

## Evaluation of Factors That Influence Workers' Awareness of Using Personal Protective Equipment (PPE) (Case Study of Teuku Umar University Building Construction Segment C)

Zulyaden<sup>1</sup>, Rinaldy<sup>2</sup>, Rita Fazlina<sup>3</sup>, Meidia Refiyanni<sup>4</sup>, Lissa Opirina<sup>5</sup>  
<sup>1,2,3,4,5</sup>Department Civil Engineering, Universitas Teuku Umar, Meulaboh 23617, Indonesia.  
Corresponding Author: Rinaldy

---

**Abstract:** The city of Meulaboh, which is located in Aceh Province, is currently experiencing significant development in the construction sector, including the construction of buildings, roads, irrigation systems, mining and factories. As development progresses on the construction project, various problems arise, one of which is the application of Personal Protective Equipment (PPE). This application must always be considered because it is one of the crucial factors needed for successful project implementation. In practice, there are several factors that hinder workers from using PPE which are often considered trivial by workers, even though the use of PPE is very important and important. impact on Occupational Safety and Health (K3). This research aims to analyze the factors that influence workers' awareness of using PPE and find out the factors that most dominantly influence workers' awareness of using PPE on the UTU Segment C building construction project. The method used in this research is a mixed method, combining qualitative and quantitative approaches. through distributing questionnaires. The problem is limited to the construction of the UTU Segment C building at Teuku Umar University with a sample size of 60 people consisting of craftsmen, workers and foremen. Using a Likert scale and the help of the SPSS (Statistical Product and Service Solution) program, the data was processed to obtain the validity and reliability of each questionnaire item. Factors related to worker behavior that influence the use of PPE include education, age, and tenure. The most dominant factor influencing workers' awareness of the use of PPE in the UTU Segment C building construction project is the education factor with the highest mean value of 3.64, followed by the length of service factor with a mean value of 3.51, and the work experience factor with a mean value of 3.51. age factor with a mean value of 3.45.

**Keywords:** Awareness Level, Workers, Personal Protective Equipment (PPE), Construction, UTU Building

---

Date of Submission: 08-07-2024

Date of acceptance: 23-07-2024

---

### I. INTRODUCTION

Construction projects are unique activities and are only carried out once, usually over a short period of time. This activity involves managing project resources to achieve desired results. Personal Protective Equipment (PPE) is essential to protect workers from potential dangers, ensure their safety and increase productivity. Proper application of PPE will create a safe, healthy and productive work environment, thereby reducing the risk of work accidents..

Occupational Safety and Health (K3) is very important in the construction of the Segment C building at Teuku Umar University (UTU), so it requires focused efforts to minimize work accidents. Regulations mandated by the government, such as Government Regulation no. 08 of 2010, requires all contractors to implement the use of PPE. Compliance with these regulations is mandatory for all workers.

Mangkunegara (2002) emphasized that occupational safety and health aims to ensure the physical and mental well-being of workers and the general public. Companies must provide a safe and healthy workplace to minimize work accidents and illnesses, thereby increasing worker efficiency and productivity.

Notoatmojo (2012) defines Personal Protective Equipment as safety equipment designed to protect workers from potential dangers in the workplace. PPE includes all clothing and accessories intended to create a barrier against workplace hazards. Proper control and management of PPE is very important, especially in the workplace. According to Law Number 1 of 1970 concerning work safety, employers are required to provide PPE that meets the Indonesian National Standards (SNI) or other applicable standards (Permenakertrans RI No. 8 of 2010).

Accidents often start from human error or actions that violate safety protocols. Suma'mur (1996) emphasized that human factors are the main cause of accidents, both directly and indirectly. These errors can be made by factory planners, contractors, machine builders, engineers, chemists, electricians, group leaders,

---

operators, or maintenance personnel. Mangkunegara (2002) groups the causes of accidents into technical, work system, human, environmental and combined factors. Jerry C. Titaley (2017) warns that inappropriate selection and use of PPE can endanger workers, as they may not be adequately protected from workplace hazards. Companies must identify potential hazards and understand the basic function of each type of PPE to ensure proper selection and use. Sustrisno and Kusmawan (2007) emphasize that work safety is very important to create a safe work environment, both materially and non-materially.

## II. EXPERIMENTAL PROCEDURE

### 2.1 Defining research variables

The variables identified in this research focus on the main factors that influence worker awareness and their relationship to the use of Personal Protective Equipment (PPE) in the workplace. Further investigation is needed to identify related factors that may influence workforce compliance with PPE use.

**Table 2.1** Awareness factors and usage relationships APD

| Variable                                    | No | Indicator                                                                                                  | Source                 |
|---------------------------------------------|----|------------------------------------------------------------------------------------------------------------|------------------------|
| Connection education with awareness use PPE | 1  | Lack of knowledge employee about what PPE is no effect to use of PPE                                       | Puji et al (2017)      |
|                                             | 2  | Workers tend to not used to use APD at the time of implementation his job                                  | Puji et al (2017)      |
|                                             | 3  | Education will influence workforce in effort prevent disease and increase maintenance ability health.      | Samsuar (2018)         |
|                                             | 4  | Must use PPE moment work to reduce risk work accident                                                      | Irwanto (2002)         |
|                                             | 5  | Education influences energy work in an effort to prevent it disease and improve ability maintain health    | Puji et al (2017)      |
|                                             | 6  | Things to pay attention to in PPE selection must be as needed                                              | Puji et al (2017)      |
|                                             | 7  | Benefits from use APD One of which is for avoid dangerous factors in work                                  | Sastrohadiwiryo (2016) |
|                                             | 8  | All PPE attributes must be always in use at the time Work.                                                 | Irwanto (2002)         |
|                                             | 9  | Good PPE is which is comfortable protect workers when used.                                                | Sastrohadiwiryo (2016) |
| Connection age with awareness use PPE       | 10 | One of the characteristics of power work which is the age factor which influence behavior obedient use APD | Notoatmojo (2012)      |
|                                             | 11 | Age is special attention Because will affect physical, mental, will to work and responsibility employee.   | Irwanton (2002)        |

|                                                |    |                                                                                                                                  |                        |
|------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Connection working time with awareness use PPE | 12 | More power work work, increasingly experienced which are owned energy work that is concerned.                                    | Sastrohadiwiryo (2016) |
|                                                | 13 | Work experience Lots provide expertise and work skills                                                                           | Sastrohadiwiryo (2016) |
|                                                | 14 | The longer the working time energy work will make energy work get to know the conditions better environment workplace            | Notoatmojo (2012)      |
|                                                | 15 | Employees who have get to know the conditions workplace environment and the danger of the job then energy work will obey use PPE | Notoatmojo (2012)      |

This table outlines various factors and indicators related to worker awareness and use of PPE, showing how education, age, and work experience contribute to compliance with workplace safety protocols.

### 2.2 Scale Criticism

According to Sugiyono (2014), the Likert scale is a tool used to measure attitudes, opinions and perceptions of individuals or groups towards a social phenomenon. The research method used is a questionnaire with a series of questions related to the research topic. In this study the sample was 60 people. Likert scale scores for positive and negative questions need to be quantified by giving a value or score to each variable, because the questions are qualitative in nature. The scores are classified as follows:

**Table 2.2** Likert Scale (Positive Statement Form)

| Category                | Score |
|-------------------------|-------|
| Strongly Disagree (STS) | 5     |
| Disagree (TS)           | 4     |
| Simply Agree (CS)       | 3     |
| Agree (S)               | 2     |
| Strongly Agree (SS)     | 1     |

### 2.3 Validity Test

According to Arikunto (2008:168), validity refers to the extent to which an instrument accurately measures what it wants to measure. In the context of a questionnaire, validity assesses whether the instrument effectively measures the concept it is designed to measure. If the questionnaire successfully measures the variable in question, it is considered valid; otherwise it is considered invalid. Validity testing is carried out to determine whether each statement in the questionnaire is valid or not regarding variables based on data collected from respondents.

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}} \quad 2.1$$

Information :

- Rxy = correlation coefficient between x and y
- N = number of respondents
- $\sum X$  = total item score
- $\sum \text{And}$  = total score obtained by each respondent
- $\sum X^2$  = sum of squares of items
- $\sum \text{And}^2$  = the sum of the squares of the scores obtained by each respondent

To determine whether an instrument item is valid or not, you compare the calculated correlation coefficient (calculated  $r$ ) with the critical value ( $r$  table). If  $r_{count}$  is greater than  $r_{table}$ , then the item is considered valid and suitable for data collection. Conversely, if  $r_{count}$  is smaller than  $r_{table}$  then the item is considered invalid and not suitable for data collection.

#### 2.4 Reliability Test

According to Sugiyono (2008), reliability testing measures the extent to which the results of a measurement remain consistent when the same object is measured many times. The purpose of reliability testing is to assess the consistency and stability of the questionnaire. A reliable measuring tool should give the same results, no matter whether the tool is used repeatedly by the same researcher or by different researchers.

2.2

$$r = \left( \frac{k}{k-1} \right) \left[ 1 - \frac{\sum \sigma_b^2}{\sigma_t^2} \right]$$

Information :

- $r$  = Reliability
- $k$  = Number of questions
- $\sum \sigma_b^2$  = Number of item variances
- $\sigma_t^2$  = Total variance

The reliability of an instrument is determined through calculations, and is considered reliable if the Cronbach's alpha value is 0.6 or higher. This value indicates that the instrument consistently measures the same concept and can reliably produce stable results.

#### 2.5 Descriptive Analysis

Narbuko and Achmadi (2004) define descriptive research as a type of research that aims to explain solutions to current problems based on data. It involves presenting, analyzing, and interpreting data. Descriptive analysis usually provides an average value (mean) and ranks each parameter discussed, often presenting the results in tabular form. Sugiyono (2014) provides a formula for calculating the average value of variables X and Y, which is as follows:

$$Me = \frac{\sum_{i=1}^{i=n} Xi}{n} \tag{2.3}$$

Information :

- Me = Mean value (average)
- $n$  = Number of respondents
- $X_i$  = Frequency of the (i-th) response given by respondents, expressed as a percentage of the total number of respondents for each specific issue

### III. RESULTS AND DISCUSSIONS

#### 3.1. Validity test

**Table 3.1** Recap of Validity Test Results

| Question | Variable |       |              |
|----------|----------|-------|--------------|
|          | Count    | Table | Information  |
| X1       | 0,632    | 0,330 | <i>Legal</i> |
| X2       | 0,737    | 0,330 | <i>Legal</i> |
| X3       | 0,410    | 0,330 | <i>Legal</i> |

|     |       |       |              |
|-----|-------|-------|--------------|
| X4  | 0,414 | 0,330 | <i>Legal</i> |
| X5  | 0,459 | 0,330 | <i>Legal</i> |
| X6  | 0,511 | 0,330 | <i>Legal</i> |
| X7  | 0,559 | 0,330 | <i>Legal</i> |
| X8  | 0,759 | 0,330 | <i>Legal</i> |
| X9  | 0,424 | 0,330 | <i>Legal</i> |
| X10 | 0,346 | 0,330 | <i>Legal</i> |
| X11 | 0,761 | 0,330 | <i>Legal</i> |
| X12 | 0,332 | 0,330 | <i>Legal</i> |
| X13 | 0,632 | 0,330 | <i>Legal</i> |
| X14 | 0,422 | 0,330 | <i>Legal</i> |
| X15 | 0,512 | 0,330 | <i>Legal</i> |

### 3.2. Reliability Test

Table 3.2 Recapitulation of Reliability Test Results

| TIME | Indicator | <i>Alfa Cronbach &gt; 0,6</i> | Information                   |
|------|-----------|-------------------------------|-------------------------------|
| 1    | X1        | 0,827                         | <i>Very possible reliable</i> |
| 2    | X2        | 0,814                         | <i>Very possible reliable</i> |
| 3    | X3        | 0,824                         | <i>Very possible reliable</i> |
| 4    | X4        | 0,832                         | <i>Very possible reliable</i> |
| 5    | X5        | 0,823                         | <i>Very possible reliable</i> |
| 6    | X6        | 0,805                         | <i>Very possible reliable</i> |
| 7    | X7        | 0,823                         | <i>Very possible reliable</i> |
| 8    | X8        | 0,805                         | <i>Very possible reliable</i> |
| 9    | X9        | 0,805                         | <i>Very possible reliable</i> |
| 10   | X10       | 0,831                         | <i>Very possible reliable</i> |
| 11   | X11       | 0,814                         | <i>Very possible reliable</i> |
| 12   | X12       | 0,828                         | <i>Very possible reliable</i> |
| 13   | X13       | 0,816                         | <i>Very possible reliable</i> |
| 14   | X14       | 0,825                         | <i>Very possible reliable</i> |
| 15   | X15       | 0,810                         | <i>Very possible reliable</i> |

### 3.3 Analysis Description

Analysis was carried out on all the data collected. Overall data processing provides results for the UTU Segment C building construction project. Descriptive analysis of the output is compiled and presented as follows in Table 3.3:

Table 3.3 Summary of values Means

| Time | Variable                                                      | Means | Group |
|------|---------------------------------------------------------------|-------|-------|
| 1    | Educational relationship with awareness of the use of PPE     | 3,64  | 1     |
| 2    | Relationship of working time with awareness of the use of PPE | 3,51  | 2     |
| 3    | Age Relationship with awareness of using PPE                  | 3.45  | 3     |

## IV. CONCLUSION

Based on the results of the analysis and discussion, the following conclusions can be drawn regarding the factors that influence workers' awareness of the use of Personal Protective Equipment (PPE) on the Segment C Building construction project at Teuku Umar University (UTU):

1. Educational Factors: The most dominant factor influencing workers' awareness of using PPE is education with the highest mean value of 3.64.
2. Work Experience Factor: Following the work time factor, with a mean value of 3.51.
3. Age factor: Age was also a significant factor, with a mean score of 3.45.

Educational factors were identified as having the greatest influence on PPE awareness among workers, while work experience and age also contributed to varying degrees

## ACKNOWLEDGEMENT

The author would like to express his sincere thanks to all parties who have contributed to the research and completion of this article. Your support and assistance has been invaluable throughout this process. Thank you for your dedication and commitment.

## REFERENCES

- [1]. Arikunto, S. 2008. *Prosedur Penelitian Suatu Pendekatan Praktik*.
- [2]. Jerry C Titaley 2017, *Analisa Pengaruh Penggunaan APD (Alat Pelindung Diri) Terhadap Produktivitas Pekerja Konstruksi Gedung Di Kota Medan*. Fakultas Teknik, Universitas Sumatra Utara.
- [3]. Kementrian Pekerjaan Umum dan Perumahan Rakyat, Peraturan Menteri Tenaga Kerja dan Transmigrasi RI No. 1 Tahun 2010 Tentang tentang keselamatan kerja
- [4]. Kementrian Pekerjaan Umum dan Perumahan Rakyat, Peraturan Menteri Tenaga Kerja dan Transmigrasi RI No. 8 Tahun 2010 Tentang Alat Pelindung Diri
- [5]. Mangkunegara, 2002, P.170. Tentang Indicator Penyebab Keselamatan Kerja Mulyandari, et.al, 2011. *Pemeliharaan bangunan (Basic Skill Facility Management)*, Yogyakarta.
- [6]. Narbuko, C dan Achmadi, A 2004, *Metodelogi Penelitian*, Bumi Aksara, Jakarta.
- [7]. Notoatmodjo . 2012. *Metode Penelitian Kesehatan*. Jakarta : Rineka Cipta
- [8]. Sugiyono, 2008. *Metode Penelitian Bisnis*. Alfabeta : Bandung
- [9]. Sugiyono, 2014. *Metode Penelitian Kuantitatif. Kualitatif dan R&D*. Bandung Alfabeta.
- [10]. Suma'mur, P.K. 1996. *Keselamatan Kerja dan Pencegahan Kecelakaan*
- [11]. Sutrisno dan Kusmawan Ruswandi. (2007). *Prosedur Keamanan, Keselamatan, &. Kesehatan Kerja*. Sukabumi