



## **Malaysian Ergonomics Standards-Its Development, Awareness and Implementation- A Review Article**

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### **Abstract**

**Background:** Ergonomics standards play an important role in product and system design as it can improve their usability; provide comfort and safety for the users. The number of musculoskeletal diseases has increased in recent years in Malaysia. However, the awareness and importance of ergonomics in Malaysia is still very low among the industries. Many ergonomics standards have been adopted by SIRIM Berhad under the purview of Department of Standards Malaysia (STANDARDS MALAYSIA). However, the take-up has been slow.

**Method:** This paper examined the role of SIRIM Berhad in developing the standards, involvement at international levels and other government agencies in promoting Ergonomics. Ergonomics awareness seminars were arranged in three localities, representing three regions, not only to disseminate information on ergonomics and standards available but also to solicit inputs from stakeholders on the problems in developing and adoption of the standards.

**Results:** Most of the stakeholders were not aware of the standards, do not know how to implement it, and do not have people who are knowledgeable in ergonomics. Since it is not mandatory, no conscious efforts were directed towards it. The lack of research in the various areas has also hindered the development of MS standards.

**Conclusion:** Standards are important in determining at least the minimum requirement for safety, health and comfort of workers. Creating awareness on the importance of ergonomics should be given some priority and this can be seen by the recent encouraging developments in Malaysia in the field of Ergonomics.

**Keywords:** Standards, Ergonomics, Malaysian, Awareness

### **Introduction**

Ergonomics or Human Factors Engineering is defined as the development and application of human system interface technology that is compatible with the capabilities of human beings in order to improve the quality of life. Ergonomics reduces the risks of injury, fatigue, pain and error, thus, improving the safety, health, comfort and productivity of the humans. The capabilities, limitations and needs of people are matched during their interactions with the products, equipment, facilities and environments used in the workplace (1,2).

“Ergonomics” is formed from two Greek words: “Ergon”, meaning work and “Nomos”, meaning laws - thus, the science of work (1,3)

Recent trends have shown that work related musculoskeletal disorders (MSDs) and compensation costs for this type of disease are increasing in many industries. Malaysia is also experiencing the same problems as it moves towards becoming an industrialized nation. Reports from SOCSO indicated that the number of cases has risen from 2 in the year 2000 to 326 in 2012. However, probably due

to the lack of understanding and awareness on ergonomics, many cases have not been reported (4). Many ergonomic standards have been developed. However, in Malaysia it was found that the adoption and implementation of the standards are low based on the sales record of the standards in SIRIM and the lack of enquiries and consultation from industries. The main reason being is that there is a lack of awareness not only of the standards but also of ergonomics itself. In addition, there are no trained personnel, employers felt that ergonomics are expensive and that since it is not mandatory, there is no need to implement them. These were mainly based on the observations, experienced, participation and discussions of the authors through their involvement in the SIRIM ISO/TC159 'mirror' committee and conducting Ergonomics awareness programs throughout the country. This paper outlined the procedures for the development of Malaysian Standards, the challenges and problems in developing the standards and the current development in advancing the field of ergonomics in Malaysia.

### ***Importance of Standards***

Ergonomics standards play an important role in improving the usability of systems, through improved consistency of the user interface and improved ergonomic quality of interface components. Conforming to standards ensures that systems used are productive, efficient, safe and comfortable (5).

Ergonomics standards can take many forms, such as regulations, which are formulated on a national level, or guidelines and standards, instituted by international organizations. Conformance to Standards gives confidence that systems or products are designed to meet at least the minimum requirement of safety and comfort. Standards are useful as they provide users a means of benchmarking their working conditions (6).

### ***Procedure for the development of Malaysian Ergonomics Standards***

Malaysia is involved in 128 Technical Committee of the ISO, one of which is TC159 Ergonomics.

The ISO TC159 ergonomics consists of 28 countries, which are P-(participatory) members, and 29 countries as O (observer)-members. As a P-member country, it is obliged to review, comment and vote on the international draft documents. Malaysia, through its own Technical committees, also actively participates at the international level in commenting on the drafts and attending international meetings.

The Malaysian Standards (MS) on Ergonomics were developed by the Technical Committee on Ergonomics established within the National Standards Development Systems under the purview of STANDARDS MALAYSIA, a government agency of the Ministry of Science, Technology and Innovation (MOSTI). The Technical Committee on Ergonomics is a 'mirror' committee to ISO/TC 159, *Ergonomics* and Subcommittee, SC 1 *General Ergonomics Principles*, SC 3 *Anthropometry and Biomechanics*, SC 4 *Ergonomics of Human-system Interaction* and SC 5 *Ergonomics of the Physical Environment*.

Malaysia's policy in developing standards is to adopt the international standards where appropriate. In addition, as a signatory to the World Trade Organization (WTO), it is obliged to align its standards with international requirements as a basis to develop the Malaysian standards, where relevant.

The stakeholders in the technical committee comprised representatives from the governmental agencies, employer federation, trade and industry association, occupational safety and health associations, academicians, as well as non-governmental organisations. Standard is a consensus standard developed by Standards Development Committees (SDC) within the Malaysian Standards System and approved by the Minister of Science, Technology and Innovation in accordance with the Standards of Malaysia Act 1996 (Act 549). The process of developing Malaysian Standards can be summarised into the stages shown in Fig. 1 after the proposal has been made by the Technical committee (7). Public participation in Malaysian Standards development can be through involvement in standards development committee or through submission of comments on the draft standards.

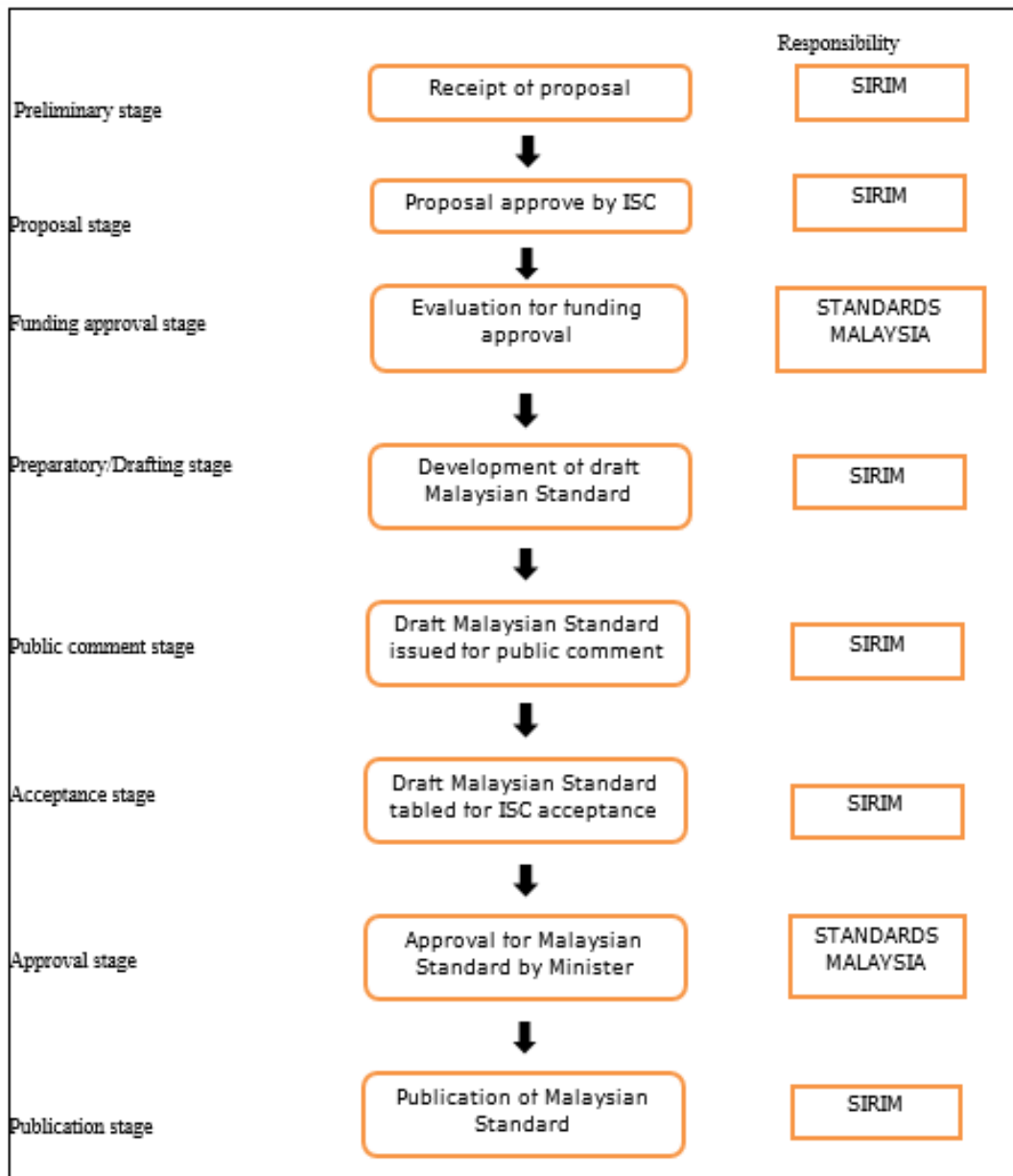


Fig. 1: Malaysian standard development process

There are 3 levels of standards development committee under the Malaysian Standards System i.e. The Industry Standard Committee (ISC), Technical Committee (TC) and Working Group (WG). For a standard to be accepted and well received by the industries, the participation of relevant and affected stakeholders during the deliberation process of the standard is most important.

#### *Adoption of International Standards (ISO) as Malaysian Standard (MS)*

The Malaysian Standards on ergonomics are technically identical to the ISO standards. The advantage in aligning with ISO standards is that these standards equate to a professional member level that are well received by the domestic and relevant industry worldwide. Up to date a total of 100 MS had been developed by TC covering from various aspects as follow;

- i) Accessible design,
- ii) Guiding principles and muscular workloads,
- iii) Human-System Interactions,
- iv) Standards related to control centres,
- v) Physical environment - thermal environment, Others,
- vi) Special needs,
- vii) User centred design standards for HCI and usability,
- viii) Ergonomics of Human System Interaction – Displays, flat screen & others, and
- ix) Software ergonomics for multi- media user interfaces

In Malaysia, participation in standards development is on voluntary basis. In addition, Malaysian Standards are voluntary documents and will only become mandatory when they are being stipulated or referenced in regulations.

#### *Awareness of ergonomics standard and way forward*

The awareness Seminars on “Ergonomics is Economics” that have been organised since 2011 by Standards Malaysia observed that there are concerns from the participants on how to approach the top management to implement ergonomics at the workplace and other issues such as manual handling and lifting mainly for Malaysian workers with reference to Malaysia’s guidelines and not ISO, as well as the implementation of ergonomics and the role of relevant agencies. They proposed Malaysia to have its own guidelines for manual handling and lifting. The seminar had met its objectives in providing the industry with the information on relevant practice and regulations as well as the available Malaysian Standards on Ergonomics in Malaysia. There was a positive and encouraging interaction between experts and participants. The participation of the industries in these series of seminars has provided useful insights on the needs of the industries and their level of awareness of the standards available on ergonomics.

SIRIM Berhad with STANDARDS MALAYSIA had done a study on the Usage of Malaysian Standard in 2012 and noted that 35% of the MS under ISCW have no known usage and are not saleable which include some of the MS on ergo-

nomics. It was found that making standards mandatory will encourage and promote the use of Malaysian Standards. Industries are of the view that usage of MS could be enhanced when the application of the standards provide direct benefits to the users. This is especially true in the areas where MS are mandated and enforced by relevant authorities or when users (manufacturers or producers) get economic gain through certification to standards. From the study, some of the recommendation had been proposed to be taken to enhance the usage and application of MS.

- a) There is a need to publish a specific catalogue for specific sectors to promote awareness and usage of MS. This catalogue should be made available to all professional bodies, industry associations, institutions of higher learning, chambers of commerce, contractors, local authorities, regulatory bodies and etc.
- b) Promotional seminars for targeted sectors and stakeholders should be conducted to enhance the awareness and promote usage of MS.
- c) The awareness of Malaysian Standards could be further enhanced through regular notification on the availability of new and revised Malaysian Standards to stakeholders and the public, including top management as they are the decision makers.
- d) The awareness on the availability and usage of MS should be promoted to be used by all industry players for the whole product value chain. A forum, discussion or ‘tea talk session’ with the relevant industry players throughout the product value chain will be a good avenue to identify problems and needs associated with the use of standards.
- e) There is a need to establish an information sheet containing listing of MS that corresponds to similar scope of the commonly used international, regional, foreign national, industries/associations standards. By having this information sheet, manufacturers can easily identify the MS, which cor-

- responds to other standards, and this inadvertently, will encourage wider usage of MS.
- f) In order to increase the usage of adopted MS by the industry, it is recommended that the adopted MS shall bear the number of the original standard. For example, adopted ASTM standard should retain prefix and ASTM number in the MS number. With this, the adopted standard will easily be recognised as corresponding standard to ASTM.
  - g) It is recommended that government agencies and Government Linked Companies (GLC) should support the usage of MS by including the reference of MS in their procurement specifications.
  - h) The ISC to relook at the approval of project to ensure the adoption of ISO standards are made based on relevancy of the standards to industries and stakeholders and the availability of potential users of the adopted MS.
  - i) In situation where the adopted MS is not likely to be widely used, direct usage of international standards may be the more suitable option. In this case, it is important for Malaysia through the representation of the relevant industry to participate actively as a “P” member in the development of the standards from the beginning. If this is not possible, there should be at least a committee that reviews and endorses the particular standard to ensure its suitability for use in Malaysia.
  - j) Promotion of MS should begin as early as at primary school level which could form part of the education syllabus or through the organisation of competition and sharing of knowledge regarding standards among school children. For example, CIDB has established a Construction Club which is used to promote awareness on standards.

#### ***Current Development in Ergonomics Awareness***

An encouraging development for ergonomics in Malaysia is the acknowledgement given in the Occupational Safety and Health Master Plan for Ma-

laysia in 2015. It has been identified as one of the important OSH strategic drivers (8). It will reinforce and build upon the main existing OSH legislative frameworks such as the Occupational Safety and Health Act 1994, the Factories and Machinery Act 1967 and other relevant acts. It will help raise knowledge and awareness on OSH and its importance and benefits, and thereby commitment to OSH. More importantly, it will form a basis for streamlining and co-ordinate action by an entire spectrum of Key Stakeholders and Social Partners including government agencies, local authorities, worker unions, trade and industry associations, employer organizations, OSH training providers, academic institutions and other non-governmental organizations.

The Department of Occupational Safety and Health, Malaysia is now moving towards achieving and maintaining the good standards of ergonomics via awareness and enforcement of legislations related to occupational safety and health of the country. They try to promote and encourage ergonomics awareness with effective safety and health measures via enforcement of the self-regulation schemes that match the industry or related organization. They also build a safe and healthy working culture by creating, cultivating and sustaining a good practice of ergonomics throughout Malaysia. Some of the initiatives are:

- a) Provide compliance support program for small and medium enterprise which include ergonomics risk assessment.
- b) Cooperation with other agencies such as NIOSH& SOCSO in managing ergonomics issues such as manual handling.
- c) Conducting program for the state offices in ergonomics risk assessment using ergonomics tools such as Hit-List, Brief-Best and NIOSH Revised Lifting Equation as well as WERA.
- d) Continually to build up basic knowledge of ergonomics among DOSH officers through practical training using ergonomics assessment checklist and so on.
- e) Conducting monitoring program for state office in ergonomics enforcement activities at the workplace.

In 2011, the Human Factors and Ergonomics Society of Malaysia (HFEM) was formed, providing a useful avenue for those human factors enthusiasts, experts and professionals to share and exchange knowledge, information and ideas. Conferences, seminars and meetings had been organized, bringing together people from various backgrounds (9).

A very positive development in the field of ergonomics in Malaysia is the setting up of the Ergonomics Excellent Center (EEC) by the National Institute on Occupational Safety and Health (NIOSH), Malaysia in 2013 in view of the rising number of occupational illnesses such as musculoskeletal disorders (MSDs). The EEC would embark on research to find solutions for injuries caused by repetitive strain or cumulative trauma disorders, as stated by the chairman of NIOSH. This initiative is intended to help the Department of Occupational Safety and Health and the Social Security Organisation to mitigate and curb MSDs, which affect work performance and productivity if not dealt with from the beginning. NIOSH has also allocated some research grants in the field of ergonomics. (10)

All these development are indicators that the development of Ergonomics is seen as important to society and that the government are taking serious views on its implementation. Thus, the greater the awareness of ergonomics problems, the greater will be the need for standards to be implemented.

#### *Issues Related to Standard Development*

Among issues that have been discussed in the Technical Committee on Ergonomics related to standards development in Ergonomics are:

- a) The lack of local experts that can participate in the various international working groups. This is essential because when the international standards are being drafted, local experts can provide useful inputs that addresses the needs of the population. A local working group based on the international working group should be established that can address the local needs and can represent the country at the international level.

In the United States, the Human Factors and Ergonomics Society (HFES) is the administrator for the US Technical Advisory groups (TAGS) for TC159. The HFES is charged with providing the American National Standards Institute (ANSI) with the US votes and comments for the standards being developed by TC159 and its subcommittees. These votes and comments are prepared by the HFEs-administered committee/ subcommittee (11).

- b) Though standards have been adopted based on the international standards there is a lack of research in some areas that can provide the relevant information for the standards to be applicable in the country. The Human factors Ergonomics society of Malaysia was only formed in 2011 and does not have the critical mass to be part of the various scientific committee and working groups established by the TC159. The HFES has long been established since 1957.
- c) Lack of funding to sponsor participation in the various working groups, standard meetings and technical meetings. These participations are important as it will increase exposure to the relevant issues addressed, how research were conducted and what were the considerations in developing the standards, and its relevance to the Malaysian environment.
- d) Lack of funding in research has hindered in adopting some of the standards as it may not be appropriate for local use, especially in the use of anthropometric dimensions in designing. Since anthropometric dimensions differ between populations, the dimensions used in the ISO standards may not be applicable to the Malaysian population. Anthropometric data is important not only for product design but also for various other applications. Studies have indicated that body dimensions differ for various populations, depending on countries (12), communities (13), ethnic group (14s), gender (15), (16), and age (15-17).

The quantum of the research grant received is small, so research is done on a small scale, usually university based. There are no standards or guidelines that can be used, unlike the Japanese with an established national database that has been referred to in many international applications (18). To make standards applicable, research have to be conducted locally, tested and verified.

## Conclusion

Many standards on ergonomics have been widely accepted. Standards only offer minimum acceptable requirements. However, conforming to standards will enable the industries to be more competitive in marketing their products.

The participation of industries in standardisation activities can increase the level of awareness of Malaysian Standards. The knowledge and experience gained through participation can be applied in their organisations.

The authors have addressed what has been considered as major issues based on the authors experience and participation in the SIRIM ISO/TC 159 committee. The ways of overcoming these issues should be explored.

## Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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The authors declare that there is no conflict of interest.

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