

This abstract will be presented during LNG2023 conference on 10-13 July in Vancouver, Canada among many other innovative projects, ideas and outlooks. LNG2023 will provide a unique platform for the global LNG industry and key stakeholders to discuss, debate, and showcase the latest industry developments and opportunities.



LEAD AUTHOR

Mark Weatherwax
Vice President, Product Development Mechademy Incorporated

CO-AUTHORS

Ruzbeh Minocher Homji
Chief Executive Officer, Mechademy Incorporated

EARLY FAULT DETECTION AND DIAGNOSIS AT LNG FACILITIES

The reliable operation of LNG facilities and the ability to target equipment maintenance during planned outages is critical for increased LNG production and reduced operational costs. The early identification of equipment issues, with the ability to determine the underlying cause, can prevent unplanned outages and allow for better scheduled outage planning.

Solutions for condition-based and predictive maintenance have largely focused on the use of machine learning (ML) and deep learning (DL) algorithms for early fault identification and diagnosis. However, their value to the LNG industry and therefore adoption has been limited as they fundamentally rely on historical healthy data and on labeled historical fault data which does not exist for most equipment used at LNG facilities.

In this paper, we describe a framework for an integrated Multiphysics and machine learning approach to predictive maintenance with several fault identification and diagnosis examples on LNG facility equipment.

Multiphysics models provide a rich understanding of the physical processes governing equipment performance and allow for interactivity between different models (e.g., a gas turbine model can be coupled with one or more centrifugal compressor models on a liquefaction train). ML and DL models on the other hand build in the historical context. The combined approach not only allows for early fault detection of a larger set of faults but also provides richer insights into fault causality.

To view the full conference agenda, visit <https://www.lng2023.org/lng-programme-overview>