

**Research Paper**

## Evaluation of the Application of Occupational Safety and Health (OSH) at the Subang State Polytechnic Laboratory

## Evaluasi Penerapan Keselamatan dan Kesehatan Kerja (K3) di Laboratorium Politeknik Negeri Subang

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### Abstract

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Occupational Health and Safety (OSH) in the industry and vocational education institutions are very important elements to ensure user safety and keep the machines in good condition. Polytechnics must be able to prepare OSH standards in the practical learning process in the laboratory. Therefore, this study aims to evaluate the compliance of the Subang State Polytechnic Laboratory in the application of OSH. Observation data obtained were analyzed by descriptively-quantitatively methods. The results showed that the facilities and application of OSH at the Subang State Polytechnic laboratory received a score of 67.20 so that it was in the feasible category.

**Key words:** Safety, Occupational Health, Laboratory

### Abstrak

Kesehatan dan Keselamatan Kerja (K3) di industri dan lembaga pendidikan vokasi adalah elemen yang sangat penting untuk memastikan keselamatan pengguna dan menjaga mesin dalam kondisi baik. Politeknik harus mampu menyiapkan standar K3 dalam proses pembelajaran praktis di laboratorium. Oleh karena itu, penelitian ini bertujuan untuk mengevaluasi kepatuhan Laboratorium Politeknik Negeri Subang dalam penerapan K3. Data pengamatan yang diperoleh dianalisis dengan metode deskriptif - kuantitatif. Hasil penelitian menunjukkan bahwa fasilitas dan implementasi K3 di Laboratorium Politeknik Negeri Subang mendapat skor 67,20 sehingga masuk dalam kategori layak.

**Kata Kunci:** Keselamatan, Kesehatan Kerja, Laboratorium

## 1. Introduction

Subang State Polytechnic is a vocational campus focused on the formation of student competencies in accordance with the field of expertise, one of which is the engine maintenance

department. This department prepares graduates to work in the field of engine maintenance and maintenance in the industry. Both the theory and practice of teaching and learning processing vocational school and industry are expected to

produce qualified graduates, which means that the theory and practice in polytechnics must be balanced to produce graduates that suit the needs of the industry [1], [2].

In the Noviansyah's study [3], the most important aspect in preparing good quality vocational graduates is the availability of adequate equipment and infrastructure in workshops/laboratories. Subang State Polytechnic has had several laboratories as a place of practice for students to improve their competence. Some of the laboratories consist of Electricity Laboratory, Drawing Laboratory, BLK Refrigeration Laboratory, BLK welding laboratory, LIPI Pneumatic and Hydraulic Laboratory, and LIPI manufacturing laboratory..

One of the most important criteria in the laboratory is the application of OSH [4]–[6]. Therefore, OSH in industry and in educational institutions in Indonesia is regulated in several occupational safety and health regulations; including Law No. 1 of 1970 concerning Occupational Safety and Ministerial Regulation No. PER-05/MEN/1996 concerning the occupational safety and health management system [7].

OSH implementation in the Subang State Polytechnic laboratory aims to prevent work accidents that can cause bodily disability and even death. Correlating with that goal, Kurniawan [8] argues that OSH problems have not received special attention in Indonesia. This can be seen from the high number of work accidents. Occupational accidents due to negligence in OSH quality assurance generally affect employees in a company [9], so it can be concluded that OSH is a very important element in the world of industry and vocational education. OSH is very important to be implemented in a polytechnic laboratory because it involves the safety and security of students when practicing with a high level of accident risk.

In a Polytechnic, learning activities that use machines must prioritize aspects of OSH for all academics involved in the process [10]. Personal

protective equipment (PPE), area and completeness of first aid room, and standard fire extinguishers are also benchmarks for OSH readiness in vocational institutions [11]. The good practice of OSH in a vocational institution is expected to be able to maintain the condition of the machines for lab work and maintain the safety of teaching and learning activities in the laboratory/workshop.

Based on the observation of the research team in August-September 2018, it was found that the OSH implementation on the vocational campus had not received too much attention. This condition can cause material losses and even work accidents. One case of perbah happened at the Subang State Polytechnic laboratory during the practice of maintenance and repair of disc mill machines. Students experience injuries to the temples due to not using standard PPE and inadequate workshop lighting. Therefore, this study aims to evaluate the availability and usefulness of OSH standards in selected Subang State Polytechnic laboratories.

## 2. Method

This research was carried out in electric laboratories, pneumatic and hydraulic laboratories, and refrigeration laboratories. The research subjects were students of the Department of Machine Maintenance. The research data were analyzed using quantitative descriptive methods. The flow chart of this study is presented in [Figure 1](#). Research steps

The research starts from identifying problems in the laboratory. Then, the researcher made an instrument that was validated by experts. The approved instrument is used as a data retrieval checklist. Data collection is carried out directly in selected laboratories assisted by technicians. Then, the data is analyzed by quantitative-descriptive method. The scores obtained are then interpreted in the feasibility criteria presented in [Table 1](#).

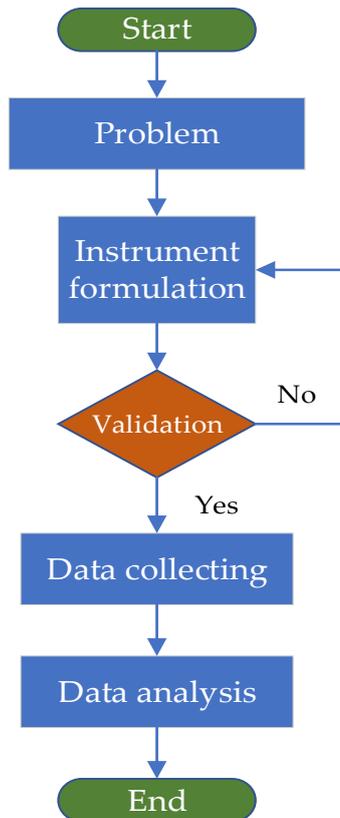


Figure 1. Research steps

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Table 1. OSH feasibility scale

Score range	Category
100-81%	Very Worthy
80-61%	Worthy
60-41%	Fair enough
40-21%	Not feasible
20-1%	Very inappropriate

### 3. Result and Discussion

This research data was obtained through observations with instruments that have been validated by experts. The aspects studied included aspects of personal protective equipment (PPE), areas and completeness of first aid kits, as well as standard fire extinguishers. Some photographic views of work safety equipment and their implementation are presented in Figure 2. Figure 2. Some photographic views of work safety equipment and their implementation at the selected Subang State Polytechnic Laboratories. Meanwhile, the results of the observations are presented in Table 2, Table 3, and Table 4, respectively.

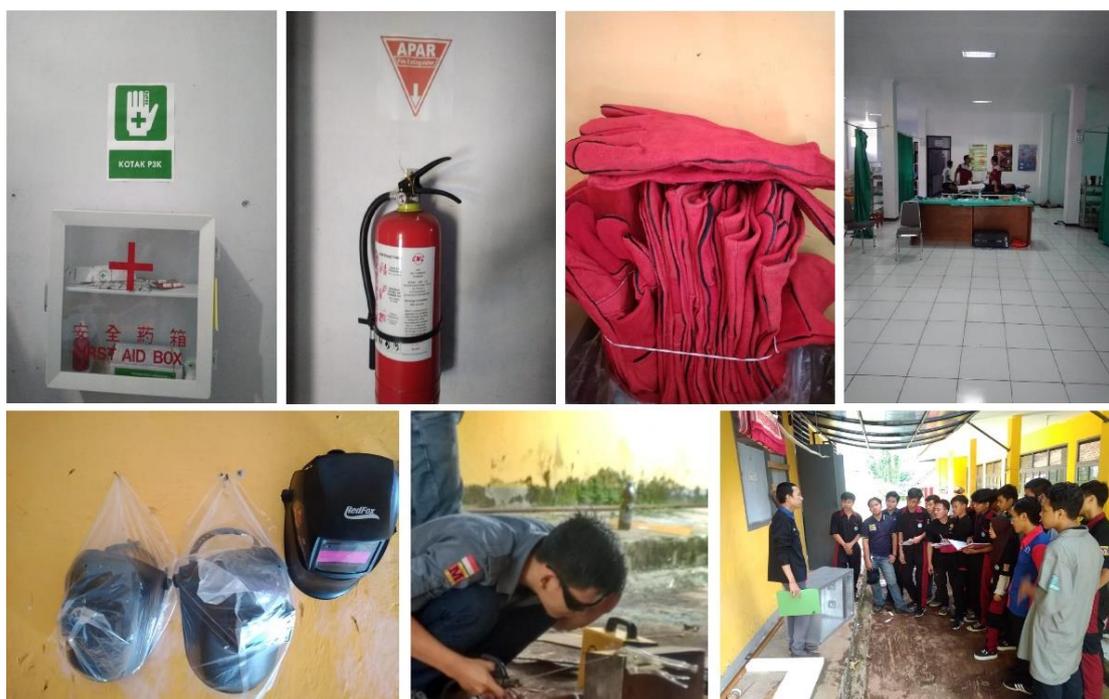


Figure 2. Some photographic views of work safety equipment and their implementation at the selected Subang State Polytechnic Laboratories

Table 2. Personal protective equipment (PPE)

PPE items	Completeness		Quantity	Typical equipment	Availability (%)	Condition
	yes	no				
1. Wearpack	√		117	Wearpack	100%	Very Worthy
2. Safety Shoes	√		112	Rubber protective shoes	63,3%	Worthy
3. Gloves	√		150	Rubber gloves	84,7%	Very Worthy
4. Ear Plug	√		10	Earmuffs	33,3%	Not feasible
5. Safety Glasses	√		15	Welding glasses and ordinary glasses	50%	Fair enough
6. Respirator	√		24	Mask	80%	Very Worthy
7. Safety helmet	√		18	Protective helmet	60%	Fair enough
Percentage of eligibility for O SH facilities					58,91%	Fair enough/fairly decent

Table 3. Area and completeness of first aid kits

Criteria	Compatibility	
	Yes	No
1. Close to the toilet / bathroom	√	
2. Close to the exit gate	√	
3. Easy to reach from work area	√	
4. Close to vehicle parking		√
5. Has a minimum area that is sufficient to accommodate one patient bed and there is still room for a first aid worker as well as the placement of other first aid facilities		√
6. Clean and bright, good ventilation, has doors and lanes that are wide enough to move victims		√
7. Signed with a clear and easy to see signboard		√
8. Sink with flowing water		√
9. Tissue paper/wipe	√	
10. Stretcher		√
11. Splint/spalk		√
12. First aid kit and contents	√	
13. Beds with pillows and blankets		√
14. A place to store equipment, such as stretchers, and/or wheelchairs	√	
15. Soap and brush	√	
16. Clean clothes for help		√
17. Trash can	√	
18. Waiting chair if needed	√	

Table 4. Standard of fire extinguisher

Criteria	Feasibility		Contition
	feasible	not feasible	
1. The condition of the tube is in good condition	√		
2. The etiquette/table is easy to read clearly and understandably		√	broken
3. Seal in good condition	√		
4. The hose is resistant to high tension	√		
5. Fire extinguishers are in good condition	√		
6. Fill the gas cylinder in accordance with the required pressure	√		
7. Its use has not expired	√		

From the evaluation as presented in Table 2, there are 7 sub-aspects examined in personal protective equipment in electric laboratories, pneumatic and hydraulic laboratories, and refrigeration laboratories. The results of the observation showed that only 3 sub-aspects were in the very feasible category (80%), namely, the types of work clothes, gloves, and masks. This condition is reasonable because wearpack is a mandatory clothing owned by every student before practicing. Meanwhile, the sub-aspects that were categorized as inappropriate (33%) were earplugs. Therefore, the average score on aspects of personal protective equipment is 58, 91% or in the fair enough/ fairly decent category.

Furthermore, from 20 sub-aspects studied in the aspect of the area and completeness of first-aid rooms in electric laboratories, pneumatic and hydraulic laboratories, and refrigeration laboratories (see Table 3), the average score for this aspect is 55% and falls into the fair enough/ fairly decent category.

From Table 4, there are 7 sub-aspects examined in the standard of fire extinguishers in electric laboratories, pneumatic and hydraulic laboratories, and refrigeration laboratories. Observation results show that adherence to the standards of fire extinguishers at the Subang State Polytechnic Laboratory obtained an average score of 87.7 or in the very decent category. The sub-aspects that are not feasible are table tags which are damaged and not too clear to read.

Finally, based on observations made by the research team to students in the machine maintenance department, it was concluded that supervisory management when students practice in the laboratory gets a decent response. This is because during the practice process in the laboratory, all students who practice are supervised and assisted by lecturers and expert technicians. To improve work safety levels, in the future it is necessary to make an Android OSH simulator that is easily accessible [12] or other media that accelerates students to apply OSH [13], [14].

#### 4. Conclusion

Based on the results of the evaluation it can be concluded that the compliance of Subang State Polytechnic in terms of the availability and usefulness of occupational health and safety standards is assessed from the aspect of personal protective equipment in the fairly decent category; aspects of the first aid kits area and completeness fit into the fairly decent category; compliance with fire extinguishers is in the very feasible category; and supervisory management when students practice in the laboratory receive appropriate response categories. In conclusion, OSH facilities at the Subang State Polytechnic Laboratory got a score of 67.20 or included in the feasible category and the application of OSH was in the feasible category.

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## References

- [1] H. Sofyan and A. Efendi, "Implementation of Teacherpreneurship on Teachers at Vocational High School," in *Proceedings of the International Conference on Technology and Vocational Teachers (ICTVT 2017)*, 2017, vol. 102, pp. 229–236.
- [2] D. Nurhadi and N. Lyau, "Cultivating Responsibilities of Vocational Teachers: A Framework for Preparing Education to Work," *Jurnal Pendidikan Teknologi dan Kejuruan*, vol. 24, no. 2, pp. 295–302, 2018.
- [3] [W. Noviansyah and A. Efendi, "Analisis Kesiapan dan Hambatan Partnership Mak-Dudi di Daerah Istimewa Yogyakarta," in \*Seminar Nasional dan Pameran Produk Pendidikan Vokasi ke 1\*, 2016, pp. 124–129.](#)
- [4] N. Hidayat and I. Wahyuni, "Kajian Keselamatan dan Kesehatan Kerja Bengkel di Jurusan Pendidikan Teknik Sipil dan Perencanaan Fakultas Teknik UNY," *Jurnal Pendidikan Teknologi Kejuruan*, vol. 23, no. 1, pp. 51–66, 2016.
- [5] K. Yu, L. Zhou, C. Hu, L. Wang, and W. Jin, "Analysis of Influencing Factors of Occupational Safety and Health in Coal Chemical Enterprises Based on the Analytic Network Process and System Dynamics," *Processes*, vol. 7, no. 1, p. 53, 2019.
- [6] B. M. Zimolong and G. Elke, "Occupational Health and Safety Management," *Handbook of Human Factors and Ergonomics*, pp. 671–707, 2006.
- [7] W. Y. Christina, L. Djakfar, and A. Thoyib, "Pengaruh Budaya Keselamatan dan Kesehatan Kerja (K3) Terhadap Kinerja Proyek Konstruksi," *Rekayasa Sipil*, vol. 6, no. 1, pp. 83–95, 2012.
- [8] Iman Kurniawan Wicaksono, "Manajemen Risiko K3 (Keselamatan dan Kesehatan Kerja)," ITS, 2011.
- [9] R. D. Wirahadikusumah, "Tantangan Masalah Keselamatan dan Kesehatan Kerja pada Proyek Konstruksi di Indonesia," Bandung, 2006.
- [10] P. Hargiyarto, "Analisis kondisi dan pengendalian bahaya di bengkel/laboratorium sekolah menengah kejuruan," pp. 203–210, 2010.
- [11] D. Komarudin, W. S. Kuswana, and R. A. M. Noor, "Kesehatan dan Keselamatan Kerja di SMK," *Journal of Mechanical Engineering Education*, vol. 3, no. 1, pp. 46–51, 2016.
- [12] H. Nasrullah, "Pembuatan dan Pengujian Media Pembelajaran K3 (Keselamatan dan Kesehatan Kerja) Berbasis Android," *Automotive Experiences*, vol. 1, no. 02, pp. 53–57, 2018.
- [13] D. Zhao and J. Lucas, "Virtual reality simulation for construction safety promotion," *International Journal of Injury Control and Safety Promotion*, vol. 22, no. 1, pp. 57–67, 2015.
- [14] A. Cohen and M. J. Colligan, "Assessing Occupational Safety and Health Training," *DHHS (NIOSH) Publication*, no. June, pp. 98–145, 1998.