The value of system-oriented ergonomics in supporting healthy workplaces

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Agenda

What does ‘systems ergonomics’ mean?

• Optimum systems performance and worker well-being
• Healthy workplaces and TWH: a necessary paradigm shift
• ‘Systems ergonomics’ framework and approach

What ‘systems ergonomics’ can offer?

• Workers engagement (participatory ergonomics)
• Optimum work design for ALL
• Problem-solving approach at the organization level
Background & some common myths

• Low recognition of ergonomics/human factors as a systems discipline
• The social value of ergonomics (and systems ergonomics) has not been well understood (nor discussed) by H&S practitioners, employers, employees and costumers
• Despite the moral and ethical arguments for ergonomics programs, they are not always cost-effective
• There are many “good intention” programs that fail to ...
  • integrate their goals with existing management systems needs and reality
  • recognize workers’ voices and their needs
  • utilize a data-driven approach that is strategic in nature to ensure sound H&S policies and processes
Human Factors/Ergonomics definition

“The scientific discipline concerned with the interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human wellbeing and overall system performance”

Source: International Ergonomics Association 2000
Why the focus on worker well-being?

- “The experience of positive perceptions and the presence of constructive conditions at work and beyond, that enables workers to thrive and achieve their full potential”
- Importance of building resilience of individuals and communities
  - United Nations SDG 3 and 8: global ‘social value’ charter for the entire planet
  - Workers well-being and organizational performance are deeply interconnected
The 21st century workplace: a paradigm shift?

• Shift from a disease-centered to an ability-centered approach
• Work-life balance: work can no longer be viewed as separate from personal life
• Absence of/from work is perceived as unhealthy (psychosocial issues)
• Health equity and diversity
• Gig economy and remote work
• Intergenerational workplace
• COVID-19 pandemic issues
Research evidence on psychosocial environment

Contributing factors for Musculoskeletal Disorders

- Job dissatisfaction
- Job-related Stress
- Monotonous work
- Perceived workload & time pressure
- Lack of job/task control
- Unsupportive manager & unresolved conflicts
- Reactive OHS culture
- Poor leadership commitment and trust issues
Why the focus on systems performance?

• When focusing on systems performance, the *human* dimension is at the center of the analysis and the most essential part of the system

• Many important work system deficiencies are identified. Examples:
  • Tasks must be compatible with peoples’ expectations, limitations and training
  • Equipment must be safe and comfortable
  • Work organization must be non-discriminatory and recognize peoples’ social and economic needs

• More integrated actions can be implemented
Towards more a proactive and well-integrated model

NIOSH-CDC Total Worker Health (TWH)

• Strategically integrates health protection with health promotion to prevent worker injury and illness and to advance health and well-being

• (Re) Design work/tasks to eliminate/reduce hazards and to promote well-being

• Cross-disciplinary and spanning departments
NIOSH Hierarchy of Controls applied to TWH

**Hierarchy of Controls**

- **Elimination**: Physically remove the hazard
- **Substitution**: Replace the hazard
- **Engineering Controls**: Isolate people from the hazard
- **Administrative Controls**: Change the way people work
- **PPE**: Protect the worker with Personal Protective Equipment

**TWH control measures**

**Eliminate**
- Eliminate working conditions that threaten safety, health, and well-being

**Substitute**
- Substitute health-enhancing policies, programs, and practices

**Redesign**
- Redesign the work environment for safety, health, and well-being

**Educate**
- Educate for safety and health

**Encourage**
- Encourage personal change

Actionable goals based on Hierarchy of Controls
An integrated management system approach: ISO 45001:2018

- Prevents work-related injury and ill-health while providing specific guidance on how to improve performance and legal compliance.
- Goes beyond accident prevention to create a healthier, more productive workforce (by proactively managing OHS risks).
- Provides a consistent framework across countries for safe healthy, and sustainable work in line with SDGs.
TWH Key Principles

1. Leadership commitment*
   • Greater emphasis on H&S climate improvement at the various leadership levels

2. Risk reduction* combined with health promotion
   • Work conditions and emerging health and wellbeing issues must be addressed

3. Worker engagement & consultation*
   • Promote and support worker participation and consultation from all levels

4. Confidentiality and privacy of workers
   • Prevent penalization of workers for their health conditions and needs

5. Integration of systems
   • Coordinating efforts for program and policy across divisions and departments (avoid silos)

* Strong Similarities with ISO 45001 actionable-goals
Main advantages of using ISO 45001 & TWH principles

• Align well with OHS management systems’ objectives
• Orient employers to engage the workforce on H & S and well-being issues
• Emphasize the need for leadership commitment
• Create a more proactive risk prevention culture through continual improvement
• Promotes integration of programs and policies across the organization (actionable goals)
• Global recognition side-by-side with United Nations’ SDGs (ISO 45001 only)
Systems ergonomics: 101

• Core principles may overlap
• Application is limited to methods available
• Human-centred design in a sociotechnical context; i.e., subject to changes and not a “one size fits all” solution
1. The value of Participatory Ergonomics

- “End users” take an active role in the identification and analysis of ergonomic risks, as well as the design and implementation of solutions
- When implemented as “continuous improvement participation”, organizational learning and culture develops with enhanced trust and better communication
- An opportunity to unravel systems’ deficiencies from the broader view of ergonomics/human factors, including better work design for health and comfort as well as emerging psychosocial health issues
1. Example of practice: BSI Participatory Ergonomics

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1. How to ensure effective participation?

- Employees have to acknowledge the need for participation
- Employees have to trust that their participation will not have negative repercussions and that they will have some control over the final decisions
- Employees have to perceive that changes are being proposed and introduced in a legitimate way (full leadership support)
- Employees have to be given a real role to play in the introduction and implementation of changes
2. The value of optimum work design

Workplace layout improvements

- Improve workflow and concentration
- Engage different users
- Consider social relations
- Respect spatial boundaries and work groups
- Privacy and ability to control environment
- Help in reducing distractions
- Exposure to nature improves performance
2. Examples of practice

Active workplaces: Design for comfort and well-being

- Incorporate user work style
- Promotes movement
- Active workspaces: Intentional by design

**Sit stand desks**
- Alternate sit/stand times
- Improve mood, work performance
- Reduce MSD

**Physical activity breaks**
- Increase energy expenditure
- Reduce general discomfort

**Prompting Software**
- Prompt employees to alternate between sit/stand postures and to take frequent breaks
3. The value of Macroergonomics

- It is human centered
- Identify the deficiencies in the technical and personnel subsystems using a humanized task approach in allocating functions and tasks (task design)
- It is both a top down and bottom up problem solving approach; therefore it usually involves extensive employee participation at all organizational levels
- It measures compatibility between people and their work, and the impact of a technological/organizational change
3. Levels of analysis

- Technology standards
- Organizational structure
- External environment
- Socio-organizational context
- Socio-technical work system

- Workers
  - performs tasks
  - uses tools and technologies
  - works in a physical environment
  - works under organizational conditions
  - Cultural environment
  - Economic environment
  - Technological innovations
  - Ecological environment

- Stakeholder
  - Human resources
  - Political environment
  - Resources
  - Operational management
  - Demographic context

- BSI
  - making excellence a habit
3. Some examples of macroergonomics methods

- **Macroergonomic Analysis of Structure (MAS)** - the organization structure is deeply analyzed by examining three major sociotechnical system elements: the technological subsystem, the personnel subsystem, and the relevant external environment.

- **High Integration of Technology, Organization and People (HITOP)** - a step-by-step manual procedure for implementing technological change.

- **Macroergonomic Analysis and Design (MEAD)** - a very systematic 10-step way of looking at the work system processes and how to improve them.

- **Macroergonomic Organizational Questionnaire Survey (MOQS)** - collects information on various aspects of the work system: tasks, organizational conditions, environmental issues, tools and technologies, individual characteristics and various outcomes such as quality of working life, stress, mental health, work-related musculoskeletal disorders and attitudes (e.g., turnover intention).

- **Macroergonomic Compatibility Index (MCI)** - combines employee perceptions regarding the macroergonomic practices implemented in their companies (person, organization, technologies and tools, tasks, and environment) and how they align with best practices.
3. Example of practice: BSI Ergonomics SWOT

- Initial understanding of management system across departments
- Management commitment
- Employee involvement
- Process evaluation, documentation, and communication
- Job analysis and surveillance
- Implementation of solutions
- Training and education
- Medical management
- Facilitate deeper conversations about organization readiness and helps setting up actionable goals
Application of systems ergonomics for TWH

• Systems analysis participatory ergonomics tool for designing integrated health and safety interventions (IDEAS)

• Developed by the Center for the Promotion of Health in the New England Workplace (CPH-NEW)
Benefits beyond financial gains

For the employees

• Enhances morale
• Improves physical, psychological and social well-being
• Higher motivation, growth and job satisfaction
• Improves performance

For the organization

• Improves trust and communication
• Strengths company image
• Tackles emerging issues
• Supports organization resilience
References

- BSI white paper: Health and Well-being in the Workplace


- Yazdani, A. et al. How compatible are participatory programs with occupational health and safety management systems? SJWEH, 41:2, 111-123. 2015
Questions?

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