A DEVELOPMENT OF ACCIDENT PREVENTION MODEL IN SMALL RECYCLE PLASTIC FACTORY*

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ABSTRACT

The purposes of this research were to: 1) develop an Accident Prevention Model in a small recycle plastic factory 2) test the Accident Prevention Model., 3) study the satisfaction level of the employees to the Accident Prevention Model and,(4) evaluate the Accident Prevention Model. The purposive sampling used in the experimental group was 40 employees of the ST Interest Groups (2004) Company Limited and 40 employees of the Rungrat Recycle Plastic Company Limited in a control group. Tools used for this research included: 1) Accident Prevention Model created by the researcher and it divided into two parts; namely operating part and training-part, 2) Questionnaire on the employees satisfaction toward the Accident Prevention Mode, and. 3) Evaluation sheet for its fitness of the Accident Prevention Model The data was analyzedby percentage, mean, and standard deviation.

Theresearch results were as follows:

1.The experimental factories,the number of accidents after using the Accident Prevention Model were lower than before using it, the number of accidents was 91.66% decreased. The number of accidents in the experimental factory using the Accident Prevention Model was lower than the controlled one which did not use the Accident Prevention Model. The employees' knowledge on safety in the accident prevention in the experimental groups after training was 69.37% increased.

Keywords: Accident Prevention Model, Safety of worker

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2.The employees were satisfied with the Accident Prevention Model at a high level. Considering each item, it found that the employees were satisfied with the performance of the safety committee's work at the highest level, and with the brightness condition at the next rank. Finally, the satisfaction with the provision of safety personal protective equipment was at the lowest rank.

3.The employees' attitude towards the experimental groups with the Accident Prevention Model was suitable at a high level.Considering each item, it found that the safety policy formulation was suitable at the highest level, the provision of safety personal protective equipment at the next rank, and the investigation and analysis of the cause of accident were at the lowest rank.

INTRODUCTION

Thai industry is continuously expanding, the number of industrial workplaces in Thailand increase rapidly. For this reason, working in an industrial workplace is an interesting form of working life. The more workplaces increase, the more labours are needed. Although the growth of industry helps to generate advancement and distribute jobs to domestic labours, it brings many problematic conditions that have effected on employees, namely the problems in the workplace. The most undesirable problem is unsafety condition because the employees can be injured This problem is necessary to be prevented because, if it happens, it will be very destructive to industrial system. The damages of industrial system caused by injury can be classified into direct overhead cost and indirect expense cost. (Witoon Simachokedee, 1998, p.5)

The rate of the growth of industry in Thailand is quite high, so that the rate of employees all over the country who are injured and ill from working in the conditions that need to leave from work for more than 3 days is very high, i.e. 172, 212 employees: 57,552 in 2004, 58,517 in 2005, and 56,143 in 2006. Resin plastic manufacture industry is one of the industries that the accidents have occurred. In 2005, the number of employees injured by accident was 712: 19 were disabled, 185 stopped working for more than 3 days and 508 employees stopped working for less than 3 days. In 2006, the number of employees injured by accident was 693: 2 were death, 15 were disabled, 199 stopped working for more than 3 days and 477 stopped working for less than 3 days (http://www.sso.go.th, 19/2/2550)

From the survey and study in the small recycle plastic factories, it was found that the accidents occurred easily without employing accident prevention model. It was also found that the small recycle plastic factories did not have responsible person for safety brought about lacking of adequate efficient safety management, the employees were risky to get injury from the accident while they were working. This was matching with the research of Suchada Warasilpa (2000) which indicated that the number of small recycle plastic factory was rising due to cheap recycle

plastic for reduction the cost of manufacturing, so that the accident was possible to increase. For these reasons, the researcher was interested in studying development of the Accident Prevention Model in the small recycle plastic factory to investigate the possible way for preventing the accident.

OBJECTIVES OF THE RESEARCH

1. To develop an Accident Prevention Model in a small recycle plastic factory.

2. To test the Accident Prevention Model in a small recycle plastic factory.

3. To determine the satisfaction of the employees to the Accident Prevention Model in the small recycle plastic factory.

4. To evaluate the Accident Prevention Model in the small recycle plastic factory.

RESEARCH CONCEPTUAL FRAMEWORK

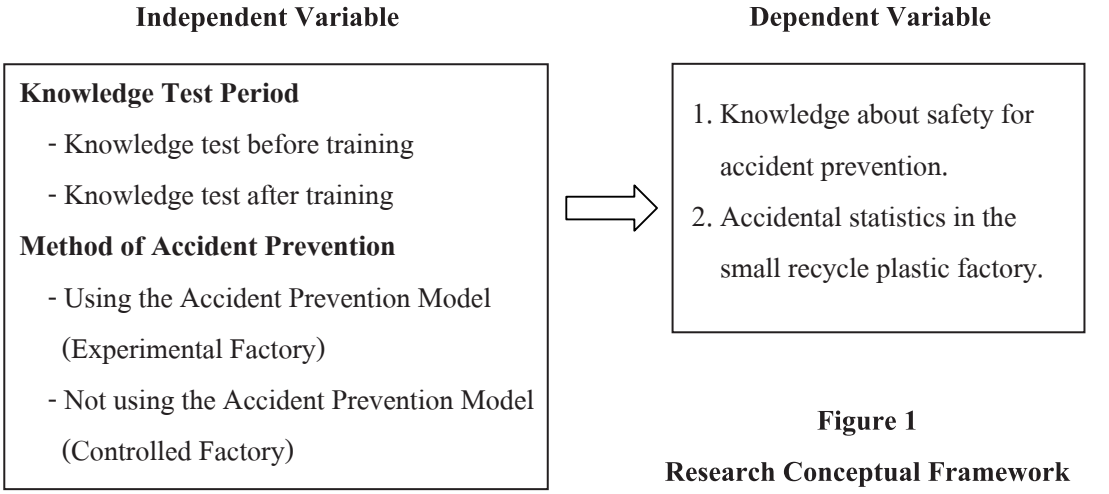

Figure 1
Research Conceptual Framework

HYPOTHESIS OF THE RESEARCH

1. The experimental factory, the number of accidents after using the Accident Prevention Model is lower than before using it.

2. The number of accidents in the experimental factory using the Accident Prevention Model is lower than the controlled one which does not use the Accident Prevention Model.

3. The knowledge about safety in the accident prevention of employees in the experimental groups after training is higher than before training.

METHODOLOGY

The process of research methodology was done as follows:

Stage 1 Developing of the Accident Prevention Model in small recycle plastic factory.

This stage was divided into 2 parts as follows:

1.1 Basic Data Study

1.1.1 Exploring the data from documents, books, research and theses findings related to the accident prevention in industrial;

1.1.2 Exploring data from observing the operation of the associated factory;

1.1.3 Synthesizing those data from the Accident Prevention Model in a small recycle plastic factory.

1.2 Developing the Accident Prevention Model in Small Recycle Plastic Factory

For this research, the Accident Prevention Model in Small Recycle Plastic Factory was separated into two parts practicing and training parts.

Stage 2 Applying the Accident Prevention Model to the experimental group of the small recycle plastic factory.

2.1 Practicing part

The steps of this part were as follows:

2.1.1 Safety policy.

2.1.2 Assignment of role and responsibility.

2.1.3 Safety management.

2.1.4 Preparation for critical situation.

2.1.5 Investigation and analysis of the cause of accident.

2.1.6 Safety personal protective equipment.

2.2 Training part

The researcher used the tool for training to train the safety for accident prevention in factory, which consisted of lecture manual, slide, evaluation sheet of supervisors and employees both before and after training. In addition, the research also trained the practicing part. The trainings were divided into 2 groups. supervisor and employee.

Stage 3 Checking the Accident Prevention Model in small recycle plastic factory. This stage was performed by measuring and evaluating the accident statistics after using the Accident Prevention Model in the experimental factory by following hypothesis of the research.

Stage 4 Evaluate the employees' satisfaction level according to the Accident Prevention Model in the small recycle plastic factory. The researcher created the questionnaire on the satisfaction and the reliability of the questionnaire was .869 Two questionnaires were constructed for measuring the satisfaction level to the Accident Prevention Model as follows:

The first questionnaire was about basic data dealing with personal variables;

The second one consisted of the questions about the employees' satisfaction to the Accident Prevention Model.

Forty employees of the experimental group were participated in this study.

Stage 5 Evaluate the fitness of the Accident Prevention Model in the small recycle plastic factory.

The researcher constructed the questionnaire

for evaluating the Accident Prevention Model in the small recycle plastic factory. The reliability of the questionnaire was .941. The respondents were 20 employees who have 1 year work experience or more than and can read and write in Thai language.

DATA ANALYSIS

The researcher analyzed the data by using the social statistics programmer by means of frequency, percentage, mean , and standard deviation .

SAMPLING

The experimental group consisted of 40 employees of the ST Interest Groups (2004) Company Limited

The controlled group was 40 employees of the Rung rat Recycle Plastic Company Limited.

DATA COLLECTION PERIOD

The data was collected from September 2007 to April 2008 and 40 sets of questionnaires were 100% obtained.

RESEARCH RESULTS

1. Result of the development of the Accident Prevention Model in small recycle plastic factory.

The Accident Prevention Model in small recycle plastic factory developed by the researcher was as follows:

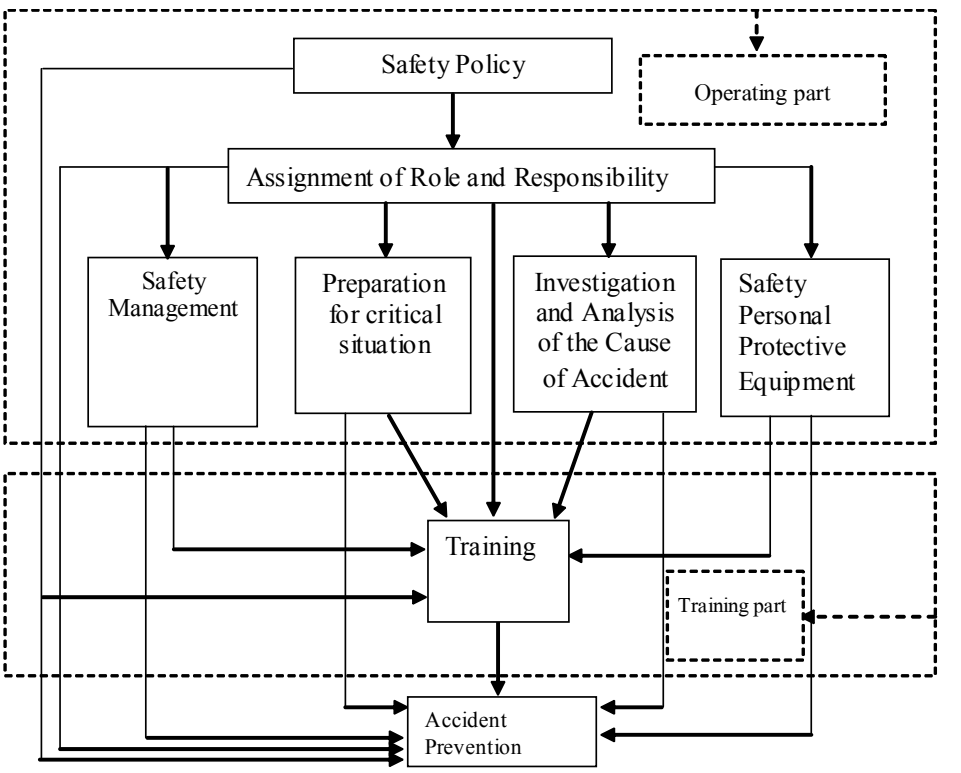

Figure 2

The Accident Prevention Model in small recycle plastic factory developed by the researcher

2. Result of Checking the Accident Prevention Model in small recycle plastic factory.

For the experimental factory, the number of accidents after using the Accident Prevention Model was expected to be lower than before using it. It was found that the number of accident in the experimental factory was lower than before using it. The number of accidents was 91.66% decreased. So it was corresponding to the research hypothesis.

The number of accidents in the experimental factory using the Accident Prevention Model was expected to be lower than the controlled one which doses not use it. It was found that the number of accidents in the experimental factory using the Accident Prevention Model was lower than the controlled one. So it was corresponding to the research hypothesis.

After the training, the employees of the experimental group were expected to have more knowledge about the accident prevention than before. It was found that the knowledge about the accident prevention of the employees of the experimental group was 30.35% increased after the training. So it was corresponding to the hypothesis.

3. Result of the evaluation of the satisfaction level of the employees to the Accident Prevention Model.

As a whole picture, the employees were satisfied with the Accident Prevention Model in the small recycle plastic factory at a high level. Considering each item, it was found that the employees were satisfied with the performance of the safety committee's work at the highest level and with the brightness condition at the next rank and the provision of safety personal protective equipment at the lowest rank.

4. Result of the evaluation of the suitability of the Accident Prevention Model in the small recycle plastic factory.

As a whole picture, the Accident Prevention Model in the small recycle plastic factory was suitable at a high level. Considering each items, it was found that the safety policy formulation was suitable at the highest level, the provision of safety personal protective equipment at the next rank, the investigation and analysis of the cause of accident at the lowest rank.

DISCUSSION

Development of the Accident Prevention Model. This stage was divided into 2 parts practicing and training part.

1. Practicing Part This part was divided into 6 stages.

1.1 Safety Policy The safety policy was successful because of its clearness, comprehensibility and concreteness of its guideline. It can be easily put into practice. The executives monitor the results of the performances through the supervisor. Moreover, the employees understand and were willing to follow the policy. This agrees to Wasin Petchnadee's research (2004), which states that the success of using the safety policy in the factory comes from 3 parts. The

first part is that the top management gave the importance to safety management. There was clear-cut of the safety policy formulation and continuous result monitoring. The second one was that the middle management adapted the policy into the guideline for performance to make the result being in accordance with the policy and objective. The final part was that the employees understand and are willing to follow the policy.

1.2 Assignment of Role and Responsibility. The company assigned responsibilities to the employees in the factory by organizing them in the form of the safety committee. They have different roles and responsibilities such as safety management, preparation for critical situation, investigation and analysis of the cause of accident and provision of safety personal protective equipment. These make the responsibilities in working being clear and improve the accident prevention.

1.3 Safety Management. The factory owners perform the administration and control of unsafe condition in working by walking to check and using the record sheet for recording the critical points or positions too easy to get accident. In addition, there are analyzing, finding and selecting the guideline for protection. The guideline that passes the analysis will be used to reduce unsafe condition. Therefore, working in the factory was safer. This is matching with the concept about the accident prevention in the unsafe condition of Witoon Simachokedee and Weerapong Chaloemjirarat (2004), which suggests that it was necessary to find the cause of accident at site by using any method, seek for and suitable criterion for prevention and solving and following criterion until it was sure that the accident can be prevented.

1.4 Preparation for Critical Situation. The company has various preparations for critical situation, for example, planning for control critical situation, provision of protective equipments for critical situation such as fire extinguisher and mapping the direction for escaping from fire which must be acknowledged to every employee. In case any critical situation happens, these can prevent the employees' confusion and fright and prevent the accident from being more violent.

1.5 Investigation and Analysis of the Cause of Accident.The company makes a document for recording and reporting the accident. This document includes the details of the accident such as name of the injured, date of the accident and place or location of the accident. The description of the accident was described chronologically and there was the report about the characteristics of injury and bodily harm and the cause of accident. Also, the meeting for acquiring the resolution about dealing with the cause of accident was held every time the accident happens to prevent the recurrence of accident. This can help in preventing and reducing the accident. It was corresponding to the concept of Witoon Simachokedee and Weerapong Chaloemjirarat (2004), which indicates that the investigation and analysis of accident can prevent its recurrence. Importantly, both of them point out that there should be a record and

report about the accident, which must cover the details of the accident such as name of the injured, date of the accident and place or location of the accident, the chronological description of the accident and the report aboutthe cause of accident, including the guideline for prevention and solution of accident. In addition, there should be the implementation in accordance with the guideline to prevent the recurrence of the accident.

1.6 Safety Personal Protective Equipment. The executives of the company give the budget for providing safety personal protective equipment for every employee. The provision of safety personal protective equipment was undergone the process of finding the necessity for the employees in different positions in using safety personal protective equipment. Moreover, the preparation of safety personal protective equipment for the employees was very suitable for their duties. There was also the training to persuade the employees to realize the importance of safety personal protective equipment. All of these can prevent the risk of the happening of the accident that can be dangerous to the employees.

2. Training Part. In part of the training of safety in working, the factory arranges the training of the accident prevention for both supervisor and employees to improve knowledge and skill of, including good attitude towards, the accident prevention. Furthermore, in the training, they are instructed about all 6 stages of the practicing part as mentioned above. The researcher considers the training as the key factor factor that encourages all employees to use the knowledge to adjust or change their working behaviours for preventing accident while working in the factory. This was corresponding to the concept of Beebe, Mottet and Roach (2004), which indicates that training was the procedure of skill development using to increase efficiency of working. It also matching with the concept of Choochai Samittikrai (2001, p.19), which suggests that training was the systematic learning procedure helping to construct or increase knowledge, skill and attitude that will enhance efficiency of working.

Checking the Accident Prevention Model in Small Recycle Plastic Factory.

1. The number of accidents in the experimental factory after using the Accident Prevention Model is lower than before using it. The result of the comparison between the number of accidents before and after using the Accident Prevention Model in the experimental factory showed that the number of accidents after using the Accident Prevention Model was lower than before using it. The number of accidents was 91.66% decreased. It is corresponding to the hypothesis and Urit Srinongkhote's study of the reduction of accident in the factory (1997, Abstract), which states that intervening activity has a statistical significant effect on the reduction of accident in the factory.

The reduction of accident in the experimental factory after using the Accident Preven-

tion Model in Small Recycle Plastic Factory created by the researcher demonstrated that its executives and employees have the knowledge and understanding about and give the importance and participation in every stage of the Accident Prevention Model namely the safety policy formulation, assignment of role and responsibility, safety management, preparation for critical situation, investigation and analysis of the cause of accident, provision of safety personal protective equipment and training. Therefore, the number of accidents in the small recycle plastic factory was reduced after using the Accident Prevention Model. In the past, the factory did not have the accident prevention system, so the accident could happen more easily.

2. The number of accidents in the experimental factory using the Accident Prevention Model is lower than the controlled one which does not use the Accident Prevention Model. It was found that the number of accidents in the experimental factory using the Accident Prevention Model in Small Recycle Plastic Factory was lower than the controlled one. This was corresponding to the hypothesis. The number of accidents in the experimental factory which was lower than the controlled one indicated that the executives and employees have the knowledge and understanding about and give the importance and participation in performing in accordance with the Accident Prevention Model in Small Recycle Plastic developed by the researcher. This was corresponding to the concept of Jutharat Naksawat (1993) claims that an accident was not unavoidable. The most important thing to prevent it was the attitude of the involved persons. Both executives and employees must believe that the accident can always be prevented and the accident prevention was not the complicated thing to do. To be successful in reducing the accident statistic, the accident prevention must be performed continuously. Moreover, the accident continually happens in the controlled factory because it does not use any model and procedure for providing safety in working for the employees.

Satisfaction of the Employees to the Accident Prevention Model in the Small Recycle Plastic Factory

It was found that the employees were satis fied with the Accident Prevention Model in the small recycle plastic factory at a high level. The satisfaction of the employees to the Accident Prevention Model in the small recycle plastic factory was at a high level because it was easy to use. Considering each item from the result of the evaluation, it was found that the employees were satisfied with the performance of the safety committee was work at the highest level. The employees regard that the safety committee was very important. This is corresponding to the concept of Anamai Tetkatuek (2007) claims that the safety committee was very importance because they are in charge of investigation an accident in the department, including monitoring safety of the department as well as working conditions.

Evaluation of the Accident Prevention Model in the Small Recycle Plastic Factory.

It was found that the Accident Prevention Model in the small recycle plastic factory as a whole was suitable at a high level. It was because the Accident Prevention Model in the small recycle plastic factory developed by the researcher was easy to be applied to use. Moreover, it was uncomplicated and easy to be understood. Considering each item from the result of the evaluation, the safety policy formulation was suitable at a high level. This was corresponding to the concept of Vijit Boonyahotra (1993) claims that the safety policy of the executives was one of the elements of the accident prevention. It must be clear and can be implemented.

RECOMMENDATIONS

1. Recommendations for the Application of the Research Results.

1.1 To use the Accident Prevention Model in the small recycle plastic factory developed by the researcher, it was necessary to consider about safety management because the context of safety management of each company, such as walking to check and improving the condition of site, are different. The problems that need to be improved are also different. Therefore, there should be an approach about the method for identifying the problems that need to be improved in accordance with the context of each factory;

1.2 To use the Accident Prevention Model in the small recycle plastic factory developed by the researcher, it was necessary to consider about wearing the safety personal protective equipment of the employees. The supervisor should emphasize the employees always wear the safety personal protective equipment whenever they work. Furthermore, there should be a punishment in case any employees disobey the safety rules.

1.3 The company should arrange a meeting between the executives and employees to discuss about the safety personal protective equipment: namely, its suitability of the working condition, correct usage, requisition and distribution method including checking and keeping method.

1.4 To apply the Accident Prevention Model in the small recycle plastic factory to use in other industries, it was necessary to provide training for the new employees.

2. Recommendations for Policy.

2.1 From the research results, it was found that the satisfaction with the provision of safety personal protective equipment was at the lowest rank. Therefore, the executives or owners of the factory should give sufficient budget for providing the safety personal protective equipment. Moreover, there should be the spare of safety personal protective equipment ready for change anytime.

2.2 From the research results, it was found that the satisfaction with the loudness in the working area was at the lowest rank. Therefore, the company should improve the noise environment in the working site suitable for employees to work

without having an annoyance from the loud noise.

2.3 From the evaluation of the Accident Prevention Model in the small recycle plastic factory, it was found that the satisfaction with the investigation and analysis of the cause of accident was at the lowest rank when considering each item. Therefore, the executives or owners of the factory should formulate the training policy the investigation and analysis of the cause of accident. The purpose of the training was to let the employees using such technique to investigate and analyze the cause of accident better and more suitably.

2.4 From the evaluation of the Accident Prevention Model in the small recycle plastic factory, it was found that the satisfaction with suitability of the training of the safety in working was at the lowest rank. Therefore, the executives and owners of the factory should formulate the policy about the safety in working by sending the involved employees to participate in the external training. By participating in the external training, the employees will receive knowledge that can be used in improving the company's training on work safety. In addition, the company should provide the room for training.

3. Recommendations for Further Researches.

3.1 The qualitative research should be done to acquire in-depth data associated with the accident prevention from the employees who had been injured from the accident.

3.2 The Accident Prevention Model in the small recycle plastic factory developed by the researcher should be tested more in the medium and large recycle plastic factories.

3.3 The Accident Prevention Model in the small recycle plastic factory should be tested in the factory of other industries.

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