A Causal Model of Safety Working Behavior in the Rubber Wood Industry

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Abstract

This survey research aimed to develop causal models of safety working behavior in the Rubber Wood Industry. The sample groups of this research were 440 manufacturing workers from 89 factories. The research instrument were the questionnaires with the rating scale and analyze the data using descriptive statistic include frequency, percentage, mean, standard deviation, variables distribution and Correlation, the relationship between factors and measurement Model, Confirmatory Factor Analysis: CFA and Structural Equation Model using AMOS v.21 program.

The study found that the developed causal models compliance with empirical data at the acceptance criteria of Goodness of Fit Index which index value of $\chi^2/df$ equal to 1.189, CFI equal to 0.996, GFI equal to 0.965, AGFI equal to 0.935, RMSEA equal to 0.022. In addition, the results found that (1) safety climate has direct influence on safety knowledge. (2) safety knowledge has direct influence on safety behavior (3) safety climate has direct influence on safety motivation (4) safety motivation have a direct influence on safety behavior. (5) safety climate has direct influence on safety attitude (6) safety attitudes have a direct influence on safety behavior (7) personality has direct influence on safety behavior (8) personality has direct influence on safety attitudes (9) safety knowledge has direct influence on safety motivation. (10) safety motivation have a direct influence on safety attitudes.

The suggestions from the research are to study safety working behavior of the other samples group or in other industrial areas with the same variables, the government and the organization may use as a guideline for safety protection and resolve the problem of safe working behavior.

Introduction

The promotion and development of national industrial sectors is the driving forces of country’s economy. Health promotion is also the first priority welfare supported by the government. One of the most important qualities of labor quality development is the promotion of safety work. Every year around the world, the labor injured, loss of their life and property from work. Each year, there were more than 317 million labors injuries from work which 160 million labors had work relat-
ed-illness. There were 2.34 million labors around the world loss their life from work. There were 3.21 hundred thousand workers injured from work accident which every 15 seconds there were 151 workers injured from work accident (International Labour Organizatio, 2013). Thailand’s statistics for work accidents or illnesses of the insurers during 2004 – 2013 found that there were slightly decrease of 15.12 percent. There were 3,036 workers with dismemberment which increase in proportion of 26.94 percent. There were 28 workers with total permanent disability which also increased from the previous year of 32.14 percent (Workmen’s Compensation Foundation, 2014).

The accidents occurring in the workplace do not only cause damages on raw material, organization and the government agencies to pay the large amount of compensation but also worker’s family because if the workers totally permanent disability and could not work. There will be the burden for the family to care. (National Institute of Development Administration. (Research Center, 2010; Osuansri,N.,2011)

Thailand’s industry has continued to grow especially the Rubber wood export industry which popular in foreign countries (Pornchaisuree,S.,2012). Southern Thailand is the region with the most rubber wood processing industry (Pluksanusak,S,2012). There are 593 legally registered rubber wood processing plant which 64.50 percent located in the South of Thailand (Department of Industrial works, 2013). In 2013, Agricultural Statistics showed that Southern Andaman provinces have high potential in rubber productions close to the average of the whole country (National Statistical Office Thailand, 2014). The rubber wood industry requires labor forces work together with large and small machinery with mostly 1 in 3 of the work each day (Department of Health,2010) which means the labors are in higher risk during their work. Fritz and Sonmentag (2009) mentioned that in taking initiative safety proactively will increase organization effectiveness.

Rubber wood processing manufacturing workers are related to all production process which the product’s quality depends on them. If the organization can create a safety system in the workplace, the employee will feel more secure and produce quality and effective work to reach the goal. (Manion, 2003). The use of human labor with large machines and sharp equipment may increase the risk of accident from work. Although the Government introduce measures on this matter related to law to prevent the risk that may cause from work but the injury rate tend to increase. Moreover, the study on factors affecting work safety has not been studied in the rubber wood processing industry.

Therefore, the researchers’ study to develop the Causal Models of Safety Working Behavior in the Rubber Wood Industry to be the guidelines for the organization to manage effective work safety, reduce injury and loss in the organization and develop the productive organization with high safety work system for the employees.

Objectives

To develop safety behavior, safety climate, safety knowledge, safety motivation, safety attitude and personality causal Models of safety working behavior in the Rubber Wood Industry.

Hypothesis

Safety behavior, safety climate, safety knowledge, safety motivation, safety attitude and personality are influencing work safety behavior in Rubber wood industry are consistent with empirical data.

Research Methodology

1. Population and Sample
Population used in this research were manufacturing workers in Southern Andaman Rubber wood industry (Ranong, Phang-nga, Phuket, Krabi and Trang) which authorized in 2014. The sample size use to analyze the Causal Models at least 20 samples per 1 variable (Hair, Black, Babin & Anderson, 2010). There were 22 variables used in this research with the sample group of 440 manufacturing workers. The random sampling used were Multi-Stage Sampling.

2. Research instruments
The research instrument used for this research were 5 level rating scale questionnaire which were very high, high, moderate, low and very low and develop the questionnaire by relevant literature reviews. Then, examine the content validity of the questionnaire and analyze Index of congruence (IOC) by 5 professional experts. The Index of congruence were 0.20-1.00. The researchers revised the contents of the questionnaire according to professional expert’s advice and try out for 30 non-sample group manufacturing workers to analyze the reliability of the questionnaire by liker rating scales
which the α Coefficient equal 0.84 indicated excellent reliability (Kline, 2011). Therefore, the questionnaire was qualified to use.

3. Data Collection

The researchers coordination with human resource department to collect the data from manufacturing workers from 89 Rubber wood industries. There were 440 questionnaires with 8 weeks for data collection with 100 percent of questionnaire returned.

4. Data Analysis

Data analysis used for this research were frequencey, percentage, mean and standard deviation. The variables distribution, analyze the relationship between factors, measurement model, Confirmatory Factor Analysis: CFA and Structural Equation Model also used to analyze the data.

Results

1. The samples used in this study were mostly male with age between 30 – 39 hold High Vocational certificate. They were mostly married and live together. Their work experiences are lower 5 years in production supervisor. The sample group were mostly from Trang province.

2. The Confirmatory Factor Analysis (CFA) analysis found that the models are consistent with empirical data that the Goodness-of-fit-index (GFI) were at the acceptance criteria of $\chi^2/df = 1.189, CFI = 0.996, GFI = 0.965, AGFI = 0.935, RMSEA = 0.022$ which the value of the index were at the good fit of the criteria as shown in table 1.

<table>
<thead>
<tr>
<th>Goodness-of-fit-index (GFI)</th>
<th>Criteria</th>
<th>Index value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2/df$</td>
<td>&lt;2.00</td>
<td>1.189</td>
<td>pass</td>
</tr>
<tr>
<td>CFI</td>
<td>$\geq 0.95$</td>
<td>0.996</td>
<td>pass</td>
</tr>
<tr>
<td>GFI</td>
<td>$\geq 0.95$</td>
<td>0.965</td>
<td>pass</td>
</tr>
<tr>
<td>AGFI</td>
<td>$\geq 0.90$</td>
<td>0.935</td>
<td></td>
</tr>
<tr>
<td>RMSEA</td>
<td>$&lt; 0.05$</td>
<td>0.022</td>
<td>pass</td>
</tr>
</tbody>
</table>

3. The researchers analyze the result by using 2 statistic testing which are Kaiser-Mayer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett’s test of sphericity to specify observable variables in identity Matrix (Supamas Ungsuchot, 2554). Therefore, However, if the KMO value is greater than 0.5 and P-Value of Bartlett’s test of sphericity less than 0.05 represent that the data of the variables are related which appropriate to be used in structural equation analysis.

4. The result of Causal relationship test found that safety climate has a direct positive influence on safety knowledge ($\beta = 0.56, p<.01$). Safety climate has a direct positive influence on safety motivation ($\beta = 0.06, p<.01$). Safety climate has no direct influence on safety behavior ($\beta = -0.03, p<.16$) conscientiousness has direct positive influence on safety behavior ($\beta = 0.53, p<.01$) conscientiousness has direct positive influence on safety attitude ($\beta = 0.29, p<.01$) safety knowledge has a direct negative influence on safety behavior ($\beta = -0.21, p<.04$) safety knowledge has a direct positive influence on safety motivation ($\beta = 0.82, p<.01$) safety motivation have no direct influence on safety behavior ($\beta = -0.82, p<.1$) safety motivation has direct positive influence on safety attitude ($\beta = 0.54, p<.01$) safety attitude has direct positive influence on safety behavior. ($\beta = 0.34, p<.01$) shown in picture 1

![Picture 1](Image 279x238 to 503x423)

Picture 1 The Goodness-of-fit-index (GFI) analysis result of Casual Model of work safety behavior in rubber wood processing industry.

Remark: * $P < 0.05$
The relationship between variables is significantly correlated.
The relationship between the variables was not significantly correlated

Discussion

The result found that the conscientious personality have an influence on safety behavior. In addition, the hypothesis testing results found that variables which influence safety behavior were safety climate has positive direct influence on safety knowledge. It is consistent with
Hedlund, Ateg, Andersson & Rosen, 2010 indicated that the safety climate make the workers realize on their work safety such as the manager with clear safety standpoint and educate the workers about work safety. It is also consistent with the study of Hughes 2008 that safety climate have an influence on work safety and their behavior. Therefore, if the manager values on work safety that will promote work safety climate and work safety behavior.

Work safety behavior has a direct influence on safety motivation in Rubber wood industry consistent with the study of Neal & Griffin, 2006 found that work safety climate has a direct influence on safety motivation. In addition, it is also consistent with Hedlund et al., 2010 indicated that work safety climate is a psychological factor that drives positive motivation. The continuous training for the workers will benefit them in long-term which give them self-esteem and lead to work safety motivation. Therefore, work safety climate that properly arranged will bring positive work safety motivation.

Personality has positive direct influence on work safety behavior in Rubber wood industry which consistent with the study of Siu,Phillips & Leung, 2004 found that personality of workers contributes significantly to work safety behavior. Therefore, it is also consistent with Nickell & Hinsz, 2011 found that personality has both direct and indirect influence on work safety behavior as well as work safety attitude. Therefore, the workers with proper personality will determine work safety attitude.

Work safety knowledge has a direct influence on work safety behavior in Rubber wood industry which consistent with the study of Probst & Brubaker, 2001 found that in order to know that work is risky will have a negative influence on work safety behavior. The work safety knowledge has a direct influence on work safety motivation which consistent with the study of Chockalingam & Sornakumar, 2011 found that work safety knowledge has an influence on work safety motivation. The more safety knowledge they have, the more effective work safety motivation.

Work safety motivation has a direct influence on work safety attitude in Rubber wood industry which consistent with the study of Deci & Ryan, 2008 that intrinsic motives and extrinsic motives have an influence on personal mindset. Jeffries, 2011 also explained that intrinsic motives and extrinsic motives supported by the organization such as work safety performance prizes, work pride which will influence woker’s positive safety attitude.

Work safety attitude has a positive direct influence on work safety behavior in Rubber wood industry consistent with the study of Henning, Stufft, Payne, Bergman, Mannan & Karen, 2009 found that work safety attitude have different effect on behavior as well as the study of Phoo-ngernkham,K.(2009) found the relevant result that attitude is the system of thought that reflects their behavior. Personal behavior or performances resulted from their attitude. If they have work safety attitude, they will have work safety behavior.

Therefore, safety behavior, safety climate, safety knowledge, safety motivation, safety attitude and personality have an influence on work safety behaviors of rubber’s wood processing manufacturing worker’s which Fritz and Sonnentag (2009) metioned that in taking initiative safety proactively will increase organization effectiveness.

**Suggestion**

1. Government agencies should set up training plans to educate the safety, consult, follow up and advise them on work safety in the industry to promote work safety behavior.

2. The organization should define the policy and safety goal along with systematic management on work safety plan as well as follow up the result continuously which will help to minimize the accident form work.

3. There should be work safety behavior study of different sample group or in different industry area for the same variable to plan the preventive plan and to resolve safety behavior issues at work.

**Suggestions for the future research**

The researchers have suggestions for the future research as follows:

3.1 There should be additional qualitative studies by using different tools such as group discussion, observation or in-depth interview and action study in order to have in-depth information to benefit in various area that can be apply in designing safety workplace for the workers.

3.2 There should be the study of the affect or the correlation of Intervening variable that might influence on the safety behavior which give more detail in the conceptual framework.
References


