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Perspective

Work Related Musculoskeletal Conditions Disorder in a Tram Loco Pilot

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DESCRIPTION

Work-Related Musculoskeletal Disorders (WRMSDs) and injuries are associated with interacting occupational design elements over time in tram driving, which is a safety-critical task. Workforce retention, public safety, workplace relations, and support are all affected by these interactions. This study employed thematic networks and system dynamics analysis to uncover a global theme behind the occurrence of WRMSDs and characterize the factors influencing the system dynamics of WRMSD occurrence in tram drivers in order to better understand such interactions. To reduce the risk of WRMSDs in tram drivers, more research into organizational culture, human factors, and design standards is needed.

Tram (light rail) systems are experiencing a "remarkable revival" in many parts of the world, and are being lauded for their economic, social (e.g., connection, accessibility, preference), and environmental (e.g., decreased emissions, sustainability, mixed mode) benefits. The tram system, like many other modes of public transportation, has inherent dangers connected with operating in densely populated mixed-traffic areas. Driving trams is thus a cognitively demanding occupation in which, in addition to physical tram operation, the driver must engage heavily with external monitoring and awareness-maintenance activities aspects of performance that are compounded by human limitations (e.g., delayed reaction time, reduced situation awareness, elevated fatigue) that increase injury risk.

Driving rail vehicles is a dangerous profession, especially when transporting passengers and it's linked to a variety of chronic metabolic health problems, which are frequently blamed on the job's design. Work-Related Musculoskeletal Disorders (WRMSDs) and injuries, which include shoulder, wrist, forearm, back, and neck strains, as well as muscle diseases that cause pain and discomfort, are becoming more common in the rail driving industry. WRMSDs account for 40% of injury and disease recorded by train drivers in compensation claims in Australia, including injuries to the upper and lower body and limbs, as well as ailments like non-specific low back pain, neck discomfort, and carpal tunnel syndrome. The physical causes that produce musculoskeletal tissue injury and micro failure are well-known. Exposure to jobs with high rates of repetition, high force demands, uncomfortable postures, and long duration are all factors. Psychosocial factors, on the other hand, can exacerbate WRMSDs, although the mechanisms are more complicated. Tram driving entails a complicated psychological milieu, as well as repetitive movements, vibration, and muscular stress. Importantly, tram driving is an imposed seated environment that necessitates proper seat design to combat sit-slouching postures, which are a risk factor for WRMSDs. Given that tram systems are expanding, but rail is experiencing labour retention challenges across the board, there is a compelling need to minimise WRMSDs and promote rail workforce retention.

WRMSDs are considered as a lesser issue than other health issues (e.g., obstructive sleep apnea), despite the fact that they diminish worker health and wellbeing, which has a direct influence on public safety. Injured drivers are often handled as a local/individual health concern, but their influence extends to the broader system, requiring re-rostering, the balancing of spare shifts, and a reliance on the remainder of the limited workforce's availability. Physical ergonomics arguments for cause and remediation are also commonly used to explain WRMSDs. WRMSDs, on the other hand, are a symptom of bigger system difficulties that can be linked to equipment design, but also result from a complex interaction of multiple elements over time. Identifying a central theme underlying WRMSD in tram driving and investigating the systems dynamics will not only improve our understanding of the problem, but it may also: (1) encourage more buy-in and recognition from organisations of WRMSDs in their employees as a systems issue (requiring a systems rather than an individual-level focus); (2) inform the development of systems models that can simulate behaviour over time; and (3) identify potential factors.

CONCLUSION

The findings of this study add to a better knowledge of the frequency of injuries among rail drivers, as well as the necessity of systems thinking in dealing with occupational injuries. This research proposes three important enhancements to the deployment of injury reduction measures in rail environments:

1. A thorough model to guide the practicalities of injury-related job design interventions,
2. A clear proof that such models can be developed by unobtrusive and highly organized observation, and
3. Support for developing the models through drivers' stated experience Rail companies will be better able zto mitigate accident risk within their own organizational demands thanks to these realistic models.

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