RYERSON UNIVERSITY

University of Waterloo

Arbetslivsinstitutet
National Institute for Working Life

## RESEARCH PROJECT

# Human Factors and Engineering Design: A Study of Professional Practices amongst Ergonomists and Engineers


## Summary

While many human factors (sometimes called ergonomics) assessment tools have been developed, the problem of work-related disorders persists. Are the tools not being used? Or do they not meet the needs of workplace designers?

This project explores these issues and others by interviewing professional ergonomists and engineers in Ontario and, through a cooperation with the Swedish National Institute for Working Life, in Sweden. Collaborating with Sweden presents a valuable opportunity to gain access to one of the world leaders in the field of human factors.

The project will create a comprehensive catalogue of design tools, equipment and methods for assessing risk and performance in the workplace. In addition, it explores tools that are in use today and examines how well these tools work. Also under investigation is the information these tools elicit and the factors that influence knowledge exchange and decision making within an organisation. The idea is to see if design teams have the tools, skills, and support they need to keep employees healthy, productive, and on the job, within a workplace that remains competitive.


## Research objectives

One objective of this project is to lay the groundwork to integrate human factors (HF) into an organisation's work system design processes to reduce risk to employee health. Specifically, we aim to create a detailed inventory of evaluation tools that are currently available as well as to understand which tools ergonomists and engineers actually employ. Furthermore, we will explore how and why specific tools are being used in the design process by examining their advantages and disadvantages.

By investigating which indicators are being used (for example risk factors like cumulative spinal load), and how this information supports decision making in the design processes, we aim to support timely application of human factors in design, resulting in workplaces that are both highly productive and, from a human health perspective, sustainable.

This project runs in close cooperation with the Swedish National Institute for Working Life where a parallel study with matching assessments will be conducted. A comparison with Swedish practice presents a unique opportunity for Ontario to 'benchmark' current practice against a world leader in ergonomics. Such contrasts may provide unique insights into the strengths and weaknesses of practice in both countries.

## Research methodology

The study uses primarily qualitative methods that target both professional engineering and ergonomics communities. Before approaching each community a comprehensive 'inventory' of available tools will be collected using electronic searches and key informants. This inventory will be made available to both professional communities and updated continually as new tools are identified.


*This study is funded by the WSIB, approved by Ryerson University's Ethics Review Board, and endorsed by the Association of Canadian Ergonomists (ACE) and Professional Engineers Ontario (PEO).*

The 'Tool Inventory' forms the backdrop for a series of semi-structured telephone interviews regarding use of tools and indicators in personal practice. What tools are used? How well do the indicators allow balancing of human factors concerns with other design issues? How might tools be improved? What are the opportunities to improve integration of human factors issues into the regular design process?

Building on pilot work conducted in Sweden, this survey will begin with the ergonomics community in year one and broaden out to the engineering community in year two.

## Intended research outcomes

- This project will result in a detailed inventory of HF assessment tools that can act as a catalogue for professionals wanting to expand their 'toolbox' to better manage health risks in design.
- The dissemination of project results will raise awareness of the availability of HF tools amongst Ontario professionals and foster uptake and testing of new tools in these communities.
- The project will generate an understanding of the connections (or lack thereof) between tools used by engineers and ergonomists, explore the advantages and disadvantages experienced by users in their everyday work, and support better cooperation between these key actor groups.
- This survey will create a benchmark of tool use that can be followed over time to determine whether progress is being made in improving management of risk in the design of Ontario workplaces.
- This survey of the 'lay of the land' in terms of current design practice will support future R&D work on the integration of human factors into work system design.
- The project will provide knowledge for HF tool designers to produce more useable tools.

## Research team

The international research team includes expertise in Design Science, Industrial Engineering, Ergonomics/Human Factors, and Sociology.

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