

Towards Hydrogen Engine-Powered Medium-to-Large-Sized Excavators: System Performance and Emissions

Hydrogen internal combustion engines offer a promising pathway toward reducing carbon emissions from off-road construction machinery while leveraging established internal combustion engine know-how. However, translating the potential of hydrogen combustion into practical operation requires addressing the challenges associated with dynamic engine behavior. Although hydrogen engine performance can be well characterized under steady operating conditions, transient engine response remains an important area of research. This gap is particularly relevant in medium-to-large sized excavators, where rapid and highly variable loads place significant demands on the engine.

This webinar will discuss the challenges associated with the transient response of hydrogen internal combustion engines when operating with commonly used hydraulic systems in excavators, as well as the limitations in the efficiency of current hydraulic systems. It will examine approaches to improving hydrogen engine operation in excavators through closer integration of the engine and hydraulic actuation system. The discussion will consider how coordination between these systems may help address performance and emissions challenges in demanding off-road applications.