

Guest Editorial

Advancing the science and approaches for evaluating work environments

1. Introduction

This special issue underscores the interest and importance of drawing upon a variety of disciplines and perspectives to advance the science and knowledge in evaluating the complexities of work environments. Contributions in this issue were received from biomechanics, kinesiology, engineering, ergonomics, psychology, nursing, health science, hearing science and occupational science. Papers represent an array of work environments comprised of contexts where people sit, drive machines or heavy equipment, are exposed to vibration, are required to hear and communicate, need to learn to work on a team, work in physically repetitive work places, are exposed to dust in non-regulated places such as stone carving, and experience cumulative loading in automotive plants. In particular this issue highlights advances in using biomechanics, measuring vibration, in evaluating hearing and communication and constraints of equipment and technologies used in specific contexts, as well as approaches in the assessment of the psychological and social expectations of workplace culture. All of these articles offer or introduce new perspectives and ways to evaluate work environments moving beyond assessment of a physical or sensory dimension of a work context such as testing noise levels. Workplace evaluations are needed that examine the multidimensional issues and transactional nature of performing work in contexts that contribute to problems or hazards and risks for workers. New approaches that can build on previous biomechanical or ergonomic knowledge bases are needed. Specifically there is a need to evaluate the impact of macro environmental dimensions such as the institutional or cultural environment, as well as the meso environmental dimensions such as the social interactions of workers or worker interactions with the physical, material, so-

cial and cognitive technologies/equipment within the work context [1,2]. Understanding methods and processes that can support the evaluation of the breadth of the complex dimensions of work environments require the development of specific scientific knowledge and approaches to provide a basis for change, optimizing worker productivity but also to improve workplace safety and health for workers. The articles in this issue afford new approaches, as well as emerging methods and perspectives for evaluating work environments.

2. Biomechanic approaches

New approaches in biomechanics were offered by Eger et al. and by Dunk and Callaghan to address issues around sitting demands of workers in different environments. Using a case study Eger et al. provide a new perspective on evaluating driving of load-haul-dump (LHD) vehicles that considered the interactions of point of regard, driving and sitting, the constraints of space within the machine, and the risks on musculoskeletal injuries. Dunk and Callaghan identified an approach to consider biomechanical risk factors for sedentary seated postures of workers with and without back pain. Seaman et al. draw attention to risks associated with the increased severity of shoulder injuries experienced in automotive workplaces. They provide new findings in evaluating cumulative loading on the shoulder in seat frame assembly workers. Mukhopadhyay and Srivastava offer insights into evaluating musculoskeletal risks and physical issues in a craft trade, in an unregulated workplace comprised of stone carving. While they drew upon traditional ergonomic and postural evaluations they also used a variety of types of photography. They offer insights into the challenges in collecting data on young male workers in the trade of stone carving.

3. Vibration approaches

The approaches used for measuring and evaluating the impact of whole-body vibration (WBV) exposure on the human body are evolving. For instance, Grenier, Eger, and Dickie examined the exposure of LHD operators. They went beyond previous WBV studies to evaluate the relationship between vibration exposure, discomfort and health effects. Dickie, Eger and Oliver introduce ways to systematically evaluate WBV exposure combining field and laboratory testing. Their study is unique because it assessed both translational and rotational vibration. Salmoni, Cann and Gillin introduce strategies for evaluating WBV exposure in the field, specifically for earth scrapers used in the construction industry.

4. Emerging approaches

Two new evaluations focus more on the interactions of the worker within the workplace. For instance, evaluating workplace culture such as workplace expectations for actions interactions and transactions among workers is a new area of study. Current changes in the nature of health care work places are demanding more interdisciplinary involvement of health care workers. Workplaces are struggling to create collaborative working teams. This change provided the impetus for King, Shaw, Orchard and Miller to develop a tool for evaluating interprofessional socialization and the shift toward collaborative teamwork, and values and work identities.

Traditional hearing evaluation has focused on hearing conservation programs evaluating workplace noise and worker need for hearing protection. Communications requiring hearing at work moves beyond noise. Jennings and colleagues introduce a framework for evaluating critical hearing functions of work and resources required to hear and communicate.

We encourage the readers to reflect on the use of this knowledge in evaluating work environments. We also encourage continued research to advance the tools, methods and approaches for evaluating the complexity of issues in workplaces to promote worker health and productivity. We would like to thank and acknowledge Dr. Sandi Spaulding for sharing her knowledge, time and effort in assisting us with this special issue.

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References

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- [2] L. Shaw and R. Lysaght, Cognitive and behavioural demands of work, in: *Ergonomics for Therapists* (3rd edition), K. Jacobs, ed., Missouri, Elsevier, 2008.