

Needs Assessment for Accident Prevention in Crude Palm Oil Industry

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Abstract - The objectives of this research are: 1) To assess the need for accident prevention in crude palm oil industry and 2) To prioritize the need for accident prevention in the crude palm oil industry. Data were collected from plant managers and supervisors in crude palm oil plant, of which 70 persons were from 35 plants in Surat Thani and Krabi. Using authentic assessment and expected on the prevention of accidents in all four aspects to collect the data consisted of: 1) management; 2) machinery and equipment; 3) environment and plant layout; and 4) worker behavior. The Index of Item-Objective Congruence (IOC) the result is 0.80 - 1.00 in which indicating the acceptable content validity. The confidence value from Cronbach's Alpha was equal to 0.94 it meant that the assessment was suited and reliable. Statistics used in data analysis were mean, standard deviation and the needs indexes were arranged according to their priority. The research found as the follow:

1) The overall result of authentic assessment to preventing accidents was rated at a high level ($\bar{x} = 3.54$, S.D. = 0.14). Considering each aspect, it was found that only Performance evaluation of workers' behavior were at a moderate level and other aspects was at a high level.

2) The overall result of the assessment of expected on the prevention of accidents was rate at a highest level ($\bar{x} = 4.57$, S.D. =

0.07). Considering each aspect, it was found that that only Performance evaluation of workers' behavior were at a high level and other aspects was at a highest level.

3) Analysis result of the needs indexes were arranged according to their priority. Prioritize the needs of descending order: worker behavior, environment and plant layout, management and machinery and equipment respectively.

Keywords - Needs Assessment Accident Prevention Crude Palm Oil Industry

I. INTRODUCTION

Thailand continues to face risk from the vulnerability or the fluctuations of the global economy that affected the agricultural sector of the country. In addition, domestic problems are the major constraints to the country's agricultural development. Therefore, conceptual framework and development direction of the agricultural development plan during the 12th national economic and social development plan (2017-2021) which focus on continuity with the agricultural development plan. The farmer integration be able to operate in the form of agribusiness that adopted by the philosophy of sufficiency economy of His Majesty King Bhumibol Adulyadej (Ministry of Agriculture and Cooperatives, 2016). Moreover, the resolution of the Cabinet approved the allocation of budget for the fiscal year 2019. The strategy for budget allocation

in the South is to develop the competitiveness of the country in term of area, focusing on improving the efficiency of palm oil production. Including to promote high yielding palm plantations and to invest in establishing a comprehensive palm oil processing industry and biodiesel production centers in Krabi and Surat Thani (Budget bureau, 2017). Based on palm oil crop area data, Surat Thani province is the 1st total crop area around 1,154,380 rai. Second is Krabi province has a total area 1,085,596 rai and third is Chumphon province that has a total area 961,352 rai (Office of Agricultural Economics, 2017).

Due to the expansion of cultivation areas and the demand for palm oil processing for consumption, renewable energy and food. From the study of the statistics of hazards or illnesses due to working in the industry, classified by the standards of the Office of Industrial Standards (TSIC). Palm oil is classified as food production and beverage (0200). The data of occupational injuries or illness due to work being ranked 4th out of 16 enterprises (Office of the Compensation Fund, 2016). Investing in prevention of accidents is cost-effective, which reduces the cost of production in one industry and increases productivity (Simachokdee and Chalermchirarat, 2002).

Based on mention above, the researcher studied various theoretical concepts, including domestic and international research on occupational accidents. The variables that cause industrial accidents are management, machinery and equipment, environment and plant layout, and worker behavior, respectively. Therefore, all four variables are the cause of the accident. For this reason, if there is no analysis or reconsideration of the palm oil industry, there will be a significant loss of plant assets and the lives of the workers. Therefore, the researcher evaluated the need for variable prevention of accident in the crude palm oil industry as a basis for developing the accident prevention training program. It also covers the palm oil research for regional development and responds to the

government's policy. In accordance with the 12th National Economic and Social Development Plan and the draft 20-year national strategic framework (2017-2036), which focuses on the philosophy of sufficiency economy of His Majesty King Bhumibol Adulyadej.

II. RESEARCH OBJECTIVES

- 1) To assess the needs on the accidents prevention the crude palm oil industry.
- 2) To prioritize the need for accident prevention in the crude palm oil industry.

III. RESEARCH FRAMEWORK

The Variables related to the prevention of accidents derived from the synthesis of the literature by Boonbai (2006), Phinpa (2006), Leecheethaun (2006), Jumphon (2007), and Chitkead (2009). Which comprises the following four variables: 1) management; 2) machinery and equipment; 3) environment and plant layout; and 4) worker behavior. The required analysis model was Needs Analysis with Matrix Analysis and Prioritization of Necessary Requirements by PNI_{modified} Needs Index (Wongwanich, 2015).

IV. RESEARCH SCOPE

- 1) The needs assessment variables on the prevention of industrial accidents crude palm oil.

- Resources include plant managers and supervisors in the Palm Oil Factories. There are 70 people from 35 factories in Surat Thani and Krabi Province.
- The study variables were the need for accident prevention in the development of accident prevention training program in the palm oil industry.

V. RESEARCH METHODOLOGY

The instruments used to collect data are to assessment the actual situation and the expectations regarding the prevention of accidents.

VI. DATA COLLECTION

The researcher collected the data by sending the assessment form by mail and followed the assessment form which was not answered by telephone. The questionnaire was returned 100%.

VII. DATA ANALYSIS

The researcher used the data analysis method as follows.

1) Descriptive data analysis uses percentage, mean, and standard deviation with the criteria for interpreting the results mean (Best, 1977).

2) Analysis of the needs assessment with matrix analysis. The decision is divided into four parts as follows (Wongwanich, 2015).

Part 1: means the condition is better than the prescribed criteria.

Part 2: means the condition is defined.

Part 3: means the condition needs to be improved.

Part 4: means the condition is not reached, but not worrisome.

3) Arrange the priority of the required needs by calculating the index for the order of need (Priority needs index: $PNI_{modified}$). The formula is as follows.

$$PNI_{modified} = \frac{(I-D)}{D}$$

when

$PNI_{modified}$ for the need index

I (Importance) for the achieve level of expectation.

D (Degree of Success) for the actual level.

VIII. RESEARCH RESULTS

1) The status of the respondents is shown in Table I.

TABLE I
NUMBER AND PERCENTAGE
OF RESPONDENTS BY POSITION

Position	Number	Percentage
Plant Managers	35	50
Supervisors	35	50
Total	70	100

From Table I, there were 70 respondents who assessed the need for accident prevention in the palm oil industry. Classified by positions, 35 plant managers accounted for 50%, and 35 supervisors accounted for 50%.

2) The actual and expected conditions for the need for accident prevention in the palm oil industry are shown in Table II.

TABLE II
MEAN, STANDARD DEVIATION, AND LEVEL OF ACTUAL AND EXPECTED CONDITIONS
OF ACCIDENT PREVENTION IN CRUDE PALM OIL INDUSTRY

Category	Actual Level (D)			Expexted Level (I)		
	\bar{x}	S.D.	Level	\bar{x}	S.D.	Level
Management	3.83	0.18	high	4.43	0.16	high
Machinery and equipment	3.86	0.26	high	4.44	0.15	high
Environment and plant layout	3.76	0.32	high	4.43	0.14	high
Worker behavior	2.70	0.19	moderate	4.98	0.03	highest
Total	3.54	0.14	high	4.57	0.07	highest

From table II, the overall assessment of the actual situation regarding the prevention of accidents to consist of management, machinery and equipment, environment and plant layout and worker behavior is high ($\bar{x} = 3.54$, S.D. = 0.14). As a result, the behavior of the workers was moderate ($\bar{x} = 2.70$, S.D. = 0.19) and other categories were in high level. For the assessment of the expectations in overall that regarding the prevention of accidents was at the highest level ($\bar{x} = 4.57$, S.D. = 0.07). When classified, the occupational behavior of workers was at the highest level ($\bar{x} = 4.98$, S.D. = 0.03) and other categories were in high level.

3) Critical Need Assessment for Accident Prevention in Crude Palm Oil Industry by the matrix analysis method as shown in Fig. 1. Results showed that management, machinery and equipment and environment and plant layout are were at Part 2 that means a condition that meets the criteria set. The behavior of the workers in the third part indicates that there is a need to improve Fig. 1.

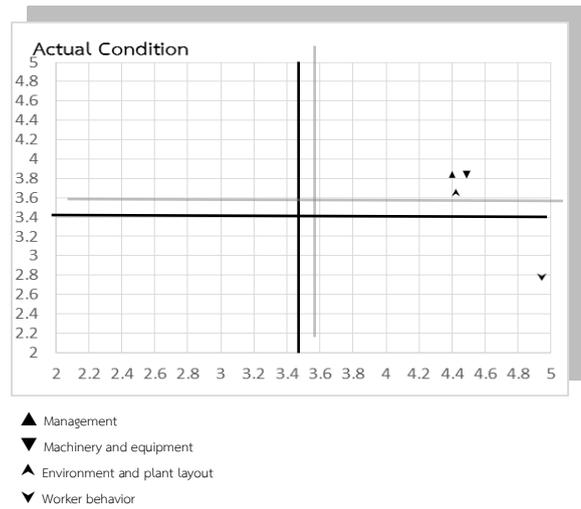


Fig. 1 Matrix Analysis of Need for Accident Prevention in Crude Palm Oil Industry Actual Condition

4) The sorting of need for accident prevention in the crude palm oil industry is illustrated in Table III.

As the results from table III priority need index modification had value between 0.15 - 0.84 that sort by descending order. Firstly, worker behavior (D = 2.70, I = 4.98, $PNI_{modified} = 0.84$). Secondly, environment and plant layout (D = 3.76, I = 4.43, $PNI_{modified} = 0.17$). Third, management (D = 3.83, I = 4.43, $PNI_{modified} = 0.16$) Finally, Machinery and equipment (D = 3.86, I = 4.44, $PNI_{modified} = 0.15$) respectively.

TABLE III
THE RESULTS OF SORTING OF NEED FOR ACCIDENT PREVENTION IN THE PALM OIL INDUSTRY

Category	The average of the actual condition (D)	Average expected condition (I)	$PNI_{modified}$	Rating
Management	3.83	4.43	0.16	3
Machinery and equipment	3.86	4.44	0.15	4
Environment and plant layout	3.76	4.43	0.17	2
Worker behavior	2.70	4.98	0.84	1

Plant layout (D = 3.76, I = 4.43, $PNI_{modified} = 0.17$). Third, management (D = 3.83, I = 4.43, $PNI_{modified} = 0.16$) Finally, Machinery and equipment (D = 3.86, I = 4.44, $PNI_{modified} = 0.15$) respectively.

IX. DISCUSSION OF FINDINGS AND CONCLUSION

1) The assessment results of the actual condition of the accident prevention was at a high level ($\bar{x} = 3.54$, S.D. = 0.14). The results of the evaluation of workers' behavior were moderate but the other were at high level. This

may be due to the fact that the person involved or the person directly responsible for the accident prevention in each factory is aware of each aspect and can be controlled to the standard criteria. Except for the occupational behavior of workers in the third sector there is a need to improve and the need index were adjusted in the 1st order, which corresponded to the research of Champhorn (2006) and Jitkead (2006). Moreover, consistent with Domino Theory (Heinrich, 1959) claim that the most common cause of industrial accidents is human crashes, which are 88% of all accidents. Therefore, executives or those who are directly responsible for accident prevention should rethink the issue as follow. Training on self-assigned tasks. Study guides for each type of work procedure. Use of accident prevention equipment by type of work. Selection of the right tools and appropriate types of work. Dress appropriately and appropriately according to the type of work. Work with alertness and enthusiasm. Exchange of ideas with colleagues about the correct and wrong way of working. Analysis of the correct and wrong way to work. Offer correct and wrong way to work and monitoring and evaluate the correct and wrong approach. Due to such issues in a non-standard criteria.

2) The results of the assessment of the expected condition of the accident prevention were at the highest level ($\bar{x} = 4.57$, S.D. = 0.07). When considering each side, it was found that the results of the workers' behavior assessment were at the highest level, otherwise were at high level. This may be due to an assessment of the expected conditions of each area to provide a guideline to prevent the occurrence of the occurrence is more average than the actual situation. In other words, factory managers and supervisors want to change the approach to prevent accidents for workers better than they are. This is consistent with the concept of Suttirat (2013) and Wongwanich (2015), who said that the needs assessment is a process of assessing the difference between the actual situation and the expected situation by identifying what the desired characteristics and what is actually happening to bring about change in the course

or activity, to create a positive and positive change. Therefore, the executives or persons directly responsible for the prevention of accidents should develop training courses on accident prevention in palm oil industry in terms of worker behavior. The problem of workers' behavior is to improve and develop the actual and expected conditions, not to be different, and to be in excess of the set standards beyond the second part of four part. These data will be used to set up standardized criteria and guidelines for how employees behave in the workplace. Moreover, included is a guide. The improvement and development process is subject to the Deming Cycle, which consists of a systematic Plan Do Check Action.

3) The results of priority need index modification can be sorted into the following categories: worker behavior, environmental and plant layout, management, and machinery and equipment. This is due to the difference in the average of each side, reflecting the actual situation in the order. This is consistent with the concept of Kaufman and English (1981) and Witkin and Altschuld (1995), claim that prioritizing needs is a decision about the plan and the allocation of resources, as well as choosing what is most important to address the problem in the future. Therefore, the executives or persons directly responsible for the prevention of accidents should be preparation of the action plan in line with the actual situation, as well as the effective and efficient use of resources.

X. ACKNOWLEDGMENT

1) Crude palm oil industry should be preparation of an Implementation plan and allocate resources to preparation work on modifying the behavior of workers.

2) Crude palm oil industry should be preparation of occupational accident prevention training course for workers.

3) Crude palm oil industry should be applied Deming Cycles in to the process of setting benchmarks and guidelines on how to behave about workers' behaviors.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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