2009-01-1422

Design Considerations for Hydrogen Management System on Ford Hydrogen Fueled E-450 Shuttle Bus

Tejas Chhaya, Stephen Deasy, Jacob Kohn
MAHLE Powertrain LLC

Alan Richardson, Ravi Gopalakrishnan
Ford Motor Company

ABSTRACT

As part of a continuous research and innovation effort, Ford Motor Company has been evaluating hydrogen as an alternative fuel option for vehicles with internal combustion engines since 1997. Ford has recently designed and built an Econoline (E-450) shuttle bus with a 6.8L Triton engine that uses gaseous hydrogen fuel. Safe practices in the production, storage, distribution, and use of hydrogen are essential for the widespread public and commercial acceptance of hydrogen vehicles. Hazards and risks inherent in the application of hydrogen fuel to internal combustion engine vehicles are explained. The development of a Hydrogen Management System (H2MS) to detect hydrogen leaks in the vehicle is discussed, including the evolution of the H2MS design from exploration and quantification of risks, to implementation and validation of a working system on a vehicle. System elements for detection, mitigation, and warning are examined. Various analysis techniques are used to show the effectiveness of the chosen design.