

Member Institution Data

Logo or Photo of Institute in jpg format:



Department of Mechanical and Industrial Engineering

Name of Institute	Department of Mechanical and Industrial Engineering, Norwegian University of Science and Technology (NTNU)
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Institute outline:

The Department of Mechanical and Industrial Engineering (MTP) at the Norwegian University of Science and Technology (NTNU) brings together broad interdisciplinary expertise in areas such as logistics, machine and product design, materials science, and the analysis of complex systems. Central to its mission is the advancement of industrial processes and production systems, with an emphasis on sustainability, optimisation, and risk mitigation. A key objective of the department is to support Norwegian industry and governance with access to knowledge and expertise on an international level.

Within MTP, the RAMS (Reliability, Availability, Maintainability and Safety) research group plays a central role in addressing disaster risk and resilience challenges. RAMS advances four key methodological domains: reliability engineering, maintenance strategies, risk management, and safety and sustainability in socio-technical systems. The group's expertise includes reliability assessment of safety-critical infrastructure, system resilience under cyber-physical integration, fault diagnosis, maintenance optimisation, and data-driven health monitoring.

Particularly, the RAMS group leads research on social security, safety, and

sustainability in the face of emerging and complex risks. This includes safety management for socio-technical systems under deliberate sabotage and cyber-attacks, the vulnerability of technical infrastructure during the green transition, and the growing threat of natural hazard-triggered technological (Natech) accidents. The group also investigates risk-informed decision-making and disaster management practices to strengthen systemic resilience.

Research Achievements and Challenges:

The Department of Mechanical and Industrial Engineering (MTP) at NTNU plays a leading role in advancing civil safety and disaster risk reduction, with a strong focus on addressing complex industrial and environmental challenges. A key recent achievement is its leadership of NTNU's interdisciplinary research group on Civil Security against Natech (natural hazard-triggered technological) accidents. This group brings together specialists from engineering, ICT, social sciences, psychology, medicine, and urban planning to enhance understanding, prevention, and mitigation of Natech risks, an increasingly urgent concern in light of climate change and the rise in extreme weather events.

To support global knowledge exchange, MTP recently hosted an international symposium on Natech accidents, facilitating dialogue between researchers and practitioners on how to reduce systemic risks. Beyond Natech, the department conducts high-level international research on industrial accident prevention, infrastructure resilience, and emergency preparedness, engaging in national and international programmes focused on risk reduction and safety innovation across critical sectors.

MTP also offers postgraduate education in disaster risk reduction, particularly in industrial accident risk management, equipping students with essential competencies to manage complex risk scenarios. In parallel, the department is advancing research and education related to hydrogen safety, examining both technical and societal dimensions through collaboration in international initiatives and contributions to doctoral training.

Looking forward, MTP is committed to addressing the increasing complexity of disaster risk, with particular attention to the energy transition, infrastructure vulnerability, and the systemic impacts of climate-related hazards.

Suggestions for GADRI Future Directions:

GADRI might consider expanding its research on research addressing complex systemic risks, such as Natech accidents, adopting an all-hazards approach to enhance the resilience of critical infrastructure, maritime incidents, and hybrid threats. Additionally, fostering stronger connections between academic crisis management education and practice-oriented training, including exercise-based learning, could further strengthen preparedness and response capabilities.

Moreover, establishing a European or Nordic regional research network might also facilitate knowledge exchange and support the development of solutions adapted to local and regional contexts.