

The Influence of Ergonomics On Occupational Safety and Health (OSH) Legislation in Malaysia

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Abstract

It is an undeniable fact that ergonomics contributes to safety and health but its role in OSH legislation is not widely appreciated and has not received consistent attention. This paper attempts to discuss the extent and effect of ergonomics influence in OSH legislation. Some current issues are highlighted. The outcome of the study is to highlight the importance of ergonomics on OSH and to propose possible areas for further research.

Keyword:

Ergonomics, OSHA, legislation

1. Introduction

In the ongoing trend of reducing fatal accident, injuries and illnesses, managers need to comply with all legislation related to occupational safety and health. There are two Acts bonding all organization in Malaysia in order to ensure the workers are being protected from all risks coming from the workplace hazards: Factory and Machinery 1967 (FMA 1967) [1] and Occupational Safety and Health Act 1994 (OSHA 1994) [2]. Regulations, guidelines and codes of practice have been drawn up to support both Acts. Ergonomics is one of the safety and health elements covered. Without ergonomics concern, the effectiveness of safety and health legislation cannot be attained. Hence, the emphasis is not yet placed within the core of the legislation.

2. Literature Review

A commonly held understanding is that ergonomics is both a science as well as practice [3]. By implementing good ergonomics practices, we would be able to achieve job satisfaction [4], and contribute significantly to human well-being and safety due to comfortable work area and designed tools, man- machine interface design and suitable work methods to human anatomy [5]. Indirectly, it is also possible to improve quality, productivity, working conditions, reduction of rejects, rejection cost and increase profits [6]. At the same time, ergonomics hazards concerns may give a big impact towards industries if the risks are taken for granted. The situation nowadays is that firms are often guilty of not being aware of repetitiveness movement. Awkward and static posture will affect to tiredness, numbness, uncomfortable, illness and consequently more serious injuries like back pain, faints and slipped disks. This will lead to trends of absenteeism, medical leave, early retirement and the situation will become worse if the workers make demands for compensation. Seeley (2009) [7] proved the importance of ergonomics through his finding on the cost of Musculoskeletal Disorder (MSD) and workers compensation that far exceed those for acute incidents such as burns, cuts and even fractures.

However, the level of ergonomics application and general awareness are low in many countries [8] including Malaysia according to Mustafa et al.'s finding (2009) [9]. Furthermore, no specific statistic on ergonomics risk such as MSD and Carpal Tunnel Syndrome (CTS) is shown by Department of Occupational Safety and Health (DOSH) [10] specifically to show the severity of ergonomics injury in Malaysia. Hence, the emphasis is not yet placed within the core of the legislation even though some researchers [6, 11, 12] mentioned that better health and well-being for employees are contribute towards improving productivity. It has been proven to play an important role in providing the safest and healthiest work environment possible for employees [10], and Hendrick's aphorism, "good ergonomics

is good economics” [11], ergonomics is still not a hot issue to be considered by many companies. According to Niu (2010) [13], existing national and international ergonomics standards and guidance have some deficiencies including narrow focus on some physical hazards, inadequate coverage of issues related to effective program implementation and inadequate attention given by document designers to document usability. This paper aims to study the extent of ergonomics issue in OSH legislation and the outcome is going to highlight possible areas for further research.

3. Ergonomics concern in Act, regulation and guidelines in Malaysia

OSH Act must be approved by Parliament while the OSH regulation must be endorsed by the Human Resource Ministry. Guidelines should be endorsed by the General Director of DOSH. Acts and regulations are seen as a method of solutions for the time being for the implementation of ergonomics in Malaysia. It is capable of being a push factor to companies which comply with it. There are two types of issue brought up in this legislation: technical issues and management issues. Normally OSHA focuses on management issues while FMA 1967 tackled on technical issues. Table 2, Table 3 and Table 4 show the ergonomics involved in acts, regulations or guidelines based on management or technical issues.

3.1 Act and regulation relevant to Ergonomics in OSHA

Ergonomics under OSHA is referred to direct and indirect statements (refer Table 2 no 1-6) and the contents are in the main, more directed towards management issues. For example, in objective (sec. 4(c) OSHA 1994) such as, “to promote an occupational environment for persons at work which is adapted to their physiological and psychological needs”. Even though the statement does not mention ergonomics directly, “physiological and psychological” refers to ergonomics. Safety policy is required as mentioned in OSH (employers’ Safety and Health General Policy Statements) (Exception) Regulation 1995. Nevertheless, it depends on employers to develop the policy and put the emphasis on safety, health or ergonomics. Here the significant role of employers is to put an effort of ergonomics as a priority, where by the content of policy should strongly emphasize ergonomics in practice. In Sec. 28 (Medical Surveillance), sec. 31 (Function of Safety and Health Committee), sec. 32 (Notification Of Accidents, Dangerous Occurrence, Occupational Disease And Inquiry) and sec. 66 (Minister Power To Regulate Or Prohibit), the detail explanations should be done to ensure the company understand the essence concerning ergonomics. This is important because the employers are bound by the statements (refer Table 2 no 2 to 4). The comments are set out at the right for each issue.

Table 2: Ergonomics mentioned in Act and regulation

	Issue	Detail in the category (FMA/ OSHA)	Act or regulations relevant to ergonomics (summary)	Comments
1	Objective of OSHA	Sec. 4 OSH Act 1994	The objective of OSH : - To promote an occupational environment for persons at work which is adapted to their physiological and psychological needs.	Direct and strong relation between ergonomics and the OSH objectives.
2	Safety and health (S&H) policy	Sec. 16 OSH Act 1994	to prepare a written statement of general policy with respect to the safety and health at work.	Indirect but strong relation between ergonomics and S&H policy. It is more towards awareness of employer to set a safety policy with ergonomics emphasis.
3	Medical Surveillance	Sec. 28 OSH Act 1994	-...by reason of changes in any process ... there may be risk of injury to the health of persons employed in the process.	Indirect and strong relation. Ergonomics falls within one of the safety and health scope. Need to establish a base against which changes in health care status can be evaluated [14].
4	Functions of SHO	Sec. 15 OSH Act Reg. (18) Safety and Health Officer under OSHA 1994	..duty extends include in particular : a) Provision and maintenance of plant .. b) Making arrangement.. to investigate new miss .. to collect, analyse and maintain statistics on any accident	the ergonomics has too much uncertainty [15]. Thus, SHO difficult to collect, analyse data and to measure the risk without any strong knowledge and expertise.

5	Functions of safety and health committee (SHC)	Sec. 31 OSH Act 1994 Reg (11d) Safety and Health Committee Regulation 1996 under OSHA 1994	The SHC shall keep under review the measures takenwhich a member of the committee or a person employed thereat considers is not safe or is a risk to health ... review safety and health policies at the workplace and make recommendations to the employer for any revision of such policies. ... inspect workplace every 3 months .. --investigate accident.. review OSH report	Indirect but strong relation between ergonomics and function of SHC. Ergonomics falls within one of the safety and health scope. However, in order to conduct the SHC on ergonomics aspect is still not clear except for those who involved in accident, or for large companies, which have their own consultant to conduct the committee.
6	Responsibility of notification	Reg. (7) NADOPOD 2004 under OSHA 1994	An employer shall send a report in an approved form to DOSH within 7 days where a person at work suffers from one of the occupational poisonings or occupational diseases in the 3rd schedule.	Indirect but strong relation between ergonomics and responsibility in making notification. 3rd schedule mentioned in the NADOPOD: (under OSHA 1994), -heat cramp/ heat stroke, inflammation of synovial lining of the wrist joint and tendon sheath, cramp of the hand or forearm due to repetitive movements, hearing impairment caused by noise, diseases caused by vibration. Difficult to identify at the early stage.

Under the regulation category, employers are bond with NADOPOD (Reg. 7 under OSH 2004) which explained the requirements of reports of occupational poisoning and occupational disease. A well-conceived explanation is required as there are hidden statements whereby companies should refer under 3rd schedule with ergonomics problem such as heat cramp/ heat stroke, hearing impairment and noise (which is listed in eight (8) pages of occupational poisoning and occupational disease category). However, the implication is difficult, as the detail is not provided to explain the limits that can be abided to control heat cramp, heat stroke etc. Reactive approach is used typically by receiving complaints from workers or when ergonomics injuries such as Musculoskeletal Disorder (MSD) and Carpal Tunnel Syndrome (CTS) happened. Normally, this will take a long period for the problem to be detected until the symptoms emerge. Thus, it needs a proactive approach to do risk assessment.

3.2 Act and regulation relevant to Ergonomics in FMA 1967

Factory and Machinery Act (FMA) approach is slightly different compared to OSHA. FMA tackled the technical issue as this provides the employer on how to identify, analyse and improve the ergonomics hazard. Limits are given as a requirement. When product or services exceed the national limits, some penalty will be liable. There is only one specific regulation dealing on ergonomics i.e. noise (Noise regulation 1989 under FMA 1967). The regulation describes in technical detail even though management or implementation steps are not emphasized (refer Table 3 no. 1). The other regulation consider ergonomics is stated under Factory and Machinery (safety and health Welfare) 1970 regulation no. 28, 29, 30 and 31 (refer Table 3 no. 2, 3, 5 and 6), consists of temperature (heat stress), lighting (illumination), seating facilities and workbench issue.

However, lighting (illumination) has further mentioned in construction works Regulation 20 Factory and Machinery (Building, Operations and Work of Engineering Construction) (safety), 1986 (Table 3 no. 4). Refer to comment (at the right of Table 3).

Table 3: Regulation relevant to ergonomics

N o	Ergonomics issue	Regulation (section)	Regulation statement relevant to ergonomics	Comment
1	Noise	Reg. (4) Noise Exposure Regulations, 1989 under FMA, 1967	Obligation of occupier and employee..... wearing a noise dosimeter during employee exposure monitoring. -wear and make full and proper use of the hearing protection device provided for his use. -attached for and undergo audiometric testing or any medical examination or test arranged by the occupier -attend employee information and training programmes conducted by the occupier.	Direct and strong relation between ergonomics and noise exposure. Permissible exposure limit is described in detail but no detail guidelines for management of hazards.

		Reg. (5) and Reg. (6) Noise Exposure Regulations, 1989 under FMA 1967	No employee shall be exposed to noise level of: i) 90dB (A) or exceeding limits specified in the First Schedule or exceeding the daily noise dose of unity. ii) exceeding 115dB (A) at any time. iii) impulsive noise exceeding a peak sound pressure level of 140dB.	
2	Space (related to anthropometry)	Reg. (24) Safety, Health and Welfare Regulations 1970 under FMA 1967	1) not less than four hundred cubic feet of space for each person employed therein, and in determining such space, all space more than fourteen feet above the level of the floor shall not be taken into account.	Direct and strong relation between ergonomics and work space
3	Height at work room (related to anthropometry)	Reg. (24) Safety, Health and Welfare Regulations 1970 under FMA 1967	2) Every workroom shall not be less than 10 feet in height measured from the floor to the lowest point of any cross beam: thereof: ... or the purpose of housing machinery and in which no person is employed full time in attendance at such , machinery and ...shall not be less than six feet and six inches.	Direct and strong relation between ergonomics and height at work place
4	Temperature (related to Heat stress)	Reg. (28) Safety, Health and Welfare Regulations 1970 under FMA 1967	Suitable provision should be made to reduce the effect of temperature as he may considerable and practicable- adequate means shall be provided, shall be lined with suitable insulating material or coated with white paint, white wash or other heat reflecting material or so lined and so coated.	General requirements is written and employers need to have guideline on how to manage ergonomics practically
5	Lighting (related to illumination)	Reg. (29) Safety, Health and Welfare Regulations 1970 under FMA 1967	-No person shall be permitted toless than 10% of the floor area thereof. Windows and skylight are located and spaced so that daylights conditions are fairly uniform over the working area. -Intensity of illumination shall not be less than two foot-candles or five-foot candles depend on the point taken. -Local lighting source shall be mounted and arranged so as to confine the light to the immediate working area....Prevent formation of shadows.	Permissible Exposure limit is mentioned but the action steps suggested is not clear, as employers need a guideline / framework to ease the management of the hazard.
6		Reg. (20) Building Operations and works of engineering Construction (Safety) Regulations 1986 under FMA 1967	Illumination sufficient for maintaining safe working conditions shall be provided wherever persons are required to work or pass. For passageways, stairways and landings, the illumination shall be not less than 50 lux.	Direct and strong relation between ergonomics and illumination.
7	Seating facilities (related to work method problem)	Reg. (30) Safety, Health and Welfare Regulations 1970 under FMA 1967	... seating facilities shall be provided and maintained suitable and sufficient seating facilities for their use. -where a substantial portion of any work can properly be done sitting, there should be provided and maintained for any person employed in that work a seat of a design, construction and dimensions suitable for him and the work, together with a foot-rest if such a foot rest is necessary to support his feet in order to reduce fatigue. -and the arrangement shall be such that the seat is adequately and properly supported ...	Direct and strong relation between ergonomics and seating facilities. Even though the explanation is not detail enough, there is a guideline provided for seating at work (See Seating at Work Guideline, 2003)
8	Work bench (related to)	Reg. (31) Safety, Health and Welfare	Every workbench or worktable shall be of a design construction and dimensions suitable for persons employed so that the work can be carried out without	General explanation. However, can refer to and Standing at Work Guideline 2002 and Seating at

work method problem)	Regulations 1970 under FMA 1967	undue strain.	Work Guideline, 2003. Nevertheless, the measurement of workbench height is not mentioned for standing at work.
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2.2 Guideline relevant to ergonomics

The role of ergonomics is also emphasized in some guidelines provided by DOSH. However, it is explained based on the job. Malaysia has nine (9) guidelines relevant to ergonomics issue as shown in Table 4. However, the study shows the role of ergonomics is only embedded in the guideline whereby the guideline is developed based on the activities. For example, some guidelines available are Seating at Work, OSH in the Office, OSH in the Agriculture and Logging Operations. Those are the activities that involved a lot of ergonomics principle such as workspace, manual handling, posture and movement. As the guideline is written, the consideration is subject to the activities and it is case-by-case issue. All activities with respect to human usage will involve ergonomics because ergonomics means job fit to the man. Without explanation of ergonomics, the guidelines lack of values. Nevertheless, guideline for Registration of Assessors, Hygiene Technician, Occupational Health Doctor 2000; Safety and Health in Logging Operations 2004; Occupational and Health in Fishing and Aquaculture Operations 2003 and Occupational Health Services 2004 do not reflex and focus to ergonomics issue. The authors feel that there needs to be further investigation as to why ergonomics is not a widely appreciated discipline.

Table 4: Matrix on ergonomics issue in the guidelines available for OSH in Malaysia.

N o.	Guideline Ergonomics issue	Guideline on seating at work 2003	Guideline on standing at work 2002	Guideline on Occupational safety and health in the office 1996	Guideline on working with VDU 2003	Guideline on registration of assessor, hygiene technician and occupational health doctor, 2000.	Guidelines on OSH in agriculture, 2006	Guideline on safety and health in logging operation, 2004	Guideline on safety and health in fishing and aquaculture operations, 2003	Guideline on Occupational Health services, 2004
1	Temperature / heat stress	-	-	■	○	-	●	-	○	-
2	Humidity	-	-	-	○	-	-	-	-	-
3	Ventilation	-	-	●	-	-	○	-	○	-
4	Vibration	-	-	-	-	-	○	○	-	-
5	Lighting/ illumination	-	-	■	■	-	○	○	○	-
6	Color	-	-	■	-	-	○	-	-	-
7	Noise	-	-	-	■	-	●	■	○	○
8	Space	●	●	○	-	-	○	○	○	-
9	Manual handling		-	■	-	-	●	●	-	-
10	Stress	○	■	○	-	-	○	○	○	-
11	Work bench height	■	-	○	■	-	○	○	-	-
12	Chair	●	-	○	■	-	○	○	-	-
13	Screen placement		■	■	●	-	-	-	-	-
14	Posture and movement	●	●	■	●	-	○	○	-	-

Key : ●- described in detail ■- described roughly but have limit explanation ○- only mentioned, not described

Code of Practice (COP) is one of documents that can help DOSH in conveying their instruction on safety and health. However, there is no clear or written ergonomics COP provided to assist companies in facing ergonomics risk or hazard.

Overall, the concept of ergonomics is explained inconsistency in Act, regulation, guideline and code of practice. Some parts are clear but some are not detailed and are thus questionable. For example, temperature is described briefly in regulation (just ignore the Act as it is more to management) and no detail explanation neither in regulation nor most of the guideline excepting agriculture. Even though in the agriculture only mentioned that the comfortable temperature is between 20-26 degree Celsius, yet it is considered helpful in assisting the employers to be aware of the environment mentioned in Section 15(2)(e), OSHA 1994. So as the posture and movement that should be given strong emphasis, are not explained significantly.

4. Conclusions

There is considerable evidence of significant ergonomics influences in OSHA but its role has either been ill defined, understood and perhaps confused. There is no specific act, regulation, or guideline available to explain ergonomics implementation in general much like what Safety issues have done for the Act (OSHA emphasized on the safety management at the workplace such as self-regulation, consultation and cooperation). Some parts of the Act refer to ergonomics and are detailed enough to merit taking action. Others are more indirect and fuzzy. Many consideration needs to be studied before an ergonomics Act, regulation or guideline can be developed. There is a lot of debate and most of the question mentioned that ergonomics couldn't be quantified especially for MSD or CTS problem.

Thus, there is a need to design a research methodology for setting a more ergonomics friendly guideline, regulation or Act after considering some other factors such as culture and size of companies. There certainly is a lot of room for new research in these areas to promote better industry conformity and extending its application elsewhere.

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