# DEVELOPMENT OF A PROFESSIONAL QUALIFICATION FOR CONSTRUCTION SURVEYORS IN THAILAND

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ABSTRACT: An occupational standard for construction surveyors and the desired skills of surveyors in Thailand's construction industry were articulated. The research was conducted by studying data from previous research worldwide. The results were used as a guideline to summarize the conceptual framework of the methodology by arranging a seminar attended by 15 experts with experience in construction surveying and by performing functional analysis involving the key purpose, role, and function; unit of competency; and elements of competency. Subsequently, the results were evaluated, and the standard certification was verified by experts by analyzing the congruence index. The experts agreed in full and certified the research results evaluation on the professional development process of construction surveyors. The process of assessing and certifying the standard of surveyors in Thailand consists of 39 units of competency and 110 elements of competency. Based on the research, the most important competence of regular use in the survey with 8 elements of competency was selected as the model to evaluate, involving 15 participants from Unique Engineering & Construction PCL. The experiment was conducted on the operational unit in the project areas. To evaluate the professional qualification level along with knowledge and skill assessment criteria, an instrument was developed. Using the developed instruments for assessment of knowledge and skills, scores of 100% and at least 80% on two sets of assessment criteria were regarded as passing. This revealed that all selected people who were assessed met the criteria of professional qualification in the construction surveyors.

*Keywords: construction surveyors, professional qualification, skills recognition, competency* 

# **1. INTRODUCTION**

Thailand's direction and development plan, in accordance with the government's policies, namely, the Twelfth National Economic and Social Development Plan and the country's 20-Year Strategic Plan (from 2017 to 2037), has determined the country's direction and reconfiguration of social status in terms of the country's productivity. Improved productivity of the country's labor still requires skilled and experienced laborers in terms of their quality and quantity, and this requirement is still rapidly increasing as the country enters the 4.0 industrial era. However, Thailand is unable to attract foreign laborers to other countries that offer higher compensation [1].

The construction industry is one of the country's most important economic sectors. An important factor for the development of the construction industry is the workforce or labor in terms of both quality and quantity. Many educational institutions that used to produce skilled craftspersons bearing the vocational certificate and high vocational certificate have gradually closed those courses and are now focusing on granting bachelor's degrees instead. Consequently, most students who graduated from those educational institutions are now unable to work in their direct field of work and cannot respond to enterprises' demands. Ultimately, it has become the enterprises' burden to develop such craftspersons, with enterprises spending both time and money to provide on-job training to their newly recruited employees.

Moreover, regardless of how skillful they are or how much improvement they have made, most laborers are not well accepted currently. Therefore, career development is more challenging, and laborers of any level of skill and expertise typically cease improving their craftsmanship and pursue courses in the school system instead to earn a qualification certificate, which has become the only acceptable criterion for promotion and increased salary. As a result, these laborers lose both money and the opportunity to work, ultimately and more importantly leading to a severe shortage of skilled labor in the future.

Based on the condition and significance of the aforementioned problem, the importance of improving labor competency was considered by focusing on standardized efficiency as a means to improve Thailand's competitive capability. Doing so also conforms to the government's policies and the direction of the country's development, which is expected to lead ultimately to a labor development scheme that conforms to vocational education and training reform. Australia, the United Kingdom and France have implemented vocational qualification systems to improve those countries' labor workforce to the same standard. Therefore, implementing vocational qualification for Thailand's labor is a potential solution to the abovementioned problems. This approach conforms to the proposal of Chana [2], who proposed a strategy for developing vocational qualification in Thailand, i.e., Thailand's vocational qualification is an entirely new approach for vocational learning and training; it is essentially an orientation of the continuous development of both oneself and one's career. Therefore, in accordance with the relevant literature, the research on the development process was pursued the vocational qualification of construction surveyors in Thailand.

### 2. OBJECTIVES

2.1 Develop an occupational standard for construction surveyors.

2.2 Develop the desired skills of surveyors to benefit the construction industry of Thailand.

## 3. MATERIALS AND METHODS

#### 3.1 Population and samples of the research

A group of professionally qualified persons was gathered for the public hearing and evaluation of the professional standard for professional construction surveyors. The members of the group were representatives of various enterprises; those fifteen members were knowledgeable, competent and experienced construction surveyors, each with a working experience of no less than ten years.

A group of experts was assembled, who would be responsible for assessing the quality of the construction surveyor's competency, the developed testing form. These experts would verify the consistency and precision of the evaluation form; these were seven knowledgeable, highly competent and skillful experts on construction surveying, each with a working experience of no less than fifteen years.

The participants of this research comprised fifteen construction surveyors identified through purposive sampling from Unique Engineering and Construction Public Company Limited construction surveyors who worked in the construction project of Ratchapruek Road Extension, pertaining to NS1, NS2, NS3 and CD Agreement.

#### 3.2 Research methodology

The study comprised four stages:

#### 3.2.1 Designing the guideline and framework

The data and the relevant literature and studies on the subject, including online data from both domestic and foreign sources, on the subject of the format and method, was studied for determining professional standards for construction surveyors. This stage included interviewing and questioning entrepreneurs and experts whose works concerned the professional standard of construction surveyors and studying the problems and demands of current enterprises. The results were then used for specifying the guidelines and the conceptual framework of this research.

#### 3.2.2 Performing a focus groups

Arranging a workshop in which fifteen professional experts and academics met to perform functional analysis [2] and to specify the method and process to determine the qualifications of construction surveyors in Thailand. In this stage, the study was divided into the five steps as follows:

Step 1 is to study the workgroup seminar of a focus group to gather data for further research, as shown in Fig. 1 and study occupational standard development in Fig. 2

Step 2 is to specify the qualifications of the potential professionally qualified person who will be invited to our workgroup seminar. In this aspect, in collaboration with the advisory team, fifteen representatives of various enterprises being highly competent and experienced in construction surveying were invited and appointed as the group of professionally qualified persons in this study.

Step 3 is to collect the data from the workgroup seminar and subsequently used to analyze the consistency of competency of each level and then interpreted the given outcome from our group of professionally qualified persons' answers based on the following index of congruence (IOC) criteria [3]:

(1) IOC value between +0.50 and 1.00: our professionally qualified persons agreed with that item;

(2) IOC value between -0.50 and +0.49: our professionally qualified persons were not certain about that item; and

(3) IOC value between -1.00 and -0.49: our professionally qualified persons were not in agreement with that item.

Step 4 is to improve and adjust various aspects of our professional standard of construction surveyors in accordance with the evaluations and suggestions of our group of professionally qualified persons. Then, with the advisory teamwork, the manuscript of the professional standard of construction surveyor was determined to improve its validity of our professional standard. Step 5 is to specify the level of competency and the factors for analyzing the level of competency, namely, the level of competency that was the outcome of the focus group seminar with our professionally qualified persons and the level of competency for actual operation, which ranged from the most primary level to an advanced level. The latter was also determined from our workgroup seminar with professionally qualified persons in the area of construction surveying. For this criterion, a table with multiple fields was designed and created for recording the competency and for specifying the competency level set by our experts.







Fig. 2 Thailand Occupational Standard Development

## 3.2.3 Creation of the tools and determination of the methodology for assessing the qualification of construction surveyors in Thailand

The functional level of the competency unit and the sub-competency unit that are necessary and required was analyzed for measuring the operational competency of construction surveyors in Thailand from our fifteen professionally qualified persons. A value assessment questionnaire with a five-level rating scale was used [4]; the resulting competency unit was then used as a prototype of the assessment.

To assess the professional qualifications of construction surveyors in Thailand, the tools were designed and created. Subsequently, their quality was confirmed by testing their consistency with seven experts on content. The data on every aspect of the guideline was collected for assessing qualifications and analyzed the statistics (by finding the mean and then using the resulting suggestion to improve every aspect of the guideline) to improve the overall quality of the guideline for assessing the professional qualifications of construction surveyors in Thailand for further research.

# 3.2.4 Testing our guideline for assessing professional qualification

Fifteen participants were selected via purposive sampling from surveyors of the Unique Engineering and Construction Public Company Limited. Furthermore, with a working experience of over ten years, fifteen assessors consisting of the teachers of educational institutions providing courses in surveying engineering and surveyor engineers from various construction enterprises were selected in this step. For assessing professional qualification, a questionnaire was used to determine the suitability of the samples, an assessment form for the person's skill and a questionnaire of consistency of the assessment form for the person's knowledge and skill [5].

To consider the operation's outcome and the level of professional qualification, two sets of testing criteria were used. The first set requires operational competency of one hundred percent, while the second set requires operational competency of not less than seventy percent. Only by passing these criteria will the assessed person be deemed to possess the required professional qualifications for construction surveyors in Thailand, in accordance with the given criteria.

The assessed person who has failed the second part of the assessment, namely, the person whose overall competency score was less than seventy percent, will be informed about the content of the guideline for assessment. As a result, they will have the opportunity to improve their professional competency and then re-apply for the assessment of their professional qualification for construction surveyor in Thailand, in accordance with the given standard.

The consistency of the assessment form for the person's knowledge and skill and the questions from our experts was carefully determined, and subsequently, applied to our samples. The statistical methods were used to determine the validity of the assessment form for the person's knowledge and skills, to discuss our research results, and to conclude this research.

# 4. RESULTS

Professional standard for a construction surveyor in Thailand: The results were collected from the function analysis of the key function, the elements of competency analysis and the professional qualification analysis; the results are given in Fig. 3. Development progress for the vocational qualification of Thailand construction surveyors has been shown as follows:

# **4.1** The competency and level of vocational qualification of a construction surveyor in Thailand

Analysis of the results of determining the competency and level of vocational qualification of a construction surveyor in Thailand, resulting from a public seminar involving fifteen professionally qualified persons. The findings revealed that the experts' opinion regarding the competency and level of vocational qualification of construction surveyors in Thailand showed concordant indexing values on every item. Moreover, our research results revealed seven levels of vocational qualification. Those levels of vocational qualification ranged from primary qualification to special expertise; our experts also concurred that such levels of vocation qualification should be rated in accordance with the national framework of vocational qualification.

# **4.2** The development of a vocational qualification for construction surveyors in Thailand

The results regarding the requirement and necessity for progress in the development of a vocational qualification for construction surveyors in Thailand based on the public seminar with fifteen professionally qualified persons revealed that level 3 of the vocational qualification is the most needed and that all the required vocational qualification levels are sorted by the level of competency.



Fig. 3 Key propose, key roles and key function

The respondents were requested to evaluate eight skills for an effective surveyor on a fourpoint scale for:

- (1) not important;
- (2) somewhat important;
- (3) important; and
- (4) very important.

The mean item score for each skill is calculated to obtain the relative importance index as follows Eq. (1):

Relative 
$$4 n_4 + 3 n_3 + 2 n_2 + 1 \quad (1)$$
  
Importance 
$$= \frac{n_1}{4 N}$$

where

 $n_1$  = number of respondents for not important;  $n_2$  = number of respondents for somewhat important;  $n_3$  = number of respondents for important; and  $n_4$  = number of respondents for very important.

# **4.3** The consistency of the competency assessment form for construction surveyors and the behavioral objectives

The analysis results of the consistency of the competency assessment form for construction surveyors and the behavioral objectives revealed that our experts are in one hundred percent concurrence. In addition, the analysis results of our experts' opinion and the assessment form and the operation performance assessment form, including the result of grading the assessment result's score, indicated that our experts are in 100 percent concurrence.

Our professionally qualified persons concluded that those eight levels of competency are urgently needed, as there is demand for labor trained by the vocational qualification system with the required competency as rated above, to recruit a workforce for the vocational qualification system [6].

# **4.4 Level 3 of the vocational qualification for construction surveyors**

As shown in Table 1, the assessment result of Level 3 of the vocational qualification for construction surveyors was as follows:

#### 4.4.1 Competency assessment

The competency assessment contained two sets of assessment criteria. The first set determines the assessment criteria for two dimensions, namely, fifty percent for knowledge dimension and another fifty percent for skill dimension. To pass the assessment, the candidate must score one hundred for both dimensions. The second set determines the assessment criteria for two dimensions, namely, twenty percent for the knowledge dimension and eighty percent for the skill dimension. To pass the assessment, the candidate must score at least seventy-five percent for each dimension and have a total score for both dimensions of not less than eighty percent.

#### 4.4.2 Population samples

The candidates for the assessment were recruited from Unique Engineering and Construction Public Company Limited; these candidates had to first pass a preliminary interview to determine whether they had the appropriate competency to be assessed in this level, with a total of five candidates recruited. The assessment result revealed that every evaluator had rated the candidates to implicitly pass the assessment, where the candidates on average scored one hundred percent from the first assessment form and around ninety percent from the second assessment form. Therefore, it can be concluded that the tools used for this assessment are reliable and accurate; from those fifteen evaluators, the assessment result of the same group yielded similar scores.

Table 1 Results of analyzing the necessity of the professional qualification of surveyor level 3 (the results are obtained from an assembly of 15 experts)

Type of	Frequency of				Mean	Rank	
competency		response			score		
	4	3	2	1	0		
1. Checking	1	2				0.9667	1
angular errors	3						
in the survey							
work network							
2. Surveying	1	3				0.9500	2
and orienting	2						
horizontally							
with the total							
station to meet							
the							
benchmark							
3. Surveying	1	4				0.9333	3
and orienting	1						
vertically with							
an automatic							
camera to							
meet the							
benchmark							
4. Processing	1	3	1			0.9167	4
transverse	1						
data to meet							
the							
benchmark of							
the survey							
work							
5. Reading	1	4	1			0.9000	5
the plan of the	0						
construction							
work correctly							
6. Reading	9	5	1			0.8833	6
the sectional							
plan of the							
construction							
work correctly							
7. Reviewing	9	4	2			0.8667	7
the project							
objectives and							
acts relevant							
to the							
construction							
8. Defining	7	4	3	1		0.7833	8
the survey							
instruments to							
support works							
according to							
the plan							
-							

According to results of questionnaires of samples comparing the mean  $(\bar{x})$  and standard deviation (S.D.) of pre-test and post-test scores, Sig. was .00, which is below .05, indicating that the mean of the post-test score was higher than that of the pre-test score with statistical significance, as shown in Table 2.

Table 2Results of the experimental assessmentwith the module of professional competency ofconstruction surveyors in Thailand

Score	Mean	S.D.	t	Sig.
Pre-test	55.53	6.728	15.000	.000
Post-	85.53	3.833		
test				

Note: \*P<.05

#### 5. DISCUSSION

The development process for vocational qualification of construction surveyors in Thailand is based on the functional analysis; determination of the level of the vocational qualification, which is based on our research: and the public seminar with professional experts and scholars, in which they agreed on every dimension of the process. Such a development process conforms to the analysis format for determining the standard of labor workmanship of the Department of Skill Development, the format for determining the labor standard of the Asian and Pacific Skill Development Programme (APSDEP), and the function analysis formats of the United Kingdom and Australia.

For the development of construction surveyors in Thailand, using the technique of functional analysis of a professional standard certified by experts who are the representatives from establishments, the professional standard of a construction surveyor in Thailand obtained from the research was found to be suitable for implementation. This developed professional standard will be the basis of definition and assessment for construction surveyors in Thailand to acquire professional qualifications in the future. Currently, the professional qualification of construction surveyors has not met the generally accepted standard because no sector has ever executed an agreement regarding the standard framework. Accordingly, the data was gathered from various domestic and international sources. One of the critical factors making the provision of professional standards for construction surveyors in Thailand successful is that experts and specialists from an industry that had much experience in practice jointly defined the relevant terms and participated in a public hearing. This process follows the approach of Chris Lioy and Amanda Cook [6], viz., implementing a standard of

competence in the development process of a professional standard requires representatives from the relevant field of occupation or industry to mutually develop the standard for updated practices to ensure that the standard is reliable because it addresses the actual requirements of that industry or occupation owners.

Regarding determining the assessment method. our research result revealed that important components of the assessment are 'the assessment tools must be of high efficiency', 'the evaluator must possess expertise of specific branch and must be knowledgeable of the assessment method' and 'there must be a sufficient interviewing process that also provides recommendations to the assessed person' to implement an appropriate assessment method according to the assessed person's demands [7]. This approach also conformed to the analysis format for determining the standard of labor workmanship of the Department of Skill Development. These tools were tested for assessing persons of higher or lower level of competency to validate the tools' efficiency for determining the assessed person's competency with precision for each level of competency. Moreover, other factors that should be taken into account in the assessment are 'competency that a person has gained from training' and 'experience from work and living'.

## 6. CONCLUSION

For progress in the development of a vocational qualification for construction surveyors in Thailand, a person or group of persons who perform competency analysis using the function analysis technique must be knowledgeable and experienced in this field of work. They must also have been extensively trained on the functional analysis technique to ensure their analysis result conforms to the goal to ensure the success of the operation.

For the competency assessment, it was found that applicants with various levels of competency should be recruited into the assessment process to verify the assessment tool's efficiency and determine whether this tool is truly capable of assessing the level of competency of the applicants. Moreover, the evaluators should have consistent assessment results.

The use of the vocational qualification of a construction surveyor in Thailand as the assessment criterion for recruiting labor into the vocational qualification system is expected to enhance motivation among laborers in this field of work and motivate them to attend vocational qualification assessment sessions. Doing so would allow these laborers to recognize their own level of competency, which will lead to continuous self-development and greater, sustainable profits over the long term toward the improvement of skilled workmanship in Thailand.

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