

ICASH-A039

ASSESSMENT OF RESIDENCE SANITATION CONDITION AND LIFE QUALITY OF CONSTRUCTION WORKERS, CHONBURI PROVINCE, THAILAND

Danai Bawornkiattikul^{1*}, Nantaporn Phatrabuddha²

¹Department of Environmental Health, Faculty of Public Health, Burapha University, Thailand

²Department of Industry Hygiene and Safety, Faculty of Public Health, Burapha University, Thailand

*Corresponding author's e-mail: danai@go.buu.ac.th

ABSTRACT

Background: Thailand economic has grown for last decade in all enterprise. Especially, construction is one industry composed by various important factors such as technology finance worker and etc. Workers in construction industry are the human resources that need welfare to promote life quality of workers. One of important welfare is the residence during constructing. Camps or residence need good sanitary management for supporting for supporting life quality of worker. Aim of this study was to assess sanitation condition of residence and life quality of construction workers.

Methodology: To survey residence sanitation, Questionnaire for life quality in 3 aspects, for samples of workers in 3 camps A B C of 3 construction sites, Analyze and compare data by as percentage and criteria that provided as 4 level of sanitation condition and life quality.

Results: Camp A sanitation was 78.70% indicating the residence sanitation was in good level meanwhile 3 aspects of life quality were during 67.45 - 70.53 % defining that samples lived and worked full effective. Camp B was 62.50 % indicating fair level of sanitation meanwhile life quality were during 63.83 - 66.89 %. Camp C was 66.00 % indicating same camp B, meanwhile life quality ranged during 63.83 - 66.89 % that same Camp A and B.

Conclusion Good sanitation management of residence influence good life quality of worker. This study could be used as tool and evidence to evaluate not only sanitation condition and life quality, these also could be used to test the consistent of both.

Keywords Construction workers residence; Construction workers life quality; Outside job welfare

INTRODUCTION

Thailand's economy has expanded considerably in recent decades. One growing economy business rapidly is construction industry such as infrastructure and buildings. Besides, materials equipment and technology skilled and unskilled labor are an important factor making the construction success. It is know that working in construction site is very dangerous and risk for accident that damage health of construction labors. So, there are so many measurement to protect construction labors from dangerous and risk such as laws and regulations about occupational health and safety in the workplace in recent decades [1, 2, 3]. However, living of construction workers is not concerned only safety on work place. There are also welfare defined by law or social effort designed to promote the basic physical and material well-being of people in need' [4] is at least as important for a worker's life quality. Providing outside welfare refers to the provision of appropriate housing, adequate public facilities (including leisure and recreation), good sleeping conditions, comfortable home, safety from accidents and disease.

The residence of most construction workers can be classified as ‘temporary buildings’ under the Ministerial Regulation No. 9 issued under the Building Control Act 1979, clause 4, which states that are not more than two floors high from ground level to the roof or are a section of the building that is not more than nine meters high and scheduled for demolition when the permanent building is completed. [5] However, there are still not standard or academic process of outside welfare status assessment in overview and life quality of worker assessment for bringing to measure outside welfare of construction workers that this paper would like to study to assess the outside welfare status and life quality of construction workers camps in Chonburi province.

MATERIAL AND METHODS

Study design

This study was conducted on three construction camps in Chonburi province. In order to protect the confidentiality of research participants and camp owners, all identifying information was changed or hidden, including the names of construction sites as well as the locations of the camp and mentioned as camp A, B and C.

Study procedure

Survey tools to collect quantitative data were created by adaptation of the "Standards and Temporary Buildings for Construction Workers and Nursery Preschools" a checklist developed by the committee of civil engineering, 1990 - 1991, Engineering Institute of Thailand [6] to be 12 topics for surveying of residence sanitation, these are Location, Building, Ventilation, Illumination, Drinking water, Solid Waste, Toilet, Insects, Kitchen, Sleep area, Fire prevention, Security. Life quality assessment of construction workers, by questionnaire from WHO Life quality – BREF [7] that composed by 25 questions levels by definition of the National Health Act, 2007 [8] clustered as 3 groups Physical health, Psychological health and Social.

Data analysis

Carried out using “Excel version 2017” (BUU licensed), survey result, life quality in each item and life quality in overall were evaluated by adapting a method to assess the sanitation of the elderly “Danai Bawornkiattikul (2015) [9]” calculated as percentage by formula below.

$$\frac{\text{Total number of items that passed the criteria for sanitation.}}{\text{Total number of sanitary conditions surveyed}} \times 100$$

$$\frac{\text{Sum of the satisfaction scores in each item}}{\text{Highest score of satisfaction (5) } \times \text{ number of samples}} \times 100$$

$$\frac{\text{Sum of the satisfaction scores in all items}}{\text{Highest score of satisfaction (5) } \times \text{ number of samples } \times \text{ number of items}} \times 100$$

Assessment procedure

Sanitation of residence composed as 12 topics Location, Building, Ventilation, Illumination, Drinking water, Solid Waste, Toilet, Insects, Kitchen, Sleep area, Fire prevention, Security

Under 55 % level 1: terrible state with an urgent need for improvement.

55–64.99 % level 2: pass level, but needs for improvement for the sanitation items that did not pass the criteria.

65 - 75 % level 3: fair level, however, measures should be proposed to the camp owner to encourage achieving a higher score.

More than 75 % level 4: good level, often some measures that can be implemented to develop the overall of sanitation the residential building further.

life quality of construction workers that composed by 25 questions and clustered as Physical health, Psychological health and Social

Under 55 % level 1: poor life quality and health, living unhappily and unable to work effectively.

55-64.99 % level 2: medium-level life quality, living reasonably happily, and able to ~~can~~ work reasonably effectively.

65 to 75 % Level 3: good life quality and well-being. Life is normal and one can work effectively.

More than 75 % :Level 4very good life quality, living comfortably, working will full effectiveness and able to continuing improve and develop one's working skills.

RESULTS

Residential sanitation survey

(1) The results of the survey of sanitation conditions of residences for construction workers in 3 camps of Chonburi can be summarized for details of surveying that referred to the sanitary survey form. The condition of residence in each camp can be described as follows. Camp A, as 2 floor building located on a high ground, with concrete roofing on the floor and all building are modified from container, each floor provides 10 rooms, divided as 2 sides, a total of 1 building with 40 rooms. Camp B, as 2 floor building located on a high ground, with concrete slabs on the floor and building using zinc as the basic material, each floor provided 15 rooms, divided to 2 sides, a total of 2 buildings as 60 rooms. Camp C as 1 floor building located on a high ground, with concrete roofing on the floor and building, using zinc as the basic material. There are a total of 60 rooms. The results of sanitation conditions in residences are summarized in Table .1

Table 1. The results of sanitation conditions in residences for construction workers in 3 camps.

Survey Program	Camp		
	A	B	C
Passed criteria	48	31	33
Not passed	13	18	17
Not measured	6	18	17
Score	78.70 %	62.50 %	66.00 %
Level	4	2	3

According to table 1, the total scores of the sanitary conditions of residential buildings in Camp A, Camp B and Camp C are 78.70%, 62.50% and 66%, respectively. The highest scores was %78.70 in camp A, at level 4 that could improve the further overall sanitation. Meanwhile, camp B took the scores as 62.50 % at level 2 that needs to be improved further and camp C took the scores as 66 % at level 3 that should be achieving for higher score.

The life quality evaluation

(2) The result of life quality evaluation of construction workers in camp A, B and C. were summarized in table 3.

Table 3 The result of nationality and life quality assessment of samples in construction camp.

Camp	Nationality			Life quality					
	Thai	Myan-mar	Cam-bodia	Physical		Psychological		Social	
				Score	Level	Score	Level	Score	Level
A	20	-	80	67.90	3	70.53	3	67.45	3
B	51	11	38	63.83	2	66.89	3	64.55	2
C	11	44	43	65.28	3	65.40	3	61.15	2

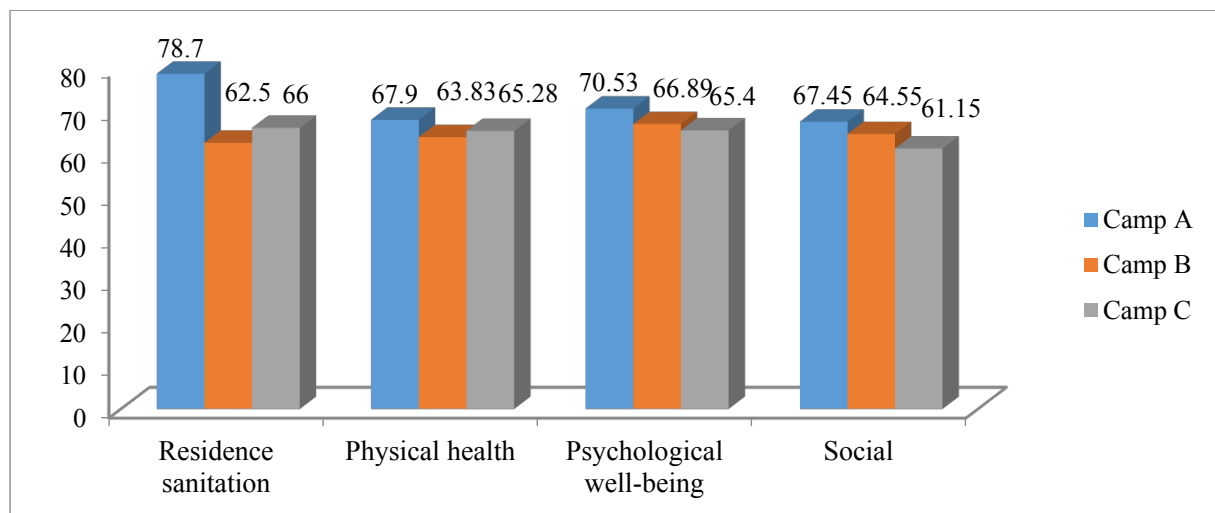
(3) Compare the result of residential sanitation and life quality evaluation, it could be described that life quality of construction workers of all three camps were in medium-level life quality (level 2) and good

life quality and well-being (level 3) in all three aspects, they can perform their duties with the utmost efficiency, living in society and working with other construction workers very effectively. About migrant workers in different national, some foreign (Cambodian and Myanmar) workers in all cap said there was no problem in working with different national worker. Every worker can work together smoothly. But there was some obstruction about communication that workers use Thai and English to speak each other. Besides, there was no problem either about salary that all national worker can take in the same rate and up to diligent that was not discourage. Comparison of the sanitation status of residence and the life quality of the construction workers were as shown in table 4, bar chart in figure 1 and square of balance in figure 2.

Table 4 Comparison of residential building sanitation and life quality in camp A B and C.

Camp	Residence sanitation		Life quality					
			Physical		Psychological		Social	
	Score	Level	Score	Level	Score	Level	Score	Level
A	78.70	4	67.90	3	70.53	3	67.45	3
B	62.50	2	63.83	2	66.89	3	64.55	2
C	66.00	3	65.28	3	65.40	3	61.15	2

Figure 1 Bar charts show the comparison of Residence sanitation and life quality in camp A, B and C.



According to table 4 and figure 1, it was noted that the level of residence sanitation of worker camp A as level 4 and life quality in physical psychological and social was in level 3 by provided percent. This means that life quality of worker in good level would get influence from welfare of residence being good sanitation management. For camp B and C that was managed of sanitation in level 2 and 3. Life quality of workers would get in level 2 with less than percentage of camp A. These reflex the influence of residence sanitation for life quality remarkably.

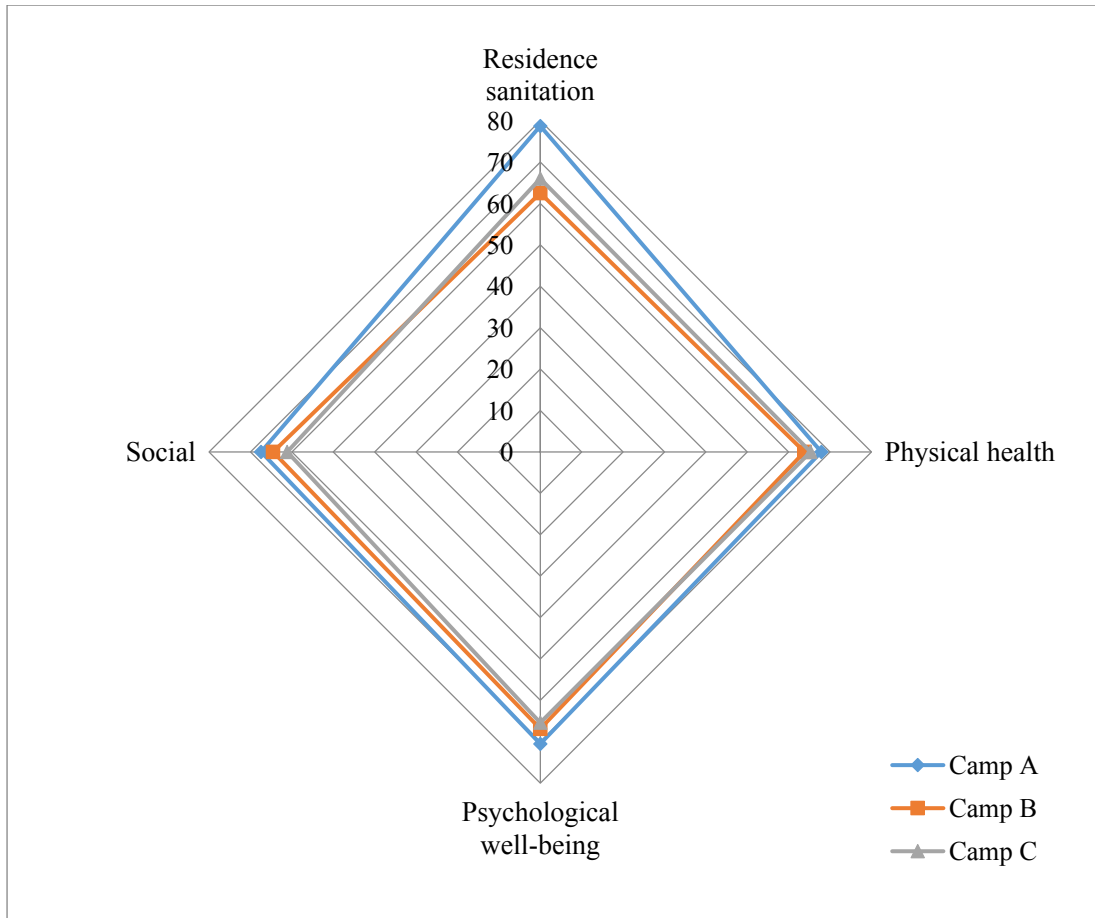


Figure 2 Square show balancing of Residential building sanitation and life quality in camp A, B and C.

About figure 2, the rank of camp A spreads of square in percent that higher than camp B and C including residence sanitation, physical, psychological and social. Especially, residence sanitation management get the rank that wider than remarkably.

DISCUSSION

The survey form of this research while comparing with the provision of welfare facilities during construction work [10] that composed by items of necessity and hygienic of worker (Positioning on Camp, Toilets, Washing facilities, Drinking water, Changing rooms and lockers, Rest facilities, Smoking and Heating) that are mentioned that this survey is according with HSE form. Meanwhile considering with provision and maintenance on construction camps and mobile, temporary or remote work camps in Western Australia [11] that focused on importance of toilets in number/person, allowable toilet types (standard, accessible, sewer) maintenance requirements, construction camp specific recommendations (provision, locations, removal). All mentioned concerned worker’s hygiene in excrete only and there are little of environmental health recommendation on wastewater overflows and other health emergencies.

Besides, while considering in case of Worker’s housing in ILO Helpdesk of International Labor Organization [12] gave widely “suggestions concerning method application” for “structural safety and reasonable levels of decency, hygiene and comfort” as 19 items and little explanation but about sanitation facilities, health and safety, inspection of premises, vacating the premises upon termination of employment referenced law and suitable standard. This survey gave method to manage facilities and life quality pretty greedy with this case. For other standard used in International Finance Corporation Worker accommodation processes and standards composed by steps of need assessment to impact

assessment to construction to management finally. Additionally, this gave so high standard of residence and facilities for workers including benchmark for implementation such as Standards for nutrition and food safety, Medical facilities Leisure, social and telecommunication facilities. These are able to use for implementation in big and very rich developing project that run by good governance as policy. However, this survey can be developed and improved for developing higher standard by adding item to survey and information to consider for assessment.

However, while comparing of Workers' accommodation: processes and standards A guidance [13] there was some topic of this paper agreed with topic in part II Standards for and Management of workers' accommodation, I. Standards for workers' accommodation in Room/dormitory facilities, Sanitary and toilet facilities, Canteen, cooking and laundry facilities. This showed that basic of life facilities in temporary accommodation are co - principle to manage camp of construction workers. Additionally, this standard also provided high standard facilities of residence National/local standards, General living facilities, Standards for nutrition and food safety, Medical facilities, Leisure, social and telecommunication facilities to benchmark for assessing.

The results can be also considerate that the difference of outside welfare of accommodation and service provision can be determined by the basic factors of living from the development camps managed and allocated to the construction workers adequately to the standard criteria in this research by the percentage ranged from 62.50 to 78.70 percent which was at the level of fair to level of good. However, the services for living factors were different depending on the location of the residential building, environment as well as needs of the workers that camp owner can manage properly. The results of the questionnaire concerning life quality of the construction workers showed that the physical, psychological well-being and social of the camp A, B and C get ranged from 61.15% to 67.45% that means this samples is pretty good life quality in aspect that evaluated. They can live normally and work fully effective.

Incidentally, in comparison the percentage of the results of residential building sanitation and the life quality of construction workers in 3 camps and consideration of percentage of residential building sanitation status and the life quality of construction workers in terms of physical health psychological well-being health and social of 3 development camps is in nearby level and according reasonably. As a consequent in camp A, residential building sanitation get the highest percentage meanwhile the life quality of workers in three aspects is in descending order. But it is still in higher than the life quality of workers in camp B. And C. Meanwhile camp B, the results of residential building sanitation is lower than the life quality of workers in all three aspects. For camp C residential building sanitation get percentage higher than life quality of workers in 3 aspects not much.

By comparing A Study on Quality of Work Life and Job Performance of Construction Workers in Chennai [14] that was implemented for 200 cases by Questionnaire provided these topics and contents such as Compensation Dimension, Working Condition Dimension, Development Dimension and Social Integration Dimension. All mentioned were both similar and different this study that focused on overview of worker life quality meanwhile study in Chennai rather emphasized on Socio-Economic mainly

There was a study on quality of work life of workers in construction industry in Madurai district [15] that implemented in 400 cases by Questionnaire. Topics in questionnaire composed as Work Environment, Salary, Personal Growth and Job Security. These showed that concept of life quality of worker in under developing area is still base on Maslow's hierarchy of needs in psychological and safety mainly. As concept in higher developing area advance in high quality of worker life.

While discussing with Reliability and Validity Testing of the SF-36 Questionnaire for the Evaluation of the Quality of Life of Chinese Urban Construction Workers [16], it was found that composed by

factors of physical and psychological health indirectly for example bodily pain, social function etc. and also lack of factor in economic.

Additionally, concept and method of this research is nearby Quality of Life of Construction Workers in Guangdong Province, People's Republic of China [17] that was implemented with 349 samples of three construction companies by WHOQOL questionnaire in 26 items composed by 2 items of general, 7 items of physical, 6 items of psychological, 3 items of social relationship and 8 items of environment and divided as 3 level by score 26-60.6 as low level, 60.7-95.3 as moderate level 95.14 – 130 as high level of life quality. The result found that most of samples were at low level of life quality (n=234, 67.05%), followed by moderate level of life quality (32.95%, n=115), no samples was at high level. These were almost same the result of this research that there were no samples in very good life quality in each feature. Anyway, the difference that case of Guangdong showed level of life quality by specify number and percent of overview samples meanwhile Chonburi showed the result of samples in each camp. Therefore, it could not specify which area or camp was in problem to solve.

CONCLUSION

According to result of research, we could conclude that welfare about residence for construction worker is importance for supporting life quality of worker notably and good sanitation management of residence for good life quality of worker. Good life quality of worker can take working effectively. This study could be used as evidence base on good governance of construction industry enterprise.

ACKNOWLEDGEMENT

The research team would like to thank those 3 construction projects owners for allowing data collection among workers. Students and staff of Faculty of Public Health Burapha University assisting this study and The National Research Council supporting grant for this study.

CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES

1. Ministry of Labor Regulations. Standards in administration and management of safety occupational health and environment in construction work. http://www.labour.go.th/th/doc/law/safty_construction_2551.pdf. (Accessed April 2 2018)
2. Ministry of Interior Notification. Safety in pile driving work 1989. <http://medinfo2.psu.ac.th/commed/ocmed/images/TIS18001/tisp4/law%20safety/images/law/10.piling.pdf> (Accessed April 5 2018)
3. The Cabinet Resolution No. 0250/7877 dated 28 June 2000. Measurement to prevent and control accidents in state construction work. http://npdwork.net/main/control_news/store_news/p3w10316114010.pdf (Accessed April 25 2018)
4. English Oxford Living Dictionary. Welfare. <https://en.oxforddictionaries.com/definition/welfare> (Accessed April 25 2018)
5. Ministry of Labor Regulations. Ministerial Regulation No. 9 issued under the Building Control Act 1979. <http://www.reic.or.th/law/lawfile/law030826111641.pdf> (Accessed April 25 2018)
6. Committee of Civil Engineering 1990 – 1991 A.D. '(Engineering Institute of Thailand Standard and blueprint of temporary building for construction workers and pre-school childcare facilities)'. Bangkok, : Chula press; 1994: 4-34.
7. World Health Organization. The World Health Organization Life quality (WHOQOL). http://www.who.int/mental_health/publications/whoqol/en/ (April 20 2018)
8. National Health Act, 2007. http://www.acfs.go.th/km/download/act_healthy_2550.pdf (Accessed April 22 2018)
9. Danai Baworkiattikul, Deachit Noommeechai. '(Surveying environmental condition of housing concerning health of senior peoples Saensuk sub-district Muang district Chonburi province)'. Paper presented at the National Health and Environmental Health Symposium, Bangkok, 2015: 25.
10. Health and Safety Executive. Provision of welfare facilities during construction work. <http://www.hse.gov.uk/pUbns/cis59.pdf> (Accessed March 10 2019)
11. Environmental Health Directorate. Sanitation provision and maintenance on construction camps and mobile, temporary or remote work camps in Western Australia. <https://consultation.health.wa.gov.au/environmental-health-directorate/sanitation-provision-at-construction-camps/> (Accessed March 10 2019)

12. International Labour Organization. Worker's housing in ILO Helpdesk of International Labor Organization. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/publication/wcms_116344.pdf (Accessed March 12 2019)
13. International Finance Corporation and European Bank for Reconstruction and Development. Worker accommodation processes and standards https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf (Accessed March 13 2019)
14. Shanmugam B, Ganapathi R. A Study on Quality of Work Life and Job Performance of Construction Workers in Chennai. *Int J Scientific Research and Modern Education*. 2017; 1(2): 68-71.
15. Ganapathi R. A study on quality of work life of workers in construction industry in Madurai district. *Int J of Management Research and Analysis*. 2016; 3(2): 63-66.
16. Qu B, Guo Hq, Liu J, Zhang Y, Sun G. Reliability and Validity Testing of the SF-36 Questionnaire for the Evaluation of the Quality of Life of Chinese Urban Construction Workers. *Int J of Medical Research*. 2009; 37(4): 1184-1190.
17. Yi Q, Khanitta Nuntaboot. Quality of Life of Construction Workers in Guangdong Province, People's Republic of China. *Int J of Nursing Science & Health*. 2012; 35(2): 111-120.