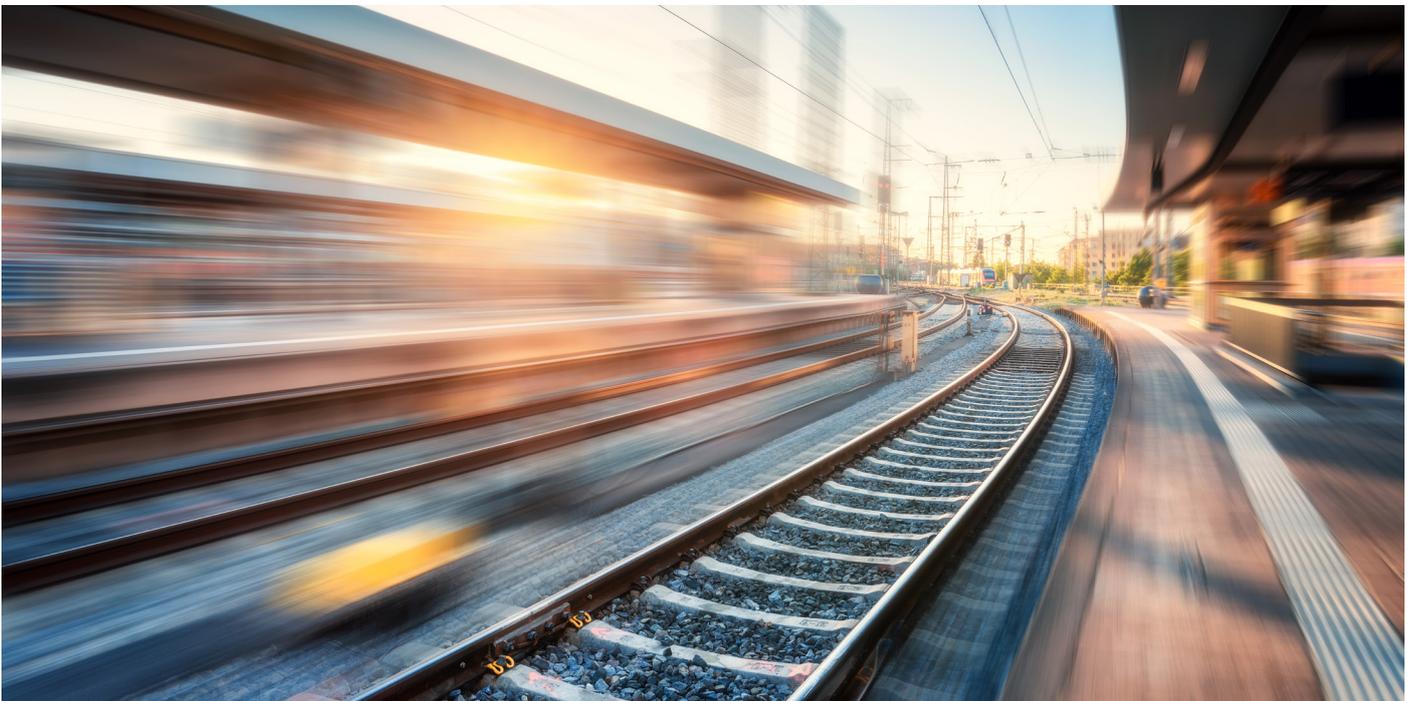


Cummins

Let's Talk about Hydrogen

Reviewing the Cummins H Class Event



As rail accelerates along its decarbonisation journey, Cummins is working with rolling stock OEMs worldwide to transition to the fuel cell-powered trains that significantly reduce emissions.

Cummins is the first company in the world powering hydrogen trains in commercial operation, so naturally, the company has learned a lot along the way.

On 15 August 2022, Cummins hosted its first ever rail hydrogen event created to enable the company's new fuel and rail experts to share what they know and start new conversations with people from around the industry.

The event was called H Class – Cummins Rail Hydrogen School. You can watch the full event video here: www.cummins.com/new-power/applications/trains

Let's look at what the Cummins industry experts had to say, and

explore the core truth – that hydrogen is not just a part of the future of rail, but is changing the industry today.

A Hydrail Pioneer

To launch the event, Regina Barringer, General Manager – Global Rail and Defense, set out Cummins's position as a pioneer in hydrail. *"We were the first engine manufacturer to receive tier 4 certification which we had 3 years ahead of the regulation",* said Regina. She also introduced the Cummins

Cummins Fuel Cell Train



Destination Zero strategy with the aim to be a carbon-neutral business by 2050.

In Rail, Conditions Are Optimal

John Carroll, General Manager – Fuel Cell Mobility, explored the reasons why hydrogen is a solution for decarbonisation.

John focused on how the rail industry is ahead of the curve in terms of readiness to adopt hydrogen fuel cell technology. *“Rail is a great example where the conditions are optimal for many customers to implement solutions now.”*

“We must work together to tackle the climate crisis that requires

action,” he said. “The rail market is ready, and where we can work together to advance hydrogen technologies and build that scale.”

This poses the question of how to decide when and where hydrogen solutions are an ideal option. Answers emerged as Cummins’s experts delved into some use cases.

Hydrogen and Passenger Trains

“Powering a passenger train with hydrogen is already a reality,” observes Sandeep Bhatia, Account Manager – Rail and New Power.

“With a range of more than 1000km, the fuel cell train matches the kilometres for fuelling performance of a conventional regional train with

lower environmental impact and lower noise levels, while having a top speed of 140km/h.”

“The combination of economic competitiveness and environmental advantages means fuel cell-powered multiple units are clearly market ready applications.” He goes on to show how: *“The total lifetime cost of hydrogen trains is already comparable for trains running on diesel on electrified lines.”*

Sandeep explores the hydrogen ecosystem and identifies five factors that make the hydrogen train proposition so attractive.

Hydrogen and Shunters

Nils Berkei, Sales Manager – Fuel Cells, makes the case for hydrogen

in shunters. He points to their global environmental impact – 5% of total global rate emissions, and how high-efficiency diesel engines may be the viable solution for some years to come. *He goes on to say however, that “Hydrogen fuel cell systems offer a greenhouse gas-free solution and are a way to meet upcoming legal requirements.”*

He explores the many advantages of a hybrid system for shunters, concluding that *“Shunting applications could be highly feasible for fuel cell electric systems... and this future ready technology is available today.”*

Hydrogen and Linehaul Freight

Rajani Modiyani, Global Account Leader – Alternate Solutions for Rail Markets, sets out the special power and range challenges of freight, especially the extreme demands of precision railroad scheduling that any alternative power source must recognise.

She discusses the rapid progress made to enable hydrogen fuel cells to meet the power density, fuel storage and durability demands of freight. *“As the technology evolves”, she says, “the hydrogen fuel cell solution can be retrofitted into*

existing locomotives,” extending the life of these valuable assets.

Fuel Cells. A Technical Deep-Dive.

“Fuel cell technology has come a long way,” says Director of New Initiatives – Fuel Cells, Ryan Sookhoo. *“It’s now a viable solution for decarbonisation.”* He describes the technology inside fuels cells that enables them, when the hydrogen is produced from renewable sources, to be zero carbon.

But for rail, how can the viability of fuel cells be evaluated? *Ryan explores the four pillars that must be considered, concluding that “there are a number of reasons why PEM fuel cells are a great solution for rail.”*

He supports this conclusion with evidence of the cost-efficiency, power density, high reliability and flexible architecture of Cummins fuel cell designs. *He goes on to discuss how much Cummins has learned from a position of being “years ahead of competitors in this technology”.*

What about the hydrogen infrastructure options for rail? Ryan weighs up the important pros and

cons of delivered versus onsite generation.

Questions, Answered

Cummins H Class generated some important delegate questions which Cummins’s expert panel addressed. In response to a safety question, the panel pointed to hydrogen as an overall safer technology rather than conventional fuels, with a long history of use in industry.

Hydrogen infrastructure, operating costs, the dependency on a clean environment for fuel cells, and how Cummins works with rail OEMs has prompted detailed responses from the panel.

H Class overall was an event that faced the challenges of the rail industry head on, and offered real optimism for the decarbonised future.

Find out more at [cummins.com](https://www.cummins.com)

