comfort and familiarity.

As soon as possible, we move the class outside to look at the vehicles. Telling them about fuel cell vehicles is certainly helpful, but having a vehicle they can see and touch is optimal. Students retain more information after the session when they've had a chance to open the vehicle's bonnet and the doors, crawl around and under the car, see the batteries, hear it turn on, and even drive the fuel cell vehicle. When available, we also provide a tour of a nearby hydrogen station so they can see how to put fuel into the vehicle.

2.1 Questions

In addition to being permitting officials and fire fighters, our students are consumers; people who buy and drive vehicles. They have all the same questions about the vehicles and fuel as people at a public outreach event. And as we move into more international audiences, the questions seem to always be the same. They ask as a

consumer—how many cars, how much do the cost, how do you get fuel, when can I buy one—and as permitters or fire fighters—the 'what if' questions and scenarios.

3 Summary

The "business processes" of granting permits are quite different from region to region. Fire fighters throughout the US and Europe have slightly different methods and tactics. Regardless of the differences, we've learned that the gap in information and the style of learning is remarkably similar throughout the world. The key to successfully training people about a new technology, like fuel cell vehicles and hydrogen, is rather simple. First address them like consumers so they can relate to your product. Then provide them the information that is most relevant to their job in a way that matches their learning style. Finally, reinforce the classroom lessons by showing them the vehicle so that it moves from a "some day" idea to a today reality.

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Jennifer Hamilton has led the CaFCP's Emergency Response Education Program since April 2006, having educated over 4,300 first responders and permitting officials in that time. Jennifer is also an instructor for the US DOE's Hydrogen Emergency Response Training for First Responders. Jennifer has a background in research and teaching.