

A study on office ergonomics management essay



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Office ergonomics serve important functions in preparing for, and responding to, workplace critical incidents. Workplace critical incidents are sudden, unexpected events that often are significant enough to overwhelm normal coping responses. They vary in type and severity and can affect employees as well as management. Such incidents can seriously affect the psychological, emotional, and physical well-being of employees, employers, and the entire organization.

Negative effects from the unresolved trauma of a critical incident in the workplace can contribute to overall lowered levels of productivity, poor performance, more frequent interpersonal conflict, increased absenteeism, increased use of physical and mental health benefits, increased workers' compensation claims, higher turnover, higher rates of alcohol and other substance misuse and abuse, and lower overall employee satisfaction and morale.

According to Jones (1985: 11-12) it is recognized that "no one is immune to problems". It is quite common that a problem in one's sphere of life will affect the other spheres, that is, it is possible that work related problems to have adverse effects on an employee's relationship with his or her colleagues, friends, supervisors and family members while on the other side of the coin a person experiencing personal problem originating from home can have a negative impact on the individual performance at work.

Already, healthcare, pharmaceuticals, and media and entertainment industries find over 25 percent of their workforce engaged in knowledge generation, idea generation, and innovation. Professional knowledge workers

share in the responsibility of generating the competitive edge of big enterprise. Bryan and Joyce (2005) report several statistics reinforcing how professionals experience interconnection. They cite that many large national and global organizations may employ as many as 10, 000 professional knowledge generators within their corporations. These people may have as many as 50 million bilateral relationships. From these numbers, one can make out that 21st century workers do not perform in a traditional vertical or linear organizational design.

Thus employee should be at the centre of every business activity and they should be integrated in a way that they deliver to the core strategy of the business. Employee should be regarded as a direct means of achieving the objectives of the company and they should be considered as an integral element of business practices in view to increase performance and brand name of the company. That why the social need and belonging is very important to present in companies so that employees can get a sense that they know they feel recognised in working in the company.

Individuals facing both personal and work related problems do exist at Air Mauritius Ltd. These problems may have their origin with their work design, interpersonal relationships at work or at home, health problem, psycho-social problems, inability to meet family and social life expectations, poor personal financial management, lack of trust and communication with the organization or suffering from stress as a result of perceiving organizational practices as being unfair towards our person.

In view that the social dimension of the enterprises in Mauritius is becoming more and more important, Air Mauritius Ltd should at all cost put its people at the heart of its economic and social progress by focusing on their needs for support when they face problem that can shatter both their personal and professional life. To respond to these needs Mauritian airline company should adopt a holistic approach by putting in place broad and explicit structures for dealing with employee problems through early identification and referral, that is, professional attention so that the employee can be assisted to unleash his/her potential to cope with work and life events that may causing harm to his/her personal and professional life.

Organisational Profile

Air Mauritius Ltd which is one of the main drivers of the Mauritian economy was incorporated in June 1967 and started operations with a Piper Navajo to transport passengers to Réunion Island.

Forty three (44) years later, the unique Mauritian airline company has grown with an actual fleet of 12 aircraft comprising of 8 wide bodied aircraft, 2 narrow bodied aircraft and 2 prop turbo aircraft and 3 helicopters. The different types of aircraft are illustrated below:

Types of Aircraft

Number

Airbus A340-300

5

Airbus A340-300E

2

Airbus A319-100

2

ATR 72-500

2

Airbus A330-200

1

Total

12

Helicopter

3

Table 3. 1-Types of Aircraft

From a domestic airline carrier, Air Mauritius Ltd has become the leading scheduled international passenger airline in the Indian Ocean and also serves 28 destinations touching four (4) continents namely Africa, Asia, Australia & Europe. It has also expanded its scope of service which includes operation of international and domestic scheduled air services for the carriage of passengers, freight and mail and ancillary services such as cargo.

The greatest part of the revenue generation comes from the business and leisure travel with the latter being the main passenger segment which

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generated 86% of the revenue, 10.4% from cargo services and 4% from other activities conducted by its subsidiaries.

During the past four financial years, the number of passengers carried by Air Mauritius Ltd has been fluctuating due to decrease in travel demand as a result of the world unprecedented financial crisis that hit countries where the mass of our passengers are located.

Apart from operating aircraft, involved in air cargo services and other aviation ancillary activities, Air Mauritius Ltd has also diversified in other business activities through its subsidiaries namely:

Mauritius Estate Development Corporation Ltd (MEDCOR) which is engaged in leasing of office and commercial space

Pointe Cotton resort Hotel Co Ltd which owns Cotton bay Hotel in Rodrigues Island and provides hotel accommodation together with all hotel services

Airmate Ltd which is a wholly owned subsidiary of Air Mauritius Ltd incorporated in 2006 to provide call centre and IT enabling services

Air Mauritius (SA) (Pty) Ltd which acts as a travel agent for Air Mauritius in South Africa

Organisational Structure

Apart from its Board of Directors and the Chief Executive Office, Air Mauritius is made up of the following clusters:

Flight Operations

Cabin Operations

Grounds Operations

Technical Services

Human Resources & Organisational Development

Internal Audit

Finance & Information Systems

Strategic Planning

Communication & Corporate Affairs & Commercial

Procurement

Cargo

Manpower composition

Air Mauritius has a total workforce of 2199 employees who work in Mauritius and it comprises of:

Male

1406

Female

793

Total

2199

Table 3.3 No of employees

Human Resources Issues

One of the mandates of the company is to manage and develop its human resources so as it can attain its corporate objectives. Air Mauritius Ltd through its mission statement and values, it demonstrates that they value their employees as one of its missions is to “be a rewarding performance driven organisation and a great place to work” and promise to display professional and caring attitude and speak and act positively with our valued customers which include also the employees.

Air Mauritius like other business enterprises is not immune of human resource issues that impact on corporate and financial performance. The most common features are labour turnover, termination of employment, sickness absenteeism, injuries at work, medical costs etc and a review of the data of associated with these problems reveal the following:

For most people, work is a safe haven. But high-profile incidents/accidents at workplace and safety and health laws are compelling employers to develop preventive programs to mitigate these problems, resulting in the creation of a promising new niche for health and safety professionals.

Improved personal control and comfort needs of employees triggered the concern among organisations to provide them with an environment and office design, which fulfill the employees' needs and helps to improve their productivity. Most people spend fifty percent of their lives within indoor environments, which significantly influence their mental status, actions, abilities and performance. (Amina Hameed 2009 adopted from (Sundstrom

1994)). Better physical environment of office will boost the employees and ultimately improve their productivity. Various literature pertain to the study of multiple offices and office buildings indicated that the factors such as dissatisfaction, cluttered workplaces and the physical environment are playing a major role in the loss of employees' productivity (Amina Hameed 2009 adopted from Carnevale 1992, Clements-Croome 1997).

According to Betty G. Dillard (February 1997) the discipline of ergonomics emerged in United Kingdom in the late 1940's and was first officially recognised in the USA in 1957 through the Human Factors Society. In the 1960s and 1970s ergonomics became a familiar study to the field of industrial engineering, and by the late 1970s ergonomics was recognized as a multidisciplinary field at the University of Michigan School of Engineering.

Ergonomics is an important factor in achieving and maintaining high levels of worker productivity. Jeffrey E. Fernandez (April 1995) defined ergonomics as " the design of the workplace, equipment, machine, tool, product, environment, and system, while considering the human's physical, physiological, biomechanical, and psychological capabilities, and optimising the effectiveness and productivity of work systems while assuring the safety, health, and wellbeing of the workers." Ergonomics is a discipline concerned with all aspects of designing for people. The aim in ergonomics is to fit the task to the individual, not the individual to the task. Ann Brook (1998) further defined ergonomics as " the practice of learning about human characteristics and then using that understanding to improve people's interaction with the things they use and with the environments in which they do so"

Hundreds of millions of people around the world work in offices. Improving the quality of these environments through user-centered design would provide enormous health, social, and economic benefits to society. Office ergonomics provides an arbitrary framework for integrating a large body of research that is relevant to the design of office work environments to optimize the health, safety, comfort, and effectiveness of their human occupants. (Jay L. Brand 2009)

Office ergonomics is an applied branch of human factors and ergonomics. At least 50% of the world's population presently works in some form of office (Jay L. Brand, P. h. D.(2009) adapted from Brounen, and Eichholtz 2004; Charles et al, 2004; Veitch et al 2007).

To demonstrate this potential, at least 2% of the American workforce suffers from a work-related musculoskeletal disorder (WRMSD) annually (Jay L. Brand 2009 adapted from Faucett et al 2002). Within the European Union (EU), work-related musculoskeletal disorders (cumulative trauma disorders) constitute 40-50% of this" (Jay L. Brand, P. h. D.(2009) adapted from Drury et al., 2006).

Several basic research areas inform office ergonomics' body of knowledge and guide its practice, including anthropometry, biomechanics, work physiology, environmental science (e. g., indoor air quality, personal space/territoriality; Sommer, 1969), individual differences, visual and auditory perception, mental workload, information processing, and human motivation. A number of applied areas of interest also enrich office ergonomics research and practice, including macroergonomics, participative

ergonomics, usability, job and task analysis, human-computer interaction, displays and controls, organizational design and behavior, and organizational development.

Office ergonomics must not only provide design guidance to minimize or eliminate health and safety issues; increasingly, the discipline needs to deliver positive organizational outcomes such as enhancing employee recruitment, retention, and productivity (Jay L. Brand 2009 adapted from Lahiri et al, 2005)

Hughes (2007) surveyed 2000 employees pertain to various organizations and industries in multiple levels. The reported results of these survey showed that nine out of ten believed that a workspace quality affects the attitude of employees and increases their productivity. Employees in different organizations have different office designs. Every office has unique furniture and spatial arrangements, lighting and heating arrangements and different levels of noise.

Office design

Office design is defined by BNet Business Dictionary (2008) as, “ the arrangement of workspace so that work can be performed in the most efficient way”. Office design incorporates both ergonomics and work flow, which examine the way in which work is performed in order to optimise layout. Office design is an important factor in job satisfaction. It affects the way in which employees work, and many organisations have implemented open-plan offices to encourage teamwork. Office design is very vital in employee satisfaction, and the broad concept of office design also includes

the workflow. The work is analysed initially and it is identified that how it is accomplished and then the overall setting of the office is made according to that flow. This ensures the smooth running of work in the office without hindrances.

Over the years, many organisations have devised new designs and techniques to construct office buildings, which can boost productivity, and magnetise more and more employees. Many researches have noted that, the physical layout of the workspace, along with well-organised management processes, is playing a significant role in increasing employees' productivity and enhancing organisational performance (Amina Hameed 2009 adapted from Uzee, 1999; Leaman and Bordass, 1993; Williams et al. 1985).

A study was conducted on US workplace environment by taking a sample size of 2013. The research was related to; workplace designs, work satisfaction, and productivity. 89 percent of the respondents rated design, from important to very important. Almost 90 percent of senior officials revealed that effective workplace design is important for the increase in employees' productivity. The final outcome of the survey suggested that businesses can enhance their productivity by improving their workplace designs. A rough estimation was made by executives, which showed that almost 22 percent increase can be achieved in the company's performance if their offices are well designed. (Gensler, 2006).

It is an undoubtedly fact that almost many organisations still do not give much importance to workplace design. As many as 40 percent of the employees believe that their companies want to keep their costs low that is

why their workplaces have bad designs; and 46 percent of employees think that the priority list of their company does not have workplace design on top. When data was summarised, almost one out of every five employees rated their workplace environment from, ' fair to poor'. 90 percent admitted that their attitude about work is adversely affected by the quality of their workplace environment. Yet again 89 percent blamed their working environment for their job dissatisfaction (Gensler, 2006).

The American Society of Interior Designers (ASID, 1999) carried out an independent study and revealed that the physical workplace design is one of the top three factors, which affect performance and job satisfaction. The study results showed that 31 percent of people were satisfied with their jobs and had pleasing workplace environments. 50 percent of people were seeking jobs and said that they would prefer a job in a company where the physical environment is good. Brill et al. (1984) ranked factors, which affect productivity according to their importance. The factors are sequenced based on the significance: Furniture, Noise, Flexibility, Comfort, Communication, Lighting, Temperature and the Air Quality.

Amina Hameed 2009 adapted from Springer Inc (1986) stated that " an insurance company in a study revealed that the best ergonomic furniture improved performance by 10 to 15 percent. Leaman (1995) attempted to find the relationship between indoor environment, dissatisfied employees and their productivity. The results revealed that the productivity of the work is affected because the people were unhappy with temperature, air quality, light and noise levels in the office. The productivity level was measured by the method of self reported measurement, which is a 9 point scale from <https://assignbuster.com/a-study-on-office-ergonomics-management-essay/>

greater than -40 and less than +40 percent (loss/gain). The data collected was correlated and results said that the coefficient of correlation (r)= 0.92 and the correlation exists between people who showed dissatisfaction with their indoor environment and those reporting that their productivity is affected by the office environment.

Transition of closed offices to open offices.

Open offices are distinguished from closed offices as having minimal floor-to-ceiling divisions inside the building shell other than structural or supporting elements. Problems with inadequate privacy and personal control have largely been replicated and extended by subsequent research to include impaired organizational performance, greater stress and cognitive workload, lower intrinsic motivation, more difficulty in concentrating, and less likelihood of adjusting so-called ergonomic furniture among workers in open-plan offices compared with those in enclosed offices (Jay L. Brand 2009 adapted from Banbury & Berry, 2005)

Maher and von Hippel (2005), measured 60 male and 49 female office workers in a field study of two open-plan office environments. Their results pointed to the importance of individual differences and salient job characteristics, as well as to a discrepancy between the visual-symbolic nature of partial enclosures and their actual effectiveness as acoustic barriers. These findings suggest that employees engaged in complex tasks or with low stimulus-screening ability prefer enclosed offices. Young office employees prefer to spend a greater proportion of their time working in groups or teams than individually.

Based on the available literature, it must be concluded that any individual, group, or organizational advantages of moving from closed to open offices depend on a conceptual framework that links a number of merely interesting assumptions still lacking adequate empirical investigation. What appear on the surface to be compelling claims of improved communication, collaboration, community, creativity, and innovation among employees in open offices have received only mixed support at best.

Factors affecting Office ergonomics

“ The future...depends on how we develop human interfaces that create a match between the internal rhythms of the operator and the computer.” -
(Harry C. Sweere (2002)

Harry C. Sweere (2002) conducted a study to investigate on the ergonomics factors involved in optimum computer workstation design. He pointed out the factors that are involved in the design of a computer workstation. The goal of conducting his research was to offer a practical guide to interpret published ergonomic guidelines and the anthropometric data that can be used to create a user friendly, ergonomically correct computer work environment.

According to Harry C. Sweere (2002) the factors involved in the design of a computer workstation are namely:-

- Visual display unit (VDU) adjustability
- Keyboard placement/adjustability
- Work surface adjustability

- Chair design/adjustability
- Foot rests
- Wrist rests
- Glare screens
- Lighting, task lighting
- Ease of adjustability
- Accessibility to components
- Human Computer Interfaces (HCI's)
- Space savings

All of the above issues concern themselves with the reduction or elimination of a class of physical disorders associated with poor ergonomic design known as Musculoskeletal Stress Disorders (MSD's), which result in:

- Eye, neck and back strain
- Fatigue, headache
- Wrist, hand, elbow and shoulder diseases such as

• Carpal Tunnel Syndrome

• Tenosynovitis

• Tendonitis

¾ Synovitis

Some of the main causes of eye, neck and back strain, which cause visual problems and wrist, hand, elbow and shoulder diseases are:

Improper Visual Display Unit screen height and the inability to adjust the screen height to individual preferences

Improper Visual Display Unit viewing distance and the inability to adjust the same

Improper Visual Display Unit viewing angle and the difficulty of adjusting the viewing angle especially of larger monitors

Improper keyboard vertical, fore and aft and tilt positioning.

A good ergonomic design principle must be applied to give the operator or a range of operators the optimum man-machine interface and the adjustability required to prevent discomfort and prevent workplace injuries. In many cases the specialised video display mounting technology developed for these work environments can be applied to the desktop to provide ergonomic adjustability and space saving benefits for this environment as well.

Screen Height

The recommended screen height for VDT monitors is that the top of the monitor screen should be set at or slightly below (approximately 1"-2") the eye height of the user when the user is sitting or standing in a comfortable, relaxed position. Whenever possible the screen height should be variable to

accommodate personal preferences throughout the day. Harry C. Sweere (2002)

Screen Tilt

Ideally an upward tilt with the bottom of the screen tilted toward the operator provides optimum viewing because it provides a consistent focal length when scanning from the top of the screen to the bottom. A tilt range of 12° to 20° is ideal depending upon the size of the monitor. (Harry C. Sweere (2002)

Screen Distance from Operator

Normally the monitor screen should be placed as far away as possible from the operator, consistent with the ability to read the information presented on the screen. A good rule of thumb for most installations is that the monitor screen should be placed at arms length, with the provision to move the monitor back and forth to suit individual needs being the ideal.

Keyboard Height/Positioning

Keyboards should be placed at a height that allows the operator to operate the keyboard with the forearms level and hands sloping slightly downward. A negatively tilting keyboard, allowing the operator to “ keep the wrinkles out of the top of the wrists” is ideal. Fore and aft positioning of the keyboard should be consistent with allowing the hands to move easily over the keyboard with forearms level and elbows at the sides, maintaining a 90° - 110° angle between upper and lower arms.

Screen/Keyboard Height Variance

Anthropometric data for the average range of male to female operators indicates that the top of the monitor screen to centerline of the keyboard placement should range from 20" to 22" with 21" being a good set-up for most applications.

Seating

Although Lueder and Noro (1994) remains an excellent reference for most of the important considerations related to user-centered seating design, more recent work has enlarged on the importance of an integrative systems framework for predicting seated comfort and discomfort. User-centered seating evaluations tend to emphasize user outcomes associated with long-term sitting such as low back disorders (Jay L. Brand 2009 adapted from Corlett, 2006; George, 2002).

Marras (2005) reviewed research that demonstrated interactions between basic tissue and musculoskeletal biomechanics with individual differences (e. g., personality and gender. In light of Marras's review, practitioners should at least realize that occupant-centered design principles that include user characteristics as well as organizational and task contexts are critical, in addition to seating design itself, for preventing or ameliorating low back disorders among office workers.

Av. Female 59. 4 44

Improving the Human Interface with Computers

Ergonomic studies done years ago indicate that screen positioning and keyboard adjustability are some of the most important factors in providing a

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comfortable work environment and preventing a broad range of MSD's associated with computer use. Disorders such as eye, neck and back strain, fatigue, headaches, and wrist, hand, elbow and shoulder diseases such as Carpal Tunnel Syndrome can all be dramatically improved through use of good ergonomic design.

The foregoing paper is based upon sound ergonomic ground rules and scientific anthropometric data, which can be used by computer workstation designers to help provide an optimum human interface for their computers. Workstation designers are urged to consult with a certified Ergonomist who is familiar with the applicable anthropometric data and computer workstation ergonomic standards for corroboration of the recommendations made for each application.

In order to meet such ambitious demands, a broader, systems view for office ergonomics must be adopted (Jay L. Brand 2009) adapted from Bettendorf, 1998). Such a framework fully acknowledges the influence of additional psychosocial, socio-technical, and organisational layers beyond individual human-workstation interactions.

Whether or not a foot rest should be recommended depends somewhat on seat height, seat back angle, and seat pan angle as well as on knee clearance considerations related to desk surface height, placement of input devices, and the relative position of these components to one another. (Jay L. Brand 2009)

After all, maintaining neutral body postures in any particular limb or body segment should not require that other limbs or body segments assume

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awkward postures. Maintaining neutral postures and neutral loadings for users requires simultaneous design of the physical components of the environment, their spatial relationships to one another, the user's behavioral interaction with each component, and task requirements. (Jay L. Brand 2009)

Marshall et al (1999) investigated the influence of complex wrist and forearm postures on wrist range of motion (ROM). Although their results relate more to human functionality constraints than to awkward postures per se, they still illustrate the necessity of an interactive systems framework for applying basic ergonomics research to practical office design problems. Wrist postures cannot be evaluated independently of elbow position, and therefore the design of keyboards or mice cannot be optimized without also considering the design and placement of forearm or wrist support. (Jay L. Brand (2009))

Helander, Little, and Drury (2000) found that seat height and seat pan angle in particular were interdependent, even when participants adjusted a single chair in isolation-that is, adjustments of one influenced adjustments of the other.

An applied example of interdependence among ergonomics principles given in Smith and Cohen (1997) involves the need for a headrest if people use a reclined posture, either to decrease spinal loading.

Allie et al (2005) suggested that human-machine system outputs (performance/productivity), user symptoms (pain, comfort, and discomfort ratings; workload) user preferences and expectations (spontaneously adjusted settings/positions of office furniture and equipment),

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biomechanical/ musculoskeletal factors (awkward postures; muscle tension, sensory/perceptual conditions (visual acuity; visual accommodation responses; color responses individual differences), and task requirements must be taken into consideration when managing office ergonomics.

Training

A related development since Smith and Cohen's (1997) masterful review of the office ergonomics literature involves the importance of placing ergonomics findings within their larger psychosocial and organizational contexts. One relevant aspect of this higher-order context relates to the quality of education and training about the elements and importance of ergonomics design guidelines and other interventions (Smith & Bayehi, 2003). The value of basic ergonomics information within applied settings often depends on the effectiveness of such training/orientation programs, as well as on individual differences (Levitt & Hedge, 2006). Recent reviews have affirmed the well-known risk factors in the development of musculoskeletal difficulties among office workers: frequency/repetition, awkward or static postures, excessive muscle loads, inadequate recovery/ rest periods and cool temperatures.

Ambient and Task Lighting

The Illuminating Engineering Society of North America (Jay L. Brand, 2009) adapted from IESNA, 2004) recommends maximum luminance ratios of 1: 3 between central task materials and the immediate visual surround (approximately 25° visual angle, centered at fixation) and 1: 10 between task materials and more remote surroundings. Unfortunately, in actual practice, the conditions relevant to these recommendations are rarely

measured and anecdotal evidence suggests that luminance ratios often exceed this advice.

In addition to their helpful review of previous lighting research that is salient for the design of office lighting, Sheedy, Smith, and Hayes (2005) employed a laboratory experiment featuring fixed head position to clarify and extend current design recommendations. Distinguishing between disability and discomfort glare they described transient adaptation effects from fixating back and forth between two disparate luminance levels—a frequent situation confronting employees in office work environments. Sheedy et al. compared younger ($N = 20$, mean age 27.9 years, range 23-39) and older ($N = 17$, mean age 55.5 years, range 47-63) participants performing a central task (presented at 91 cd/m²) at surround luminances of 1.4, 2.4, 8.9, 25.5, 50, 91, 175, 317, and 600 cd/m². Disability glare was assessed with low-contrast (20%) visual acuity charts; discomfort glare was measured with a questionnaire and preferred (surround) luminance by the method of adjustment. Younger participants performed best at a surround luminance of 50 cd/m² and older ones at 91 cd/m² (equivalent to task luminance). Surround luminance influenced transient adaptation at low but not high levels for both age groups.

The design of lighting and day lighting has also experienced a shift from direct guidelines such as adjustable task lighting to provide adequate luminance and legibility/ contrast for work materials or the elimination of glare to the importance of the larger, perceptual context for understanding user-centered design. (Jay L. Brand 2009)

However, some evidence paints a more optimistic picture of providing useful, objective guidelines for office lighting. Jay L. Brand (2009) (adapted from Newsham and Veitch (2001)) derived several practical guidelines, including the follow