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A comparative study of the occupational health and safety implementation in the industries and vocational high schools in Yogyakarta

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Abstract. This study aims to describe the extent of the Occupational Health and Safety (OHS) implementation in the manufacturing industries compared with that in the Mechanical Engineering study program of the vocational high schools (VHSs) in Yogyakarta Special Region. It uses the qualitative descriptive statistical analysis with data collection techniques covering field studies with direct observation and interviews. The research participants, the employees of the manufacturing industries and the VHSs' Mechanical Engineering teachers in Yogyakarta Special Region, were determined purposively. The results show that the application of OHS in the industrial workplaces is somehow better than that in the VHS's Mechanical Engineering study program in the researched region. In general, the problems of the OHS application in VHSs are perhaps triggered by the lack of health and safety equipment, facilities, and infrastructure in the mechanical engineering workshops and the poor OHS management system (OHSMS). The recommendations made are that VHSs improve the OHSMS, conducting OHS education and training programs for the VHS teachers and staffs, and using rewards and sanctions for all of the school community members.

1. Introduction

Occupational health and safety (OHS) refers to the health aspect in the workplace and work environment. Admittedly, work safety can improve the efficiency of work performance and productivity. However, Indonesia still has a low level of work safety. Based on the data from the International Labor Organization (ILO) there were 99,000 cases of workplace accidents of which the total victims, about 70% have fatal consequences, death or permanent disabilities (ILO, 2012) [1]. Meanwhile, the Healthcare and Social Security Agency (*BPJS*) notes that the total number of the workplace accidents reached 123,000 cases in 2017 with the total claim value of Rp 971 billion, an increase of 20% from that in 2016 that accounted over Rp 792 billion (finance.detik.com, 2018). Thus, the OHS implementation in the industries aims to assure the health and safety of the workers and other people in the workplaces, and guarantee the production sources that they can be used safely and efficiently (Suma'mur, 2006) [2]. Finally, By minimizing of harm possibility, employees must act safety and safely (Adiratna et al, 2003) [3].

The companies that are aware of the importance of the employee's productivity will always pay attention to factors contributing to such productivity, one of which is done by implementing the OHS program. Despite the fact that the OHS implementation is the responsibility of all parties, the industrial communities and VHSs should involve and play an active role in the implementation of OHS culture to



improve the quality of human resources and their productivity. Additionally Nielsen (2013) [4] in his research suggests that the health and safety organization (HSO) can improve the company's safety culture by focusing on safety-related interactions. This is in line with Rijuna Dewi (2006) [5] who states that OHS has a positive and significant effect on the employee performance. Based on Law No. 1 of 1970 on Occupational Health and Safety [6] and the Regulation of the Republic of Indonesian Government No. 50 of 2012 on the Implementation of the Occupational Health and Safety Management System (OHSMS) [7], OHS should apply in not only industrial workplaces and job agency but also schools and colleges. Thus, OHS needs to be applied in the practicums held by VHSs as well.

Concerning this, VHSs as the education and training providers function to generate skilled workers by offering a variety of study programs tailored to the needs of the world of work, one of which is the Mechanical Engineering. Often, the flagship programs in VHSs are the productive ones, which aim to equip students with the competencies based on the Indonesian National Working Competency Standards (SKKNI). Besides, to establish good work attitudes, strategies to improve the quality of OHS implementation through the learning process of OHS in schools should be carried out. According to Triadmidi (2010) [8] VHS graduates from the mechanical engineering study program will generally work as beginner workers or supervisors which deal directly with relatively dangerous tools, machines, and materials. Therefore, viewed from the existing problems, the objective of this paper is to describe the OHS implementation in industries and VHSs and to measure to what extent the OHS applies in either the manufactories or VHSs.

2. Method

This is a qualitative descriptive research study with the participants determined purposively. The manufacturing industries and the VHSs' mechanical engineering study programs in Yogyakarta Special Region were its setting. The data are in the forms of the results of field studies carried out through direct observation, in-depth interviews, and documentation. The data analysis was carried out by combining the primary and secondary data, categorizing them by a substantive theme prepared, rearranging them for the data interpretation, and drawing the conclusions. The validity test used the data triangulation so that the data presented are valid ones.

3. Results and Discussion

3.1. The OHS Implementation in the Industries

Occupational health and safety (OHS) resembles a system employed by an institution or company in regulating, supervising, and managing people working in the industrial workplaces. By monitoring and managing the working employees, it is expected that OHS can reduce the risks of occupational accidents.

In general, the health and safety programs in the industrial places cover several main aspects regarding the health and safety rules, rule awareness, protective clothing, floor cleanliness, enough light in the production areas, and work environment. Other aspects also include firefighting equipment, first aid and medical services, sufficient number of toilets, bathroom cleanliness, the programs, local directions, clean drinking water, health and safety committees, emergency procedures, and health and safety promotions. Of these aspects, however, this study focuses on the four aspects the OHS implementation in the manufacturing industries in Yogyakarta Special Region, namely, the aspects of work safety, occupational health, occupational health and safety management system (OHSMS), and competence.

In terms of work safety, the findings of the OHS application in the manufacturing industries located in Yogyakarta Special Region reveal that (a) the building and the arrangement of tools and machines

apparently suit the applying standards. (b) The use of work equipment and the machine operation has also been somewhat in accordance with the standard operational procedure (SOP) applies in the company. Moreover, (c) the personal protective equipment (PPE) such as safety helmets, safety shoes, earplugs, work gloves, chemical respirators, dust masks, chemical goggles, PVC gloves, welding gloves, welding masks, safety glasses, and the protective clothing seems to be complete. Besides, they also find that (d) the equipment and first aid kits apparently meet the standards stated in the Regulation of the Republic of Indonesia Minister of Manpower and Transmigration No. PER.15/MEN/VIII/2008 concerning the occupational first aid (OFA) [9]. Additionally, (e) the hydrants are available in every workroom, and (f) the environmental sanitation in the workplace is properly managed, proven by the cleanliness of the surrounding environment and the water quality, as well as the presence of industrial waste tanks. In overall, the OHS implementation in the manufacturing industries has been effective, but there are some problems, especially in terms of safety, including the management and utilization of waste products and the uninstalled alarms and emergency shower for fire detection in every room.

When viewed in terms of the occupational health, the OHS implementation in the industries covers the followings. (a) The work environment has met the Good cleanliness criteria, (b) noises are at the unwavering level, (c) the air conditioners or fans seem to be available in every workroom, and (d) enough light is assured in every workroom and hall as regulated. Besides, (e) clean culture in the workplaces has been carried out well such as the cleanliness of the stairs, floor, hallway, material storage, hand washing, and toilets, and the availability of landfills. Moreover, (f) the employees have been registered as the members of *BPJS Ketenagakerjaan* (social security programs for employers and individuals in Indonesia), and (g) there is support from the company leaders and good communication amongst workers. Based on these results, the OHS implementation in terms of the occupational health has run as planned. However, the findings find that such implementation has not run optimally as there are still many obstacles in the management of hazardous and toxic waste that has not been carried out well and the labeling for such waste is also not well coordinated.

Regarding the OHSMS, the manufacturing industries in the Yogyakarta Special Region have applied it effectively as governed by the Regulation of the Indonesian Minister of Public Works No. 05/MEN/1996 Chapter III Article 3 concerning the basic principles of OHSMS [10] that consist of five aspects carried out continuously. These aspects are (a) commitment/policy, (b) OHS planning, (c) implementation, (d) measurement/evaluation, and (e) review and improvement. Apart from these five aspects, some new findings are found. Some of them refer to the implementation of Law No.1 of 1970 Section VIII Article 12 concerning the reward and punishment that has not been carried out optimally due to either the lack of supervision from the institutions in charge of OHS regulation or the availability of OHS experts. These two problems result in another problem in the formulation and the implementation of OHS programs in the field.

Regarding the OHS implementation in terms of the workers' competence, in general it is found that all workers know the OHS programs, implement the programs, and participate in evaluating the programs. All of these are carried out in Good category. Based on the observation in the field, the workers possess the knowledge of the OHS programs, including those about (a) the first aid kits, (b) the proper use of PPE, (c) safety signs, (d) SOPs on fire extinguishing, (e) the socialization of the OHS programs, and (f) the audit of OHS programs. Therefore, to strive for the quality improvement of the OHS programs in the manufacturing industries, the companies should always upgrade their workers' competence by providing some training and simulation on the OHS implementation.

3.2. *The OHS Implementation in VHSs*

The OHS implementation in VHSs constitutes the management system that influences the level of the teacher and student performance. However, apparently the OHS in VHSs has not been implemented and coordinated optimally among the school management, teachers, and students. Thus, the quality of teacher performance in implementing OHS appears to be a benchmark for the OHS implementation in such schools.

In terms of work safety, based on the results of the observation in the mechanical engineering workshops, the OHS implementation in VHSs includes the followings. Firstly, the VHSs' workshop/laboratory building are in accordance with the Regulation of the Indonesian Minister of National Education No. 40 of 2008 concerning the facilities and infrastructure at VHSs [11]. Some of the machine maintenance is carried out periodically by cleaning the machine monthly, while its lubrication is carried out every 6 months, and the overhaul is carried out every 1 year. In addition, the OHS implementation in the mechanical workshops is not yet in accordance with the standards applied by the manufacturing industries. Moreover, there are many problems revealed from the observation of the OHS implementation in VHSs. They deal with the condition of the machines used for the practicums 50% of which are no longer appropriate to use. Besides, some of existing machines are damaged in its coolant, automatic component, and engine lighting. Such damage to the machines is due to either the aging factor or poor maintenance.

In terms of the occupational health, the findings on the OHS application in VHSs' mechanical workshops uncover the presence of the School Health Clinic (SHC), lighting, ventilation, as well as the air circulation systems that function properly. However, there are still many problems found there. They are (a) the cleanliness of the workshops, hand washing, and toilets, (b) the workshops' wall stain, c) the provision of industrial waste disposal, and d) the presence of fans or blowers in the workshops.

Concerning the OHSMS in VHSs, the observation results show that this management system has not been implemented in the VHSs' workshops. The socialization of OHS programs has not been carried out effectively to teachers, staffs, and students. When referring to the basic aspects of the OHSMS, some staffs and teachers already know the OHS programs, but they do not implement them due to the ineffective communication among the teachers, staffs, students, and school management in formulating the OHS programs that should be implemented. Thus, it affects the implementation of the industry-based OHS culture in VHSs.

Despite the fact that VHS teachers have enough knowledge on the OHS, what hinder its implementation are the availability of OHS supporting facilities and infrastructure, and the ineffective communication among the school management, teachers, students, and staffs. These problems cause the teachers and staffs to ignore the OHS principles during the practicum process in the workshop, and later this condition is becoming a dilemma experienced by most vocational teachers.

3.3. *A Comparison of the OHS Implementation in the Industries and in VHSs*

There are some difference son how OHS applies in the industries and in VHSs, especially in terms of the facilities and infrastructure. The Regulation of the Indonesian Minister of National Education No. 40 of 2008 states that health and safety in the workshop scan be ascertained if sufficient PPE is provided to meet a certain minimum ratio of the total students. However, it is found that the available PPE in the VHSs' workshops is limited, and even the students sometimes should prepare their own PPE. When compared with that in the industry, the supply of PPE is quite enough or even more PPE is available for the number of employees working in one division, for example in the production section.

According to Article 1 concerning OFA for the workplace accidents, the first aid kits and the safety equipment condition are essential for the workers and other people who are at work who may experience pain or injury since the danger posed has been of high risks. Meanwhile, in VHSs the first aid kits are in poor condition and far from adequate for the students. Therefore, the OHS implementation in VHSs needs to be improved especially in the provision of OHS supporting facilities and infrastructure in the workshops.

In the Regulation of the Indonesian Minister of Public Works No. 09/PER/M/2008 [12], it is stated that the OHSMS is the part of the overall management system that includes the organizational structure, planning, responsibilities, implementation of procedures, processes and resources needed for development, implementation, achievement, study maintenance of OHS policies in order to control work-related risks to create a safe, efficient, and productive workplace. It is found that in the industrial workplaces such management system has been implemented in accordance with the applied regulation, but not in the VHSs. Based on data from the Indonesian Ministry of Education and Culture, the OHSMS was only applied to 60 State Vocational High Schools (SMKN) throughout Jakarta, Bogor, Depok, Tangerang, Bekasi (JABODETABEK) the contained of (Republika, 2016) [13]. Therefore, VHSs should prepare or develop an industry-based learning curriculum that enables them to apply OHS culture effectively and in the future, they can carry out the management system of the industry-based OHS by themselves.

In addition to the problem of OHS supporting facilities and the management system that distinguishes the application of OHS in industries and that in VHSs, the absence of OHS experts in VHS sand education and training for VHS teachers and staffs is another problem. In terms of the OHS knowledge, VHS teachers perform higher than do the industrial employees because the teachers' education is better than that of the employees in the industries. However, in terms of the OHS implementation, these employees has better implemented the OHS than have the teachers. Therefore, to balance this condition, VHSs should have work standards regarding the OHS implementation that are guided by that of the industries.

3.4. The Alternative OHS Programs for VHSs to Apply

Based on the description of the results and data analysis that has been provided in the previous sections, the important measures to carry out are as follows.

3.4.1. The OHS education and training. The OHS education and training for VHS teachers and staffs are in tended to improve their understanding on the importance of OHS programs. By applying the OHS programs in the workshop, it is expected that the risks of occupational accidents related to the machines used can be minimized and the productivity of teachers, staffs, and students may increase. Thus, the recommendation made is that VHSs should hold OHS education and training programs for teachers and staffs or establish cooperation with companies engaged in machining and manufacturing sectors to assist them in instilling the OHS culture.

3.4.2. Socialization on the OHS programs to the teachers, staffs, and students. Based on the findings, the socialization carried out by the school management to teachers, staffs, and students has not been properly carried out. These parties do not know and understand OHS programs, so that in practice, students often ignore the OHS. For example, students sometimes do not wear safety glasses and gloves when involved in the lathe practicum. Recommendation made is that the school management should

participate in the formulation and management of the teaching and learning activities, especially in the productive courses carried out in the school with the aim that the school management can participate in the OHS implementation, supervision, and evaluation in the workshops.

3.4.3. The availability and completeness of personal protective equipment (PPE). The availability and completeness of PPE are the main issues in implementing the industry-based OHS. In this context, it is found that the PPE in VHSs is less complete, that is, some of the PPE is less feasible but it is still used for the practicum. Recommendations made are those concerning the PPE renewal, procurement, and maintenance

3.4.4. Health services at school. Health services in schools are commonly associated with those in the form of the SHC and first aid kits. These health facilities and infrastructure are possessed by all schools, but for the VHSs in context, such SHC and first aid kits are considered less feasible or no longer appropriate to be used when accidents during the practicums happen. Besides, limited medicines and health tools become the next inhibiting factors when students are to use the first aid kits. Recommendations made are that the VHSs should provide the SHC and physicians, as well as a health insurance for teachers, staffs, and students so that they do not need to worry if accidents occur during the practicum in that the pain or injury can be directly handled by the physicians.

3.4.5. Rewards and sanctions. This study found that rewards and sanctions have not run optimally in VHSs. In practice, rewards have not been given for teachers and staffs, but for students they are given as an additional value that is embedded to their productive learning achievement. Whereas for the sanctions, employees and teachers are not given any sanctions, but it is found that students are given warnings and fines when they cause some damage to the tools or components used for the practicum. It is recommended that rewards or sanctions should apply to not only students but also all school community members who are involved in the practicums done in the workshop. Thus, there will be no gap between teachers, staffs, and students in applying the work culture based on the industry-based OHS.

4. Conclusions

Based on the results of the data analysis, it can be concluded that the OHS implementation in the manufacturing industry is better than does that in the VHSs. The OHS implementation in VHSs still has many shortcomings, one of which is in the provision of facilities and infrastructure at school. These are caused by several problems, including (a) the rewards and sanctions that have not been implemented and (b) the provision of OHS facilities that is less optimal in terms of the procurement of PPE and first aid kits, and the cleanliness of the workshops. Moreover, (c) the OHSMS audit has not been scheduled by the school management, and (d) there is no OHS education and training for VHS teachers. The recommendations for the OHS implementation in VHSs concern with the procurement of tools, facilities, and infrastructure in accordance with Minister of National Education Regulation No. 40 of 2008, support for the OHSMS within the school scope, OHS training program for teachers and staffs, and the rewards and sanctions given for all school members.

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