FRAM, STAMP, and EAST: case study of a collaborative robot

Systemic methods in complex and digitalized manufacturing series

Date: February 5th, 2025
Time: 15:00 UTC
Duration: 60 mins

Brief summary of content:

This webinar is the second part of the Webinar Series: Systemic Methods in Complex and Digitalized Manufacturing, showcasing applied and analytical modeling research using FRAM and STAMP-STPA. The webinar is presented by members of the IEA Resilience Engineering Committee. The series focuses on applications in complex and digitalized manufacturing environments, including scenarios with complex manual work, digital gloves, smart glasses, and cobots.

In particular, the intervention introduces systems-thinking methods to analyze a socio-technical perspective on cobot safety, which also provides insights for other forms of human-machine interactions. The socio-technical dimension is expected to overcome an overly narrow interpretation of safety issues, anticipating the challenges ahead in ever more complex cobot applications. Three systemic safety analysis approaches are presented and tested with a demonstrator case study concerning their feasibility for cobot applications: System-Theoretic Accident Model and Processes (STAMP); Functional Resonance Analysis Method (FRAM); and Event Analysis of Systemic Teamwork (EAST). These methods reveal the distributed and emergent result from joint actions and overcoming the reductionist view from individual failures or single agent responsibilities.

Early results:

Adriaensen, A., Costantino, F., di Gravio, G., & Patriarca, R. 2021 Teaming with industrial cobots: A socio-technical perspective on safety analysis. Human Factors and Ergonomics In Manufacturing, 1-26-1–26. https://doi.org/10.1002/hfm.20939

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Arie Adriaensen is an Assistant Professor in Safety of Infrastructures at TU Delft, Netherlands. He is the Chair of the Young Talents Program of the Resilience Engineering Association, and he is also a co-chair of the IEA Technical Committee on Resilience Engineering. His professional background started as an airline pilot and safety manager. Later transitioned into an academic career. His previous professional experiences have heavily influenced his research interest on operational and socio-technical aspects of safety. Arie Adriaensen has explored and advanced different socio-technical modeling methods and is currently part of the FRAM (Functional Resonance Analysis Method) Methodology Development Group. His publications have appeared in Safety Science, Ergonomics, Human Factors and Ergonomics in Manufacturing, and the International Journal of Industrial Ergonomics. He graduated from Lund University, Sweden (MSc) in Human Factors and System Safety, and KU Leuven, Belgium (Ph.D.) in Mechanical Engineering

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Registration

https://us02web.zoom.us/webinar/register/WN_8iUVs6MnQ9-3p7vTxFgrng

Registration is free to all interested people. The webinar will be recorded and published on YouTube. Registration permits live interaction with the presenters via Q&A.

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