

## Strengthening policies and building industrial-public sector collaboration: Public awareness towards sustainable ergonomics

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### Summary

During the Covid-19 pandemic, there was increasing concern for human interactions with urban environmental systems. This awakening acknowledged human-induced and human-created problems resulted in a greater push for wellbeing, safety, health, and comfort among work sectors that face occupational hazards and safety risks.

Data from ergonomics research in Malaysia showed that the planned design, construction, and functioning of human-system interactions are linked to performance, productivity, efficiency, and other socioeconomic benefits.

Less addressed is industrial and public awareness about ergonomics policies that foster sustainability. The objective of this brief is to emphasize to policymakers that ergonomics should be a stated sustainability goal of Malaysian workplace culture. Our aim is to frame the entire chain of custody that brings together ergonomics practitioners' skills, knowledge, and understanding of risks, costs, and benefits in prioritising ergonomics for Malaysian work sectors.

Awareness building strategy must better integrate global standards with local standards. We recommend stronger emphasis on sustainable, practical, and affordable solutions to improve resource and design efficiency applying specific United Nations Sustainable Development Goals (SDGs) to foster awareness towards sustainable ergonomics design. Assessing the potential benefits of ergonomics must go beyond applied theories in the post-pandemic era. Industrial and public awareness of sustainable ergonomics design will be critical to enhance practices in occupational safety, improve productivity, efficiency, and business performance.

### Introduction

Ergonomics mainly focuses on products and systems that attain universal design standards. These guidelines are well received by industrial sectors for reducing and preventing workplace and industrial-related injuries. Several Malaysian agencies play central roles in the adoption of, and adherence to, international standards such as Ergonomics: General Approach, Principles and Concepts by the International Organisation for Standardisation (ISO). SIRIM, the Department of Standards Malaysia, is the national agency whose role is the development of guidelines on standards and harmonising these descriptors to international standards. SIRIM adopts the ISO Standard as the MS ISO 26800:2013. MS is governed by the Standards of Malaysia Act 1996 (Act 549).

Another agency, the Department of Occupational Safety and Health Malaysia (DOSH), has non-mandatory guidelines aimed at reducing occupational accidents and diseases which compromise health and safety. DOSH applies the universal definition of ergonomics by the International Ergonomics Association (IEA). It also delivers regular industrial training and seminars to identify how design solutions minimises the risks of injury, fatigue, and error.

### Key messages

- **Five step approach for ergonomics design planning.**
- **Review ergonomics standards periodically.**
- **Foster awareness with industrial-public sector collaborations.**

## The challenges

In 2013, SIRIM developed the MS guideline as part of national standards policy to facilitate domestic and international trade cooperation in relation to standardisation. In the past decade, the publication of MS guidelines has not received much industry attention. Furthermore, SIRIM's Ergonomics Policy 2013 does not consolidate research data on the benefits of ergonomics design for specific sectors. Sustainability is merely an appendix in the policy. Sustainability of ergonomics design standards and specific guidelines for sectors that incorporate technologies in its facilities, has yet to be addressed.

## Broad and unspecific guidelines

Another government agency, the Department of Statistics Malaysia (DOSM) provides big data analytics of national occupational accidents and fatal occupational injuries statistics from industrial cases reported between 2011 to 2021 (Figures 1 and 2). However, the long-range trend statistics use unspecified data indicators obtained from Malaysia's Social Security Organisation (PERKESO) and the Ministry of Human Resources for the purpose of risk analysis such as loss of workdays, production output, and income due to injuries. DOSM statistics do not helpfully inform employers with industry-specific guidelines for ergonomics best practices which promote workplace safety, or to protect and improve employee health and wellbeing, as well as to ingrain OSH into a more environmentally sustainable workplace culture (DOSM, 2022). In the accompanying media statement, DOSM indicated the voluntary basis of quantitative data collection, a practice that is not comprehensive for effective planning of workplace ergonomics design.

The first challenge lies in gathering more specific industrial data to inform OSH guidelines, as well as consistent awareness-building initiatives demonstrating the advantages of ergonomics application. Ergonomics as a discipline of practice has not gone beyond basic knowledge

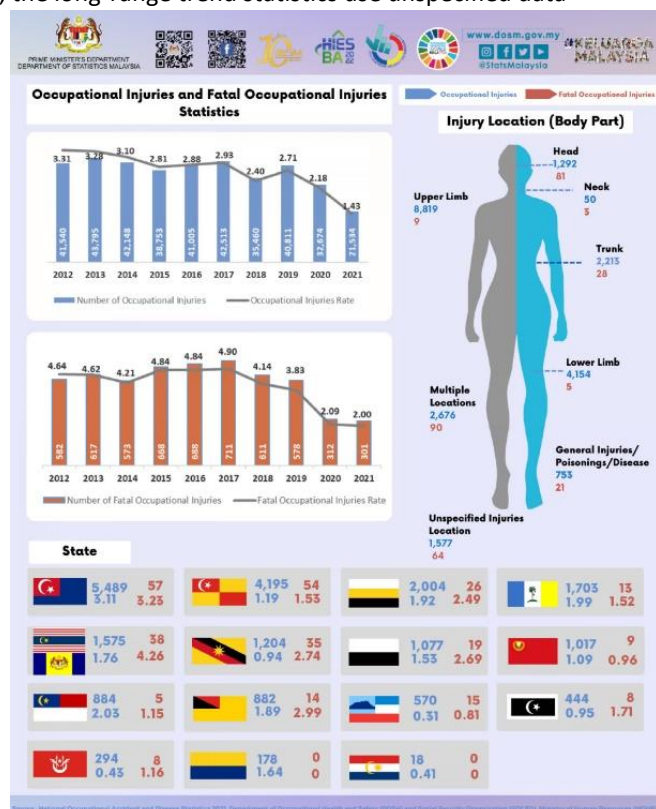


Figure 1: Statistics on occupational injuries and fatal occupational injuries by Malaysian states and location of injuries (DOSM, 2022)

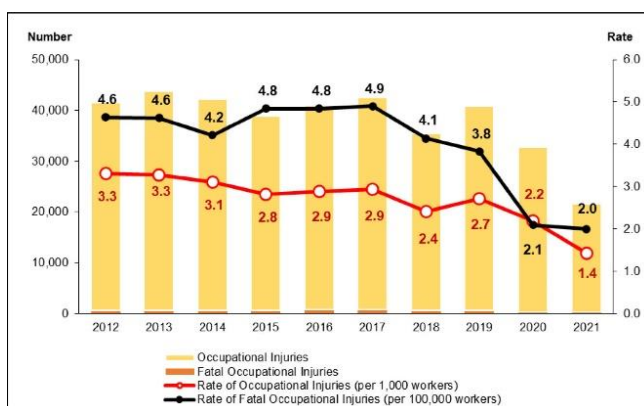


Figure 2: Statistics on the number and rate of annual occupational injuries and fatal occupational injuries from 2012-2021 (DOSM, 2022)

of minimum regulatory requirements and provisions such as the Occupational Safety and Health Act (OSHA) 1994 (Act 514), Factories and Machinery Act 1967 (Act 139), ISO 11228:2003 Ergonomics: Manual Handling for the prevention of musculoskeletal disorders (MSD), and SIRIM-approved designs.

## Low Practitioner Participation

Ergonomics practitioners believe that unaddressed OSH issues decrease productivity and efficiency, compound safety risks, and compromise health, physically and

psychologically. SIRIM provides basic definitions of the minimum requirements for conformance to standards in ergonomics design as governed by the Standards of Malaysia Act 1996 (Act 549), but the prescribed approaches do not correlate with local benchmarking findings on OSH issues such as accidents, MSD, and injuries.

Ergonomics is a field noticeably less prioritised in Malaysia, with low practitioner participation in discussing benchmarking beyond conformance to standards. With hardly any channel for direct stakeholder input, it is not surprising there is lack of enthusiasm in the promotion and implementation of the non-mandatory guidelines, and many industrial professionals are unable to identify the economic advantages of ergonomics, or to associate the impact of good ergonomics design in developing a culture of sustainability through applications in enhancing efficiency while reducing costs to humans.

## Data insufficiency for post-pandemic recovery

Reviews of ergonomics literature published in industrial research journals in fields such as mechanical engineering and public health, detail the psychological and physical pain and discomfort from musculoskeletal conditions in sectors such as metalworks, plantation, nursing, teaching, manufacturing, office administration, and others. Several local and regional studies in the past applied basic frameworks to synthesise industrial policies with OSH legislation, and emphasise professional training for occupational injuries management (Chan *et al*, 2011; Loo and Richardson, 2012; Rosnah Mohd Yusuff *et al*, 2016). The goal is to understand the role of ergonomics in achieving higher productivity, task concentration, lower strain, and protecting against OSH risks (Isa Halim *et al*, 2004; Khalid Amin *et al*, 2017; Noorhashirin *et al*, 2018; Shukri *et al*, 2020). However, these studies do not reflect one key national policymaking objective - to broaden awareness of ergonomics' sustainability.



In the post-Covid recovery, however, neither qualitative nor quantitative landmark studies have been produced by Malaysian public agencies to document the integration and relationships between sustainable ergonomics and productivity, with the shifts from physical to virtual and hybrid working modes during Covid-disrupted business closures. Without scholarly contributions, there are insufficient data insights to assist practitioners in strengthening policies on infrastructures, facilities, equipment, and product designs that meet the SDG Goal 3 of ensuring healthy lives and promoting well-being, and SDG 11 of making cities safe, resilient and sustainable. Only recently have ergonomics researchers begun critically examining the problems and solutions related to post-pandemic health issues including sprains and mobility-related injuries which disrupt work performance and efficiency. Current research suggests the potential to reach a wider sector of stakeholders including occupational rehabilitation services with high-tech facilities.



## Conclusions

Malaysian practitioners must emphasise ergonomics as an applied branch of environmental science while adapting its approaches to align with the SDGs. Malaysia's attainment of developed nation status should consider SDG indices of healthcare and wellbeing, and to improve perceptions of local industrial and services sectors' commitment to ergonomics while satisfying sustainability goals of resource efficiency and environmental concerns.

Ergonomics form a valuable indicator of national wellbeing, but current standards that measure behavioural outcomes of occupational safety and health in the post-pandemic economic recovery period must be reviewed by the technical committees involved in policymaking. Improving public awareness enhances ergonomics design capacities to meet the nation's overall economic and social goals. This enables practitioners to create better environmental conditions in which ergonomics design can be adapted to fulfil users' needs, increase productivity, reduce, or lower risks to safety, while addressing material sustainability as end-goal solutions.

## Recommendations

The following recommendations discuss how to create a chain of custody to strengthen current policies and guidelines, improve public awareness, and enhance understanding of sustainable ergonomics.

### 1. Five step approach for ergonomics design planning

A five-step approach is recommended to improve current ergonomics guidelines, with materials, strategies, and techniques that integrate human-centred design (HCD) principles, while considering affordability, economic, and environmental sustainability. Essentially, these steps must:

- Identify why ergonomics design planning is critical.
- Describe the issues, settings, and environment that affect occupational health and safety management for stakeholders.
- Assess and understand the scope of ergonomics design issues including low public awareness towards occupational risk factors and design affordability.
- Strategise ways to cope or resolve occupational risk problems which considers environmental and economic sustainability objectives.
- Recommend ways to change industrial perceptions with higher stakeholder participation.

### 2. Review ergonomics standards periodically

Periodic meetings among the technical committees involved in policymaking is recommended among standards practitioners, authorities, and relevant public agencies. Meetings are necessary to review and update current ergonomics standards implementation to address industry-specific OSH issues. Committees representing governmental, industrial stakeholders can help change public mindsets beyond conformance to local regulations.

To increase standards awareness, they must regularly publish findings on sustainable ergonomics design assessment standards, and how newer ergonomics design solutions incorporating smart technology can be sustainable, viable, and affordable while positively impacting the safety, wellbeing, and health of employees in Malaysian industrial, institutional, and service sectors in the post-pandemic recovery era.

### 3. Foster awareness with industrial-public sector collaborations

Sustainable ergonomics awareness needs to be promoted through encouraging stronger participation among stakeholders through more collaborative industrial and public sector programmes and initiatives organised by agencies such as Malaysia's Social Security organisation (PERKESO), a department under the Ministry of Human Resources Malaysia set up to implement the Employees' Social Security Act 1969 and other employee welfare regulations.

One eminent initiative where the benefits of ergonomics can be demonstrated is at PERKESO's Neuro-Robotics Rehabilitation Centre launched in 2014 in the city of Melaka, southern Malaysia (pictured, right).

Programmes can promote its facilities incorporating high-tech ergonomics design which enhance the quality of occupational rehabilitation services for PERKESO member employees recuperating from work-related accidents, injuries, or dealing with neurodegenerative health conditions.



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