Analysis of Work Accident Factors in the Shipyard

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Abstract. In the shipbuilding industry, the majority of ship accidents are caused by human error. Other factors are caused by the work environment, company conditions, management policies and others. These data show that human factor has a major impact on accidents. Therefore, a proper prevention is required. The purpose of this research is to determine the relationship between individual characteristics and work accident factors as well as to determine the prevention of work accidents. The method used in this paper is bivariate method. Then, the analysis was conducted using the chi square approach. The result of this research showed that age has a relationship with knowledge of engineering and skill. It has meaning that older workers would most likely understand in engineering better than the younger ones. Work pressure also has a relationship with age. It has meaning that the workers with an age of <35 and >45 have more work pressure than those with an age of 35 - 45. Furthermore, tenure and education do not have a relationship with work accident factors. Thus, some efforts are needed to minimize work accidents, such as providing in-class training to new workers, doing on-job training or field training, providing assistance on every job, exchange of workers from one place to another, sharing sessions on static electricity to young workers, creating a comfortable work atmosphere, provide adequate facilities, provide training on stress management and decision making.

1. Introduction
The development of the industrial world has created a new challenge in doing business. It is inevitable that currently, in Indonesia; companies are being incessantly demanded to be more effective and efficient [1]. This, in turn, will develop and cause the existing industry to be able to compete globally. The biggest challenge for both domestic or foreign industry is for them to be able to make a product effectively and efficiently; starting from something small to something enormous [2]. Small things are usually not receiving many attention from the industry. However, if an industry did not pay attention to the small things; big problems will occur in the future. Therefore, superior and competent human resources are needed by the company [3][4].

In 2016 - 2019, the number of work accidents in PT X shipyard had experienced an increase. In 2016, there were three work accidents. In 2017, there were 12 work accidents. In 2018, there were 21 work accidents. Meanwhile, in 2019, there were 34 work accidents. 2019 is the year with the most work accidents in the last 4 years and the share with the most work accidents, namely subcontractors with 28 people. From the 70 work accidents which have occurred; 74% were minor (meaning the accident caused workers to be sent to the shipyard’s clinic to receive treatment), 24% were moderate accidents (meaning the accident caused workers to be sent to the hospital - but did not need to be hospitalized), while 2% were the accident which caused death[5][6].

Companies have always been developing innovation and creativity in terms of technology, collaboration, etc. However, they must also pay attention to the workers' health and safety. Usually, most workers did not really care to the procedures in the company they which they work for [7][9][10].
The procedures would not receive proper attention since the workers are more concerned with completing their work rather than giving too much attention on work safety. However, work safety is a crucial thing to be concerned with [11][12][13].

In general, occupational safety issues in Indonesia are still often ignored. This can be seen from the large number of work accidents in Indonesia. In the last 3 years, the number of work accidents in Indonesia had shown an increase. In 2016, there were 101,367 cases. In 2017, there were 123,041. Meanwhile, throughout 2018, there were 173,105 cases. A research by the International Labor Organization (ILO) has concluded that an average of 6,000 people die each day (meaning it is one person every 15 seconds or 2.2 million people per year) due to illness or accidents related to their work. According to Heinrich in Hadikusumo, 88% of accidents are caused by unsafe act from humans, while the rest are caused by things which are not related to it (10% due to unsafe conditions and 2% due to the inevitable things/fate) [14][15][16]. This shows that the human factor plays a big role in accidents and therefore it requires serious handling [17][18].

The implementation of work health and safety is very important in addition to controlling the risk of work accidents, where in the event of a work accident it will result in asset/material loss to the company and nationally [19][20][21]. The application of good occupational health and safety regulations caused a company to have a good work health and safety management system; which is the demand of the international community.

2. Methods

2.1 Sampling methods

In the calculation of this final project, sampling is needed to facilitate the survey. By taking samples, one can get a picture of the actual conditions. Precise and accurate data is required in sampling. If the number of samples is still insufficient, the result will not be able to describe the actual conditions; but if the data is too much, it will cost a lot of money and time. Therefore, first it is important to determine how many samples are wanted; so that the research will not cause waste in the process. The method used is the Slovin method, and the formula is;

\[ n = \frac{N}{1 + Ne^2} \]  

(1)

Where

N : Number of samples
N : Number of population
e : Error tolerance

The determination of the tolerance limit is determined by the researcher. The smaller the tolerance limit, the more it will describe the actual condition. The study used a tolerance limit of 10% [3].

2.2 Chi-Square Analysis

Chi-Square analysis is one of the most frequently used non-parametric statistical analysis. This analysis aims to determine the sample data used by determining the relationship between the independent and dependent variable; where the variable in question has a nominal measurement scale [4]. This analysis can be illustrated in the following equation:

\[ X^2 = \frac{(f_o - f_h)}{f_h} \]  

(2)

\[ f_h = \frac{(\text{Number of categories}) (\text{number of groups})}{N} \]  

(3)

Where

X2 = Chi square
Fo = The frequency obtained from fh sample observation
N = The expected frequency in the sample
Meanwhile, to test the null hypothesis (H0), an alternate hypothesis (H1) is also formulated as follows:

(H0): Work accident factors do not affect individual characteristics.

(H1): Work accident factors affect individual characteristics.

Furthermore, it is necessary to calculate the DF (degree of freedom) value, obtained by the following equation:

\[ df = (k-1)(m-1) \]  

(4)

Where:

- \( k \) = number of categories
- \( m \) = number of groups

By using alpha level = 5%, the chi-square table obtained. Then, the analysis of respondent’s perception could be carried out by comparing Chi-square tables with calculated Chi-square; where, if the calculated chi-square < Chi-Square table, then H0 is accepted and H1 is rejected - but if the calculated chi-square > chi-square table, then H0 is rejected and H1 is accepted.

Furthermore, if it is related, it will be measured by the odds ratio (OR) with the aim of interpreting the value of the variables studied. By doing so, it will help researchers to understand a conclusion from the data analysis carried out.

**Tabel 1 Shipyard Questionnaire Result Workplace Factor**

| Numbers | Question                                                                 | Yes (%) | No (%) |
|---------|--------------------------------------------------------------------------|---------|--------|
| 1       | Are the precautions taken sufficient in the workplace against parts falling from a height? | 87.7    | 12.3   |
| 2       | Do you use personal protective equipment (PPE) (helmet, mask, etc.)?      | 100     | 0      |
| 3       | Is the use of protective equipment at work checked regularly?             | 86.2    | 13.8   |
| 4       | Have you taken any courses and training in occupational safety?          | 71.9    | 28.1   |
| 5       | Do you think the training you receive is beneficial?                     | 93.7    | 6.3    |
| 6       | Do you believe that your working area is safe?                          | 73.4    | 26.6   |
| 7       | Do you believe that you have adequate training about the equipment you are using? | 76.9    | 23.1   |
| 8       | Do you get your equipment checked on a regular basis?                    | 81.5    | 18.5   |
| 9       | Are precautions taken to prevent falling from height enough for you?    | 83.1    | 16.9   |
| 10      | Are you afraid that you will be exposed to an accident by falling at heights? | 96.9    | 3.1    |
| 11      | Do you use safety harness while working at heights?                     | 100     | 0      |
| 12      | Does safety harness complicate your job while working at heights?       | 23.1    | 76.9   |
| 13      | Are the precautions taken against electrical contact hazard enough?     | 78.5    | 21.5   |
| 14      | Are you afraid to get exposed to an accident by electrocution?          | 95.4    | 4.6    |
| 15      | Are the electrical cables scattered around in the workplace environment? | 47.7    | 52.3   |
| 16      | Do you pay attention to the low voltage and high voltage difference while using equipment (sockets, lighting, etc)? | 85.9    | 14.1   |
| 17      | Do you have any information about static electricity?                   | 35.4    | 64.6   |
| 18      | Are adequate precautions taken to deal with fire and/or explosion in the workplace? | 90.5    | 9.4    |
| Numbers | Question                                                                 | Yes (%) | No (%) |
|---------|--------------------------------------------------------------------------|---------|--------|
| 19      | Are you afraid to get exposed to an accident by fire and/or explosions?  | 96.9    | 3.1    |
| 20      | Has your workplace implemented a hot work permit?                        | 90.6    | 9.4    |
| 21      | Have gas measurements been made in indoor environments before working?  | 46      | 54     |
| 22      | Do the gas hoses spread around in the workplace environment?             | 39.1    | 60.9   |
| 23      | Have you done enough training and exercise in fire?                     | 62.5    | 37.5   |
| 24      | Do you find training and exercise useful?                                | 98.4    | 1.6    |
| 25      | Do you pay attention to the exits in your workplace environment?        | 95.4    | 4.6    |
| 26      | Do you think there are enough exits in your workplace environment?      | 83.1    | 16.9   |
| 27      | Have gas measurements been made in indoor environments before working? | 46      | 54     |
| 28      | Can you act according to fire safety procedures?                        | 89.1    | 10.9   |
| 29      | Do you get enough training and exercise in fire?                        | 98.4    | 1.6    |
| 30      | Do you have any knowledge about occupational diseases?                   | 54      | 46     |

| Numbers | Question                                                                 | Yes (%) | No (%) |
|---------|--------------------------------------------------------------------------|---------|--------|
| 1       | Are you experiencing intense stress about your work?                     | 23.4    | 76.6   |
| 2       | Have you witnessed any work accident?                                    | 66.2    | 33.8   |
| 3       | Has any work accident that you saw or heard changed your morale?         | 30.8    | 69.2   |
| 4       | Do you feel tired and sleepy at work?                                    | 30.8    | 69.2   |
| 5       | Do you effortlessly adapt to work after the holiday?                     | 78.1    | 21.9   |
| 6       | Are your daily work hours often more than 8?                             | 63.1    | 36.9   |
| 7       | Does lunch affect your work                                               | 32.8    | 67.2   |
| 8       | Do the first working hours in the morning affect your work?              | 26.6    | 73.4   |
| 9       | Does constantly growing intense work pressure affect you?                | 58.5    | 41.5   |
| 10      | Do daily life problems often come to mind while working?                 | 50      | 50     |
| 11      | Do you have enough time to rest during working hours?                    | 81.5    | 18.5   |
| 12      | Do you work as a subcontractor worker?                                   | 21.5    | 78.5   |
| 13      | If yes, do you get adversely affected as a subcontractor worker?         | 44.9    | 55.1   |
| 14      | Does bad weather condition affect your work?                             | 93.8    | 6.2    |

3. Result and Discussion

1.1. Bivariate Analysis

a. Age

Age factor is said to be related when statistically acquired Chi-Square count > 3.84

1) Age with knowledge of static electricity
In Table 3, the chi-square value is obtained = 3.93 and this is greater than the chi-square table 3.84 so it can be concluded that age and knowledge of static electricity are related.
Judging from the odds ratio value between ages <35 and ages 35 - 45, it is 1.94, which means that employees aged 35 - 45 have 1.94 times more knowledge of static electricity than employees aged <35. Then the odd ratio value between the ages of 35 - 45 with ages> 45 is 1.86, which means that employees aged> 45 who know about static electricity are 1.86 times more than employees aged 35-45. Meanwhile, the odds ratio value between age <35 and age> 45 is 3.6, which means that employees aged> 45 who know about static electricity are 3.6 times more than employees aged <35.

2) Age with Gas Measurement in the Work Environment.

In Table 4, the value of chi-square = 0.89 is obtained and this is smaller than the chi-square table of 3.84 so that it can be seen that the age of gas measurements on the indoor work environment is not related.

3) Age with Training on Fire Safety.

In Table 5, the chi-square value is obtained = 0.56 and this is smaller than the chi-square table 3.84 so it can be said that age with fire safety training is not related.

4) Age with health test.

In Table 6, the chi-square value is obtained = 1.42 and this is smaller than the chi-square table 3.84 so it can be said that age with health test is not related.
In Table 6, the chi-square value is obtained = 1.42 and this is smaller than the chi-square table 3.84 so it can be concluded that age with routine health tests is not related.

5) Age with witnessed any work accident.

| Witnessed any work accident | Chi-Square count |
|-----------------------------|------------------|
| Age                        | Yes  | No  | Total |
| <35                        | 16   | 7   | 23    |
| 35-45                      | 15   | 5   | 20    |
| >45                        | 12   | 10  | 22    |
| Total                      | 43   | 22  | 65    |

In Table 7, the chi-square value is obtained = 2.14 and this is smaller than the chi-square table 3.84 so that it can show that age with witnessing work accidents is not related.

6) Age with Work that Exceeds 8 Hours.

| Work that Exceeds 8 Hours | Chi-Square count |
|---------------------------|------------------|
| Age                       | Yes  | No  | Total |
| <35                       | 18   | 6   | 23    |
| 35-45                     | 11   | 9   | 20    |
| >45                       | 12   | 10  | 22    |
| Total                     | 41   | 24  | 65    |

In Table 8, the chi-square value is obtained = 2.99 and this is smaller than the chi-square table 3.84 so that it can be said that age with work that exceeds 8 hours is not related.

7) Age with working pressure.

| Working Pressure | Chi-Square count | Odd Ratio |
|------------------|------------------|-----------|
| Age              | Yes  | No  | Total | |
| <35              | 17   | 6   | 23    | 4.25 |
| 35-45            | 8    | 12  | 20    | 2.17 |
| >45              | 13   | 9   | 22    | 1.96 |
| Total            | 38   | 27  | 65    |

In Table 9, the chi-square value is obtained = 5.07 and this is greater than the chi-square table 3.84 so that it can show that age and pressure are relationships. Judging from the odd value, the ratio between ages <35 and ages 35 - 45 is 4.25, which means that employees aged <35 have work pressure that can affect 4.25 times more than employees aged 35-45. Then the odd ratio value between the ages of 35 - 45 with ages> 45 is 2.17, which means that the age of employees> 45 has work pressure which can affect 2.17 times more than employees aged 35-45. While the odd value ratio between age <35 and age> 45 is 1.96, which means that employees aged <35 have work pressure which can affect 1.96 times more than employees aged> 45.

8) Age with Think of problems while working.
**Table 10** Relationship between Age with Think of problems while working

| Age  | Yes | No | Total |
|------|-----|----|-------|
| <35  | 12  | 11 | 23    |
| 35-45| 10  | 10 | 20    |
| >45  | 11  | 11 | 22    |
| Total| 33  | 32 | 65    |

Chi-Square count = 0.03

In Table 10, the chi-square value is obtained = 0.03 and this is smaller than the chi-square table 3.84 so that it can show that age and think about problems in the workplace are not related.

b. Long time working in this shipyard

Factors old work is said to be related when statistically acquired Chi Square count > 3.84.

1) Long time working in this shipyard with knowledge of static electricity.

**Table 11** Relationship between Long time working in this shipyard with knowledge of static electricity

| Knowledge of static electricity | Chi-Square count |
|---------------------------------|------------------|
| Length of work                  |                  |
| <10                             | 10               | 23   | 33   |
| 10-20                           | 7                | 11   | 18   |
| >20                             | 6                | 8    | 14   |
| Total                           | 23               | 42   | 65   |

Chi-Square count = 0.81

In Table 11, the chi-square value is obtained = 0.81 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work with knowledge of static electricity is not related.

2) Long time working in this shipyard with Gas Measurement in the Work Environment.

**Table 12** Relationship between Long time working in this shipyard with Gas Measurement in the Work Environment

| Gas Measurement in the Work Environment | Chi-Square count |
|-----------------------------------------|------------------|
| Length of work                          |                  |
| <10                                     | 16               | 17   | 33   |
| 10-20                                   | 7                | 11   | 18   |
| >20                                     | 8                | 6    | 14   |
| Total                                   | 31               | 34   | 65   |

Chi-Square count = 1.07

In Table 12, the chi-square value is obtained = 1.07 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work with measurements of gas in the indoor work environment is not related.

3) Long time working in this shipyard with Training on Fire Safety.

**Table 13** Relationship between Long time working in this shipyard with Training on Fire Safety

| Training on Fire Safety | Chi-Square count |
|-------------------------|------------------|
| Length of work          |                  |
| <10                     | 13               | 20   | 33   |
| 10-20                   | 11               | 7    | 18   |
| >20                     | 8                | 6    | 14   |
| Total                   | 32               | 33   | 65   |

Chi-Square count = 2.64
In Table 13, the chi-square value is obtained = 2.64 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work with taking training about safety from fire hazards is not related.

4) Long time working in this shipyard with health test.

**Table 14** Relationship between Long time working in this shipyard with health test

| Health Test | Yes | No | Total | Chi-Square count |
|-------------|-----|----|-------|-----------------|
| Length of work | <10 | 8 | 25 | 33 | 0.42 |
|             | 10-20 | 3 | 10 | 13 | |
|             | >20 | 6 | 13 | 19 | |
|             | Total | 17 | 48 | 65 | |

In Table 14, the chi-square value is obtained = 0.42 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work with the health test is not related.

5) Long time working in this shipyard with Witnessed any work accident.

**Table 15** Relationship between Long time working in this shipyard with Witnessed any work accident

| Witnessed any work accident | Yes | No | Total | Chi-Square count |
|-----------------------------|-----|----|-------|-----------------|
| Length of work | <10 | 22 | 11 | 33 | 2.72 |
|             | 10-20 | 14 | 4 | 18 | |
|             | >20 | 7 | 7 | 14 | |
|             | Total | 43 | 22 | 65 | |

In Table 15, the chi-square value is obtained = 2.72 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work and witnessing a work accident is not related.

6) Long time working in this shipyard with Work that Exceeds 8 Hours.

**Table 16** Relationship between Long time working in this shipyard with Work that Exceeds 8 Hours

| Work that Exceeds 8 Hours | Yes | No | Total | Chi-Square count |
|---------------------------|-----|----|-------|-----------------|
| Length of work | <10 | 22 | 11 | 33 | 0.42 |
|             | 10-20 | 11 | 7 | 18 | |
|             | >20 | 8 | 6 | 14 | |
|             | Total | 41 | 24 | 65 | |

In Table 16, the chi-square value is obtained = 0.42 and this is smaller than the chi-square table 3.84, so it can be concluded that the length of work with a job that exceeds 8 hours is not related.

7) Long time working in this shipyard with working pressure.

**Table 17** Relationship between Long time working in this shipyard with working pressure

| Working Pressure | Yes | No | Total | Chi-Square count |
|------------------|-----|----|-------|-----------------|
| Length of work | <10 | 21 | 12 | 33 | 0.84 |
|             | 10-20 | 10 | 8 | 18 | |
|             | >20 | 7 | 7 | 14 | |
|             | Total | 38 | 27 | 65 | |

In Table 17, the chi-square value is obtained = 0.84 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work with work pressure is not related.

8) Long time working in this shipyard with Think of problems while working.
**Tabel 18** Relationship between Long time working in this shipyard with Think of problems while working

| Length of work | Think of problems while working | Chi-Square count |
|----------------|--------------------------------|------------------|
| 10-20          | Yes: 11, No: 7, Total: 18      | 1.15             |
| 20             | Yes: 7, No: 7, Total: 14        |                  |
| Total          | Yes: 33, No: 32, Total: 65      |                  |

In Table 18, the chi-square value is obtained = 1.15 and this is smaller than the chi-square table 3.84 so it can be concluded that the length of work with the problem of working in mind is not related.

c. Education

Education factor is said to be related when statistically acquired Chi Square count > 9.48

1) Education with knowledge of static electricity

**Tabel 19** Relationship between Education with knowledge of static electricity

| Education                | Yes | No | Total |
|--------------------------|-----|----|-------|
| Primary School           | 0   | 1  | 1     |
| Junior High School       | 1   | 4  | 5     |
| Senior High School       | 18  | 25 | 43    |
| Diploma                  | 1   | 8  | 9     |
| Bachelor                 | 3   | 4  | 7     |

In Table 19, the chi-square value is obtained = 4.34 and this is smaller than the chi-square table 9.48, so it can be concluded that education with knowledge of static electricity is not related.

2) Education with Gas Measurement in the Work Environment.

**Tabel 20** Relationship between Education with Gas Measurement in the Work Environment

| Education                | Yes | No | Total |
|--------------------------|-----|----|-------|
| Primary School           | 0   | 1  | 1     |
| Junior High School       | 2   | 3  | 5     |
| Senior High School       | 20  | 23 | 43    |
| Diploma                  | 4   | 5  | 9     |
| Bachelor                 | 5   | 2  | 7     |

In Table 20, the chi-square value is obtained = 2.67 and this is smaller than the chi-square table 9.48, so it can be concluded that education with measurements of gas in the indoor work environment is not related.

3) Education with Training on Fire Safety.
Table 21 Relationship between Education with Training on Fire Safety

| Education         | Training on Fire Safety | Chi-Square count |
|-------------------|-------------------------|------------------|
|                   | Yes | No | Total |                  |
| Primary School    | 0   | 1  | 1     |                  |
| Junior High School| 5   | 0  | 5     |                  |
| Senior High School| 18  | 25 | 43    | 7.38             |
| Diploma           | 5   | 4  | 9     |                  |
| Bachelor          | 4   | 3  | 7     |                  |

In Table 21, the chi-square value is obtained = 7.38 and this is smaller than the chi-square table 9.48, so it can be concluded that education with taking training about safety from fire hazards is not related.

4) Education with health test.

Table 22 Relationship between Education with health test

| Education         | Health Test | Chi-Square count |
|-------------------|-------------|------------------|
|                   | Yes | No | Total |                  |
| Primary School    | 0   | 1  | 1     |                  |
| Junior High School| 2   | 3  | 5     | 2.92             |
| Senior High School| 11  | 32 | 43    |                  |
| Diploma           | 1   | 8  | 9     |                  |
| Bachelor          | 3   | 4  | 7     |                  |

In Table 22, the chi-square value is obtained = 2.92 and this is smaller than the chi-square table 9.48, so it can be concluded that education with conducting health tests is not related.

5) Education with Witnessed any work accident

Table 23 Relationship between Education with Witnessed any work accident

| Education         | Witnessed any work accident | Chi-Square count |
|-------------------|----------------------------|------------------|
|                   | Yes | No | Total |                  |
| Primary School    | 1   | 0  | 1     |                  |
| Junior High School| 1   | 4  | 5     | 5.60             |
| Senior High School| 30  | 13 | 43    |                  |
| Diploma           | 6   | 3  | 9     |                  |
| Bachelor          | 5   | 2  | 7     |                  |

In Table 23, the chi-square value is obtained = 5.6 and this is smaller than the chi-square table 9.48, so it can be concluded that education and having witnessed a work accident are not related.

6) Education with Work that Exceeds 8 Hours.


### Table 24 Relationship between Education with Work that Exceeds 8 Hours

| Education       | Work that Exceeds 8 Hours | Yes | No | Total |
|-----------------|---------------------------|-----|----|-------|
| Primary School  |                           | 1   | 0  | 1     |
| Junior High School |                       | 2   | 3  | 5     |
| Senior High School |                      | 27  | 16 | 43    |
| Diploma         |                           | 7   | 2  | 9     |
| Bachelor        |                           | 4   | 3  | 7     |

Chi-Square count = 2.67

In Table 24, the chi-square value is obtained = 2.67 and this is smaller than the chi-square table 9.48, so it can be concluded that education with work that exceeds 8 hours is not related.

7) Education with working pressure.

### Table 25 Relationship between Education with working pressure

| Working Pressure | Chi-Square count |
|------------------|------------------|
| Education        |                  |
| Primary School   | 1 0 1            |
| Junior High School | 1 4 5          |
| Senior High School | 23 20 43    |
| Diploma          | 8 1 9            |
| Bachelor         | 5 2 7            |

Chi-Square count = 8.11

In Table 25, the chi-square value is obtained = 8.11 and this is smaller than the chi-square table 9.48, so it can be concluded that education and work pressure are not related.

8) Education with Think of problems while working.

### Table 26 Relationship between Education with Think of problems while working

| Think of problems while working | chi square count |
|--------------------------------|-----------------|
| Education                      |                  |
| Primary School                 | 1 0 1            |
| Junior High School             | 2 3 5            |
| Senior High School             | 19 24 43        |
| Diploma                        | 6 3 9            |
| Bachelor                       | 5 2 7            |

Chi-Square count = 4.05

In Table 26, it is found that the chi-square value = 4.05 and this is smaller than the chi-square table 9.48, so it can be concluded that education with a problem thinking at work is not related.

### 4. Conclusions

The relationship between work accident factors and individual characteristics:

(a) Older workers are more knowledgeable about static electricity than younger workers.
(b) Workers aged <35 & age> 45 have more work pressure than those aged 35 - 45.

The efforts to prevent work accident factors related to individual characteristics:

A. Knowledge about static electricity has a relationship with age, which means that older workers know more about static electricity than younger workers. Efforts to minimize work accidents that can be done include;

1) Provide classroom training for new workers.
2) Doing job training or training in the field.
3) Mentoring or every job there are always seniors and juniors.
4) Exchange of workers from one place to another.
5) There is a sharing session from older workers regarding experiences or knowledge about static electricity to younger workers.

B. Work pressure also has a relationship with age, which means that ages <35 & age> 45 have more work pressure than those aged 35 - 45 years. So that companies can focus more on age <35 and age> 45 in prevention efforts to reduce work pressure. Efforts to reduce work pressure include:
1) Create a comfortable work atmosphere.
2) Provide adequate facilities so that workers are comfortable doing their work.
3) Provide training in stress management.
4) Provide training in decision making.
5) Provide counseling to workers who have problems and help find solutions so that workers can work more productively.

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