"Prognosis, Diagnosis and Maintenance Decision Support Systems: A mathematical approach"

Mathematics is woven into many areas of everyday life. Performing mathematical calculations with success requires an understanding of the correct methods and procedures, and practice and review of these principles. Mathematics may be thought of as a set of tools. Asset management will need these tools to successfully complete the maintenance, repair, installation, or certification of different type of equipment. Moreover, reliability and maintenance do have an important impact on engineering systems' performance and profitability.

The mathematical modelling of maintenance is by definition applied mathematics., indeed reliability and maintenance of engineering systems have always been the domain of engineers, but increasingly more and more mathematical or statistical modelers are getting involved. This is driven largely by the stochastic nature of engineering systems' failures and the sophistic problems encountered in practice.

On top of this, assets are more and more complex where much information needs to be captured and mined to assess the overall condition of the whole system. Therefore the integration of asset information is required to get an accurate health assessment of the whole system, and determine the probability of a shutdown or slowdown, making the mathematical models more complex as well, trying to integrate information from designers and end users. Moreover, the mathematical models must deal with one additional problem i.e the data collected are not only huge but often dispersed across independent systems that are difficult to access, fuse and mine due to disparate nature and granularity. Therefore, creation of math models for failure diagnosis, prognosis and further maintenance decision support becomes more challenging in the era of Big data and IoT, evolving from the traditional tools which were dealing with small data sets easy to handle by reliability engineers and maintainers.


Prof. Diego Galar holds a M.Sc. in Telecommunications and a PhD degree in Design and Manufacturing from the University of Saragossa. He has been Professor in several universities, including the University of Saragossa or the European University of Madrid, researcher in the Department of Design and Manufacturing Engineering in the University of Saragossa, researcher also in I3A, Institute for engineering research in Aragon, director of academic innovation and subsequently pro-vice-chancellor.

He has authored more than three hundred journal and conference papers, books and technical reports in the field of maintenance, working also as member of editorial boards, scientific committees and chairing international journals and conferences.

In industry, he has been technological director and CBM manager of international companies, and actively participated in national and international committees for standardization and R&D in the topics of reliability and maintenance.

Currently, he is Professor of Condition Monitoring in the Division of Operation and Maintenance Engineering at LTU, Luleå University of Technology where he is coordinating several EU-FP7 projects related to different maintenance aspects, and was also involved in the SKF UTC centre located in Lulea focused in SMART bearings. He is also actively involved in national projects with the Swedish industry and also funded by Swedish national agencies like Vinnova. He is also Professor of Reliability and Maintenance in University of Skovde where holds the VOLVO chair for Maintenance, coordinating several projects with VOLVO cars, VOLVO GTO (trucks and construction equipment) and GKN aerospace (former VOLVO aero).

In the international arena, he has been visiting Professor in the Polytechnic of Braganza (Portugal), University of Valencia and NIU (USA), currently, University of Sunderland (UK) and University of Maryland (USA). He is also guest professor in the Pontificia Universidad Católica de Chile.