

Fatigue management in safety-critical industries

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For affiliations and more information please see:

<https://www.ttl.fi/en/research-and-development-projects/wow/>

Human fatigue constitutes a safety hazard in 24/7 safety critical industries. To mitigate this hazard, there are two complementary approaches available. The prescriptive approach is based on the idea of regulating working hours, whereas the risk-based fatigue approach utilizes performance metrics (e.g., fatigue levels) to manage the risks of workplace fatigue.

Recommendations

Authorities should provide 24/7 safety critical industries with guidelines on effective fatigue mitigations strategies and Fatigue Risk Management Systems (FRMS) and their implementation.

Safety critical organizations should use an FRMS that:

- Include a documented plan on how they manage fatigue in an effective and feasible way with the resources available. The plan should a) evaluate the current situation, b) determine their policy, practices, and responsibilities, c) select mitigation measures and set goals for them, and d) determine how to monitor developments.
- Use fatigue measures with generally established critical values and if possible, study the association of these measures with near-misses and incidents.
- Complement fatigue mitigation measures with fatigue proofing strategies to support safe performance when managing the risks associated with fatigue.

It is also important that these organizations share their best practices and benchmark themselves against relevant fellow organizations.

Current knowledge on fatigue management

WOW studies showed that

- long-haul truck drivers and civil airline pilots report high fatigue levels during night shifts and especially during the 1st night shift
- fatigue management training alone does not result in reductions in fatigue among long-haul truck drivers
- biomathematical fatigue modeling is a promising organizational measure to assess the fatigue effect of shift schedules (e.g., Vire, a web tool <http://vire.arturcloud.com/>)

Based on the current knowledge, human fatigue at night work cannot be completely overcome by working hour regulations or by a single fatigue countermeasure such as education, bright light treatment or nap breaks. Multiple, simultaneous measures organised into an FRMS are needed.