

# **CONSTRUCTION WORKERS' WILLINGNESS TO FOLLOW INDEPENDENT SAFETY INSURANCE BASED ON THEIR SAFETY COMPREHENSION**

SUNARJITO

*Research Institute for Human Settlements, Agency for Research and Development,  
Ministry of Public Works, Cileunyi Wetan Kabupaten Bandung, Indonesia*

Construction workers should be protected against the risk of workplace accidents through insurance programs, with premiums paid for by the contractor company they work for. But the fact that there are still many companies that do not provide this protection has led to the idea of independent safety insurance for construction workers. This paper presents the results of a survey of construction workers' willingness to follow independent safety insurance programs, where they have to pay their own insurance premiums, based on their understanding of the principles of safety. Chi-Squared Automatic Interaction Detector (CHAID) analysis of 151 construction workers surveyed in the city of Bandung, Indonesia, showed that the variable "has implemented Health and Safety" to be a good predictor for their decisions associated with the value of the premium and its coverage. A group of construction workers that tends to follow independent safety insurance program is a group of workers that often implements safety principles when performing work tasks. Meanwhile, workers that stated that they did not implement the safety principles have a tendency not to subscribe to this program. This paper concludes that at least some construction workers are willing to subscribe to the independent safety insurance program and pay premiums comparable to the coverage.

*Keywords:* Chi-square, Health and safety, Work accidents, Indonesian Law No. 18.

## **1 INTRODUCTION**

Health and safety (HS) generally is less of a concern in Indonesia. For example, during 2012 there were 103,000 cases of work accidents, and every day there were 9 social-security participants who died from a work accident (PT Jamsostek 2013). In fact, available data record less than half of actual work accidents (Wirahadikusumah & Ferial 2005).

To protect against the risk of work accidents, the company commonly insures their employees. For large-scale enterprises, the cost of insurance is included in the calculation of wages for workers (Rahayu 2003). But in construction companies, usually only regular company staff is covered by insurance. The construction workers who are casual workers are not fully covered by insurance, especially for small projects. Based on Indonesian Law No. 18 of 1999 on Construction Services, those who work as employees of the prime contractor or subcontractor must be included in the social security program. Unfortunately, according to PT Jamsostek, from the total number of workers in the construction sector at 6 million in 2010, only 57% join the program.

Since many construction workers do not have protection against the risk of work accidents, it is worth considering a discourse of independent safety insurance programs with simple schemes, such as gift vouchers. Research questions before considering the discourse can be realized if one realizes how aware construction workers are of work-accident risks, and how willing they are to sign up for independent safety insurance schemes they pay for themselves.

This paper presents the results of a survey of how willing construction workers are to follow self-paid independent safety insurance programs, based on their understanding of the principles of safety. Analysis to determine the relationship between the variables used the Chi-Squared Automatic Interaction Detector (CHAID).

## **2 CHI-SQUARED AUTOMATIC INTERACTION DETECTOR**

The CHAID procedure-based Automatic Interaction Detector uses the chi-square statistic as its main tool (Kunto & Hasana 2006). CHAID selects a single variable, called the dependent variable, which is based on a number of other variables or independent variables. CHAID is an iterative technique that tests one-by-one predictor variables, and classifies them based on the level of influence of Chi-square statistics on the response variable. It is only effective when applied to data derived from repeated instances (Gallagher 2000).

CHAID analysis can be summarized into three key elements (Sharp, Romaniuk, & Cierpicki 1998): Chi-squared tests to identify the most influential explanatory variables, Bonferroni correction, and algorithms for combining the categories of variables. In CHAID, Chi-squared is used in two ways: 1) to determine whether the categories in a predictor variable is uniform and can be combined into one, and which variables are the most significant predictors; and 2) to divide or differentiate the categories in the response variable, when all explanatory variables have been summarized into a form that is significant and may not be recombined (Gallagher 2000). Furthermore, the CHAID method may be used to analyze specific data types and nominal or ordinal (Ronita 2012).

## **3 METHODS**

Data was collected through a questionnaire specially prepared for this study. Respondents were asked about their willingness to participate in independent safety insurance programs. Respondents were also given questions about their knowledge of HS principles, and if they always implemented HS principles in performing work and getting HS insurance. Data were then codified, as shown in Table 1. To maximize the response rate, direct interviews were conducted with respondents at construction projects that become the focus of this research.

The survey was conducted between July and August 2013 directly by researchers involving three surveyors who had been previously trained in techniques and knowledge related to the conducting of the survey. The target respondents of this study were people working on building construction projects both large (such as hospitals, apartments, and hotels) and small (such as residential houses and shops). Construction projects underway in the city of Bandung were chosen as the locus of this study.

Table 1. Categories of variables.

No	Variable		Category
Dependent Variable			
Y	Willingness to follow insurance programs	1 = No 2 = Yes	
Independent Variables			
X1	Do you know HS principles?	1 = Know 2 = Do not know	
X2	Are you implementing HS principles in performing work?	1 = Yes 2 = No	3 = Sometimes
X3	Do you get HS insurance?	1 = Yes 2 = No	3 = Do not know

Data from the questionnaire were then analyzed using SPSS software version 21, which generates a dendrogram analysis, or decision-tree classification of respondents. From the dendrogram can be seen the group of respondents with a particular classification, indicating the factors behind the decision of the respondent's willingness to subscribe to independent safety insurance offered.

## 4 ANALYSIS

### 4.1 Demographics of Respondents

Of the 151 respondents surveyed, a total of 107 respondents (70.9%) stated that they are willing to sign up for the independent safety insurance program. This proportion was quite large, and at least indicates that they have a fairly high awareness of the need for protection against the risk of workplace accidents. This also indicates that 29.1% were not willing to sign up. The survey results are in Table 2.

Table 2 also shows that the majority of respondents (79.5%) stated that they know about the principles of HS. However, only 27.8% stated that they always implement HS principles when doing their job. This suggests that many workers who know the principles have yet to implement them. Also, most of the workers acknowledged that they were getting insurance coverage, but they still want the protection of independent safety insurance.

Table 2. Survey results.

Variable		Follow		Not follow		Total	
		Value	%	Value	%	Value	%
X1	1	86	80.37	34	77.27	120	79.47
	2	21	19.63	10	22.73	31	20.53
X2	1	34	31.78	8	18.18	42	27.81
	2	17	15.89	18	40.91	35	23.18
	3	56	52.34	18	40.91	74	49.01
X3	1	42	39.25	19	43.18	61	40.40
	2	24	22.43	17	38.64	41	27.15
	3	41	38.32	8	18.18	49	32.45

### 4.2 Factors Based on Safety Comprehension

Figure 1 presents a decision tree or dendrogram analysis from the respondent decision to follow the independent safety insurance program. The CHAID results showed that there was only 1 (one) significant independent variable for the dependent variable, namely [implement HS principle]. Thus it can be said that the best predictor for explaining the respondent decision is the [implement HS principle] variable. Meanwhile, 2 (two) other independent variables considered have no relation to the dependent variable.

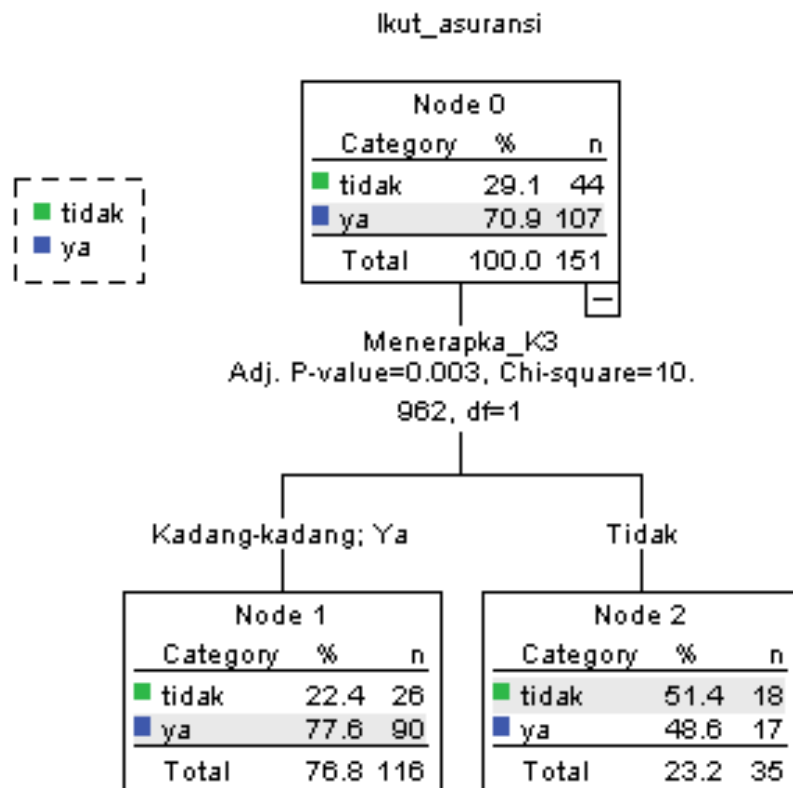


Figure 1. Willingness to follow independent safety insurance program dendrogram.

From Figure 1, it can be seen that the group of construction workers who are willing to sign up for independent safety insurance programs tend to be a group of workers who often or always implement safety principles when performing their work. On the other hand, the group of workers who claimed not to implement safety principles tend to be unwilling.

The *p-value* and Chi-squared value of the independent variable is considered to be related to the dependent variables. If the decision taken is done by the *p-value*, where the value is  $\alpha = 0.003$  (less than  $\alpha = 0.05$ ), it can be concluded that the decision of the chi-squared test is  $H_0$  is rejected. This means that there is a relationship between these variables with the dependent variable.

## 5 CONCLUSIONS

- (1) There is a large group of construction workers (70.9%) who were willing to follow the program of work accident insurance. This at least indicates a high level of awareness of construction workers for protection against the risk of accidents.
- (2) Variable [implemented HS] seems to be a good indicator for how likely respondents would to sign up for the independent safety insurance program.
- (3) The group of construction workers that tends to be willing to sign up for an independent safety insurance program is the group of workers who often or always implement safety principles when working.
- (4) The group of workers who claimed not to implement safety principles tends to be unwilling.

## References

- Gallagher, C. A., Discussion paper: An iterative approach to classification analysis, Casualty Actuarial Society, 2000, retrieved from [www.casact.org/pubs/dpp/dpp90/90dpp237.pdf](http://www.casact.org/pubs/dpp/dpp90/90dpp237.pdf) on September 7, 2013.
- Kunto, Y. S. and Hasana, S. N., Analisis CHAID sebagai Alat Bantu Statistika untuk Segmentasi Pasar, *Jurnal Manajemen Pemasaran*, Universitas Kristen Petra Surabaya, 1(2), 88-97, 2006.
- PT Jamsostek, Setiap hari ada 9 peserta jamsostek tewas kecelakaan kerja, 2013. Retrieved from [www.jamsostek.co.id/content/news.php?id=3957](http://www.jamsostek.co.id/content/news.php?id=3957) on May 20, 2013.
- Rahayu, S. K., Penerapan upah minimum di jabodetabek dan Bandung, 2013. Retrieved from [www.smeru.or.id/report/field/umrjabotabekbdg/umrjabotabekbdg.pdf](http://www.smeru.or.id/report/field/umrjabotabekbdg/umrjabotabekbdg.pdf) on September 3, 2013.
- Ronita, Analisis kepuasan peserta kursus komputer menggunakan metode CHAID berbasis komputer, *Skripsi*, Universitas Bina Nusantara Jakarta, 2012.
- Sharp, A., Romaniuk, J., and Cierpicki, S., The performance of segmentation variables: A comparative study. *ANZMAC 1998 Conference Proceedings*, 1998.
- Wirahadikusumah, R. D. and Ferial, F., Kajian penerapan pedoman keselamatan kerja pada pekerjaan galian konstruksi, *Jurnal Teknik Sipil Institut Teknologi Bandung*, 12(2), 2005.

