



CRITICAL ISSUES WORKSHOP

CNG & Hydrogen Cylinders: Opportunities, Challenges & Strategies

www.CNGandH2workshop.com

PROGRAMME

11 & 12 March 2008, Brussels, Belgium

Le Châtelain Hotel, Rue du Châtelain 17, 1000 Brussels (32.2.646.00.55)

The Purpose & Goal of this Critical Issues Workshop

The reliability and safety of high pressure gaseous fuel storage systems is an integral part of the success and sustainability of natural gas vehicles (NGVs) and hydrogen vehicles (H2Vs), whether they will be powered by internal combustion engines or fuel cells. As the market for these vehicles expands globally, the need to maintain and enforce quality control of cylinders and the associated technology systems (valves, relief devices, etc.) is critical. Inevitable incidents that occur due to system failures must be handled with scientific integrity so manufacturers and consumers can learn from these experiences in order to improve safety and reliability into the future. *CNG & H2 Cylinders; Challenges, Opportunities & Strategies* is designed to bring together high-level experts and industry stakeholders to address the very specific and challenging issues facing CNG and hydrogen fuel storage systems. Based upon the critical issues identified over two-half-day sessions, the outcome will advance specific actions and strategies required in the near- and longer-term future.

Tuesday 11 March 2008

13.00 – 15.00 CURRENT VIEWS OF CNG & HYDROGEN CYLINDER SYSTEMS

This session provides an overview of CNG and hydrogen cylinder 'systems' including associated valves and cylinder assemblies, from the manufacturers' perspectives. Manufacturers' views will cover the full range of different type cylinders, from Type I to Type IV. Each speaker also will provide their view of key issues that are most critical to address. Presentations will be brief but comprehensive, and speakers will participate in other discussions throughout the workshop.

Brief Overview: Opportunities, Challenges & Strategies, *Jeffrey Seisler, CEO, Clean Fuels Consulting*

CNG & Hydrogen Cylinder Systems and Technologies

- **Raufoss Fuel Systems AS**, *Per Heggem, Director Research & Product Development*
- **Dynetek**, *Christian Rasche, President & CEO*
- **Luxfer**, *Dave Myers, U.S. Alternative Fuels Sales Manager*
- **Worthington Cylinders GmbH**, *Winfried Freches, Director of Marketing & Sales*
- **Ullit SA**, *Christophe Elie, Design Engineer*
- **MCS International**, *Axel Mohnhaupt, Manager Sales & Distribution*

Valve & Pressure Relief Device Technologies

- **VTI Automotive GmbH**, *Dirk Kaben, Director of R&D*
- **Rotarex Automotive**, *Sven Hinnerwisch*

15.00-15.30 Coffee Break with the Table Top Exhibitors

15.30-17.30 CYLINDER INCIDENTS: INVESTIGATIONS, FINDINGS & CONCLUSIONS

Despite the fact that CNG/Hydrogen fuel systems are by far the strongest and safest on the market, incidents involving cylinder failures are inevitable, particularly as the CNG and hydrogen vehicle markets expand dramatically. Catastrophic failures of high pressure cylinders can be dramatic. Each incident must be examined with the care normally associated with accidents in the airline industry, in order to learn from technological or human failures and, therefore, maintain the highest level of safety among all the fuels.

- **Technology Improvement through Cylinder Failure Analysis**, *Bernie James, Powertech (Canada)*
- **Some Things to be Learned from the 'Other' Compressed Gas Fuel System**, *Hank. Seiff, Clean Vehicle Education Foundation (USA)*
- **Investigation of CNG Cylinder Incidents: A European View**, *Christian Rasche, President/CEO Dynetek*
- **Investigation of French CNG Cylinder Incidents**, *Marc Mestrel, Mestrel Associates*

18.00-19.30 NETWORKING COCKTAIL RECEPTION

Wednesday, 12 March 2008

8.30– 10.00 USERS PERSPECTIVE: CNG & HYDROGEN STORAGE

CNG and hydrogen vehicle manufacturers must be confident in the products and systems installed on their vehicles. The integrity of the vehicles becomes a benchmark for consumer confidence, particularly when new fuels are introduced into the market. Likewise, quality control throughout the life of the vehicle must be assured. This session provides an essential view of gaseous fuel storage issues from the manufacturer's perspective, and also discusses the vital need for on-going inspections to assure reliability and safety.

- **Light Duty Vehicle Manufacturer View of Gaseous Fuel Storage**, *Hans-Peter Kahland, Team Leader, IAV GmbH*
- **Fuel Storage in the NGV Retrofit Industry**, *Gert Jan Rap, Rap Clean Air Products*
- **Cylinder Inspection: What to Look for in the 'Field'**, *Bruno Vandenberghe, Product Manager, Technical Center for the Mechanical Engineering Industries (CETIM)*

- **Cylinder Examination & Testing**, *Rohintan (Roy) Irani, Chairman of CEN TC 23/SC1 Gas Cylinder Design, Manufacture and Testing, and Chairman of ISO TC 58/SC4/ WG 3, group on Inspection of On-Board CNG Cylinders*

10.00 - 10.30 Coffee Break with the Table Top Exhibitors

10.30 – 11.30 STANDARDS & REGULATIONS: CNG & HYDROGEN CYLINDERS

The heart of reliability and safety of high pressure gaseous fuel storage systems lies in the quality and integrity of the national and international standards that then are transformed into national and international regulations. These standards provide the benchmark for performance and reliability in design and manufacturing. Regulations provide a mechanism to implement and ultimately enforce quality control in the market. There is a strong relationship between CNG and hydrogen standards and regulations. The progress of each and the harmonization that is required will be explored in this session.

- **Hydrogen Technology: Moving Toward a Global Technical Regulation**, *Reinhold Wurster, Senior Manger, Hydrogen Projects, L-B-Systemtechnik GmbH (LBST)*
- **CNG & Hydrogen Cylinder Standards, Regulations & Technical Issues**, *Rohintan (Roy) Irani, Chairman of CEN TC 23/SC1 Gas Cylinder Design, Manufacture and Testing, and Chairman of ISO TC 58/SC4/ WG 3, group on Inspection of On-Board CNG Cylinders*
- **Harmonization of ISO Standards and UN Regulations: New On-Board Components for CNG, H2 and CNG-H2 Blends**, *Aldo Bassi, Chairman, ISO Technical Committee 22/Subcommittee 25, Vehicles Using Natural Gas*

11.30 – 12.30 STRATEGIES INTO THE FUTURE: TECHNOLOGIES, MARKETS & REGULATIONS

An interactive discussion between panelists selected from the session presenters and the audience will provide the final results of the workshop activities, with an eye toward laying a foundation and strategy for further work required by the industry to advance and maintain the safety and reliability of high pressure gaseous fuel storage systems into the future.

- **Luigi Cola, Managing Director**, *Faber Industrie Spa,*
- **Per Heggem**, *Director Research & Product Development, Raufoss Fuel Systems AS*
- **Rohintan (Roy) Irani**, *Gas Package Solutions (GPS) Ltd.*
- **Bernie James**, *Powertech*
- **Reinhold Wurster**, *Senior Manger, Hydrogen Projects, L-B-Systemtechnik GmbH (LBST)*

