

# Execution Strategies in Compliance with the Self-regulative Requirements on Workplace

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**Abstract:** This essay aims to generate the execution strategies in compliance with the self-regulative requirements on workplace health and safety set out by the ERA Company. Through adopting the tolerability of risk (TOR) model, various hazards in production and construction activities have been identified and classified into three categories: acceptable, tolerable and unacceptable. Based on the risk control analysis, three suggestions to improve health and safety practices are proposed: developing training programmes on health and safety to employees, enabling the operational communications and coordination, and improving the environmental control and management of personnel protection equipment. The company may gain benefits from effective implementations. To examine the effectiveness of the strategies, performance measurements are discussed from physical, functional and financial aspects. It suggests developing formal procedures to audit and review the performance for continual improvement. Finally, it predicts that the workplace health and safety regulations and practices will have implications on both facility managers and organisations. For the facility managers, they may face career opportunities; and for the organisations, good performance in health and safety may help them gain competitive advantages and more business opportunities.

**Keywords:** facility management (FM), risk control, workplace health and safety

## 1. Introduction

Health and safety is always a non-ignorable topic for all the organisations due to its importance of protecting not only the workers but also the business. It is legal requirements for the employers to ensure that no activity will pose risks to workers and visitors [1]. Failure of incorporating health and safety legislations at the correct time may result in grief and excessive cost later [1]. The evidence from Health and Safety Executive (HSE) shows that UK business accident cost accounts for 18 million per annum, not to mention those countries less focusing on compliance with legislations [13]. Health and safety laws and legislations vary in different regions, with examples of Health and Safety at Work Act 1974, Management of Health and Safety at Work Regulations 1999, and Control of Substances Hazardous to Health Regulations 2002 [2]. Governmental and professional organisations have been established to control workplace safety standards, be it Occupational Safety and Health Administration (OSHA) or HSE, who is responsible for regulations of workplace hazards in UK [25][27].

In China, there are adequate workplace health and safety regulations, such as Prevention and Control of Occupational Diseases Law 2002 [5]. However, it is criticised that the employer compliance is variable, discrete and even poor, especially in the manufacturing sector, where

the highest accidental injuries and work-related illness have been recorded [9][32]. The ERA Group plc is a newly listed manufacturing company in China, and it has been chosen for the discussion of self-regulative approach to improve health and safety practices. The board of this company has recently published higher requirements on workplace health and safety standards. In response to that, the facility managers, who hold the executive responsibility for workplace health and safety management, need to consider how to interpret and implement the relevant directives and legislations [28].

From the self-regulative perspective, the author aims to analyse and manage the health and safety risks created by the business activities. This essay will firstly introduce a risk management framework. Then it will identify workplace hazards according to the product life cycle and apply the model to propose risk control strategies in the facility management (FM) realm. After the implementation of the strategies, the benefits it may bring in and continual improvement proposals will be suggested. Finally, the future implications on FM role and the prediction on industrial health and safety practices will be briefly discussed.

## 2. Risk Analysis on the Health and Safety Hazards in the FM Realm

Health and safety risks may have multifaceted subjective interpretations [18]. There are numerous methods available for health and safety risk assessment, including Probabilistic Risk Analysis (PRA) and computer-based tool HaSARD Manager (Pate-Cornell, 1994; HSE, 2011). In this case, the tolerability of risk (TOR) model developed by HSE will be applied as the principal framework [31]. As shown in Figure 1, risks (denoted by “R”) are mainly classified into three categories: acceptable, tolerable and unacceptable, determined as the product of the severity of harm (denoted by “S”) and the likelihood of the occurrence (denoted by “P”) [31]. In the abscissa axis, the severity of risks ranges from insignificant to fatal; while in the longitudinal axis, the possibility of the risk occurrence ranges from high to low.

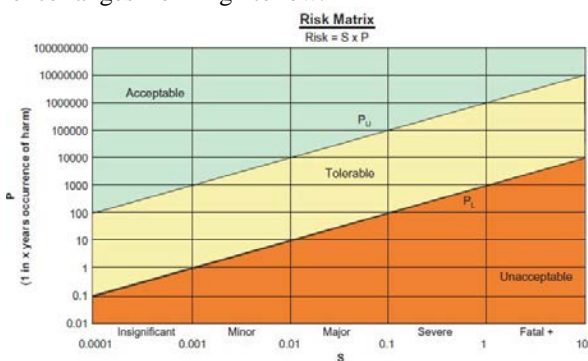


Figure 1. Risk matrix of tolerability [31].

If the risks fall into the unacceptable zone, catastrophes may occur, which means the risks should be treated or terminated immediately. If risks are in the tolerable zone, it usually means a legal duty to eliminate or reduce risk and these risks are morally unacceptable, such as employees’ exposure to unnecessary or avoidable risks and hazards [31][1]. If the risks belong to the acceptable zone, they can be retained or transferred. In applying this matrix, the organisations may adopt their reliable recorded data to calculate risk tolerability; whereas in the absence of data records, they can use qualitative analysis to estimate and classify risks rather than numerical analysis.

To comply with self-regulative health and safety standards in the ERA plc, the facility managers may take walk-through surveys to identify the hazards in the activities involved in the life cycle of the product. With the adoption of TOR model, it will decide who might be harmed and how the risks can be controlled using preventive or reactive strategies. The ERA Company is a photovoltaics (PV) modules manufacturer and usually delivers the package of integrating PV systems into buildings or other systems to generate electricity. The manufacturing and construction procedures along with the main workplaces are presented in Figure 2, where the activities consist of production, transportation, construction and maintenance and disposal.

In the production of PV modules, machine-guarding injuries, slips on floor and chronic work-related illness are identified as three risks in the workshop. People working on the production lines are most likely to get injured by carelessness or inappropriate operations. The consequence can be as severe as maimed and the possibility of occurrence is high. To deal with this unacceptable risk, training on skills and on safety awareness for the technicians is extremely important before they get on board and warning signs should be placed strikingly to remind them of safety operation. When accidents occur, first aid should be available. The possibility of slips on floor always exists to any occupiers including employees and visitors, but luckily, the consequences are of low severity. This risk is acceptable and it should be noted that the floor needs to be kept dry and clean, otherwise accumulation of dusts will cause less friction between feet and floor and the possibility of slips may increase. As long as the risk is already been controlled, further quantifying this risk will be a waste of time [29].

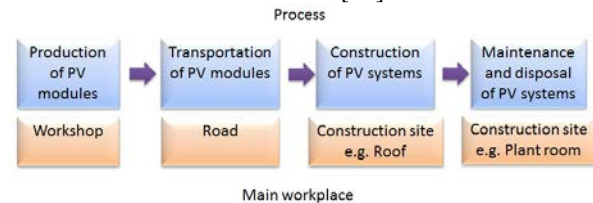


Figure 2. Manufacturing and construction procedures in the ERA Company

Another risk in the workshop is chronic illness, which is perceived as tolerable but requires treatment. The study conducted by Shikdar and Sawaqed (2003) reveals that 94 percent of companies have no ergonomic assessment. Through investigation, it is found that senior managers in ERA did not consider it as a strategic issue as well. Illness resulted from ergonomics will lead to less productive of workers and lower ability to make high quality decisions [3]. It is thus suggested that ergonomic training should be delivered to all the employees. The built environment factors, such as air quality and noise, may also result in chronic illness and affect health outcomes [6]. Solutions to alleviate the problem may include equipping the occupiers with protective devices and enabling the ventilation system to prevent occupational diseases [7]. In the transporting process of PV modules, injuries by heavy work and road accidents are two primary risks. For the former one, the negative effect on individuals is minor to medium and that to the organisation will be insignificant time loss and economic loss, whereas the possibility of occurrence is relatively high. As this risk is tolerable, the company should inform the employees of taking care of themselves to reduce injury risks. The later one may cause major damages to the drivers and minor economic loss to the company and it has a medium possibility to happen. The risk is tolerable but hard to control

as road condition is sometimes unpredictable. To reduce the risk, the company needs to select the drivers with good driving records and remind them of avoiding fatigue driving. To avoid economic losses of compensation, the company can transfer the risk to insurance companies. In the construction process of PV systems, two major risks are identified: fire hazards and falling down from the construction site. As the installation of PV systems usually involves hot works, the risk of fire occurrence is thereby high [11]. The impact can be severe to fatal, including worker injuries, equipment damages, productivity reduction and costs by delay and compensation [11]. It is thus considered that the risk is unacceptable. To treat this risk, precautionary actions of fire safety management should be taken, such as checking fire service installation and keeping escape routes free from obstruction [26]. The construction often takes place on the roof, and when it comes to the circumstance that the building is poorly designed, the construction team need to get trained and be familiar with access routes in case of dangers.

The other risk is construction members' falling down from the construction site. The impact can be severe and the occurrence rate seems low, but this accident did happen to the ERA Company once last year. A worker moved a ladder for his own use, but he did not notice that another worker was standing on the ladder doing work. The man standing high fell down to the ground and broke his leg. This incident was resulted from carelessness, which should definitely have been avoided. To reduce the risk, staff training and operational communications are of high priority, through which the health and safety awareness can be enhanced.

In the system maintenance process, natural disasters and electrical hazards are two risks. Due to the typhoon last summer, a PV module was blown off from the panel and dropped to the ground. Fortunately, no injury was caused but it is of great significance to prevent the similar accidents from happening. The occurrence of natural disasters varies from regions, and it will be high especially in some areas. The consequence can be fatal not only to human beings and properties but also to the business reputation. To treat the risk, facility managers need to coordinate with PV system designers to improve the product performance. Electrical hazard is tolerable but the risk needs reducing. The technicians should have qualified skills and protection equipment should be on site. As the PV systems usually have a lifetime of 15 to 20 years, none of the system conducted by the ERA Company has achieved the disposal stage. It is predicted that there may be some uncertainties such as injuries and precautions should be prepared.

From the analysis of potential health and safety risks embedded in the business activities, three suggestions to improve health and safety practices are proposed: developing training programmes on health and safety to em-

ployees, enabling the operational communications and coordination, and improving the environmental control and management of protection equipment. It is generally agreed that effective training to all the employees can improve safety and reduce injuries and fatalities [4] [8]. Depending on the work nature of the workers, training may cover the knowledge on hazards from chemical exposures, adverse health effects, ergonomic hazards, machine guarding, electrical hazards, emergency actions and fire prevention plans, while the training through site experience only is inadequate [5] [30].

### **3. Predictions on the Implications of the Risk Control Strategies Implementation**

After the implementation of the proposed strategies, the company may gain the benefits of better governance on health and safety practices. It is expected with achievements of self-regulatory standards and enhancements in reputation and business performance. When the risks are treated in a concerted manner, economic inefficiencies can be avoided [20]. Employees are expected to have less work-related injuries and be better satisfied by jobs, which may achieve stable workforce for the organisation. Performance measurements will be briefly discussed from physical, functional, and financial aspects to examine the effectiveness of the strategies [17]. From the physical perspective, the environmental factors such as lighting, cleanliness, ergonomics and presence of safety equipment are performance indicators. From the functional viewpoint, the health and safety incident rate, work productivity and job satisfaction are key indicators. From the financial aspect, it is stated that the higher the investment in safety, the better the performance will be, whereas organisations will not unlimitedly invest to it because cutting cost is one significant motivator to adopt health and safety programmes [19][24]. In practice, the investment in health and safety can be compared with that in previous years and the conclusion on whether implementing preventive or reactive measures are more cost effective can be drawn out.

To achieve a continual improvement in health and safety practice, formal procedures to audit and review the performance can be developed. Facility managers should periodically check the noticeboard, first aid, fire precaution, work equipment and personal protective equipment [1]. As workers tend to not report work-related injury and illness due to the concerns of losing job, fears of reprisal or lack of responsiveness, it is necessary to enable the reporting and feedback channels to collect the workplace health and safety data [14][21].

The workplace health and safety regulations and practices will have implications on both facility managers and organisations. Because of the fast development in business and technologies, workplace risks change rapidly [9]. Correspondingly, facility managers need to inspect the

changes and equip themselves with transferrable skills to deal with different risks and challenges. Meanwhile, they should keep tracks of new health and safety requirements and interpret the intentions of legislation and policies to workplace [2][4]. It is possible that experienced and professional facility managers will have career opportunities to become consultants or policy makers on health and safety.

For the organisations, the general health and safety performance is still under expectation and needs improving. The evidence shows that the independent assessment of workplace standards in US is rare [32]. Among all the companies, larger establishments have more possibilities to be targeted by health and safety inspectors and they appear owning safer work environment; while small firms often lack investment in health and safety programmes and the employees have higher probabilities of getting injured [16]. As the employee health and safety includes parties in supply chain who are exposed to a company's product, it is speculated that companies prefer to select contractors and suppliers with good records to secure the safety performance [15]. When companies are performing well in health and safety, they will gain competitive advantages and have more business opportunities. Health and safety is a topic that never out of fashion for all the organisations. To prosper business, it is applicable to develop culture of good organisational communication and management commitment towards health and safety [23].

#### 4. Conclusion

In reviewing the essay, it firstly outlines the management problem in the ERA Company that the board have set higher requirements on workplace health and safety standards, which requires execution by the facility managers. The TOR model is introduced for the analysis of self-regulative legislations compliance, which classifies health and safety risks into three categories: acceptable, tolerable and unacceptable. It then identifies the hazards in the activities involved in the life cycle of the product: machine-guarding injuries, slips on floor and chronic work-related illness in the production process; injuries by heavy work and road accidents in the transporting process; fire hazards and falling down from the construction site in the construction process of PV system; and natural disasters, electrical hazards and uncertainties in the system maintenance and disposal process. Based on the risk control analysis, three suggestions to improve health and safety practices are proposed: developing training programmes on health and safety to employees, enabling the operational communications and coordination, and improving the environmental control and management of personnel protection equipment.

After the implementation of these strategies, the company may gain the benefits of improvements in health and

safety practices and enhancements in reputation and business performance. Following that, performance measurements are discussed to examine the effectiveness of the strategies from physical, functional and financial aspects. To realise a continual improvement, it suggests developing formal procedures to audit and review the performance. Finally, it predicts that the workplace health and safety regulations and practices will have implications on both facility managers and organisations. For the facility managers, they may face career opportunities; and for the organisations, good performance in health and safety may help them gain competitive advantages and more business opportunities. Workplace health and safety will safeguard people using buildings, equipment and facilities, and it will always be a concern for all the organisations.

#### 5. Acknowledgment

Thanks are due to all of the people who have contributed to this paper in some manner. Besides, this study was supported by the project of Wenzhou Vocational & Technical College (WZY2015028).

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