

Towards the Development of Operational Digital Twin

Prof. Jacob Bortman

PHM Laboratory, Department of Mechanical Engineering, Ben-Gurion University of the Negev, P.O. Box 653, Beer-Sheva 8410501, Israel

Abstract

Digital technologies, also known as industry 4.0 technologies, allow achieving improved productivity, automation, and flexibility via technology, data, and reducing unnecessary maintenance. In recent years, one can see a growing role of simulation-based digital twinning. A Digital Twin (DT) is a powerful new concept that aims to produce a one-to-one mapping of a physical structure, operating in a specific context, into the digital domain. In recent years, DT has been implemented in different industrial sectors, in several applications areas such as design, production, manufacturing, and maintenance. As the impact of the execution of poor maintenance tasks may greatly impact product functionality, maintenance is one of the most researched applications in the context of digital twins.

The use of digital twins is also driven by the rise of IoT sensors. Sensors that can provide data on how the object is activated and its response to the environment. Digital twins can make use of it and improve the analysis, make simulation of situations, actions and give new value.

In the railway industry, poor maintenance may cause the shutdown of the rolling stock or worse, pose a clear risk to the safety of the passenger and operator of the train. Hence, the application of more intelligent maintenance strategies can offer huge benefits. In this context, **the presentation focuses on the development of DT for a railway system in order to formulate and evaluate new hypotheses in railway condition-based maintenance through iteration between physical and computer experiments.**

