

METHODOLOGICAL ISSUES IN CONDUCTING A SURVEY OF CONSTRUCTION WORKERS IN NORTHEASTERN THAILAND

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Abstract. Social and health problems among the construction workers in Thailand were studied in a multicenter cross-sectional survey. This paper documents methodological issues related to conducting the survey in the northeastern Thailand. These issues include defining suitable sampling frames for building sites and workers and collecting data. A number of practical problems and the approaches to solve them are discussed.

INTRODUCTION

The number of registered construction companies in Thailand was reported to be 2,875 and the work force to be 86,704 in 1991 (Labor Studies and Planning Division, Ministry of Interior Thailand, 1992). Another agency reported that the construction work force increased from 764,500 in 1986 to 1,000,000 in 1989 (National Statistical Office of Thailand, 1989); these differing figures point to discrepancies in estimation of the real number involved in this industry. The average rate of increase of the work force has been estimated to be 11% per year (Phandhuratana and Thongpasook, 1989). Compared to other groups of laborers, the employment of construction workers is less secure and they are at high risk for many health problems including the work-related injuries. During 1990 there were 180 injuries and 3.7 permanent disabilities per 1,000 worker-years (Division of Techniques and Planning, Ministry of Interior, 1991). The death rate from injuries was 14 times and the disability rate was 3.4 times the average for workers in manufacturing industries (Labor Studies and Planning Division, Ministry of Interior Thailand, 1992) emphasizing the critical need to evaluate the implementation of safety regulations in relation to health risks in this industry. To formulate policy to reduce health problems among the construction workers, insight into their social backgrounds and health behavior is needed. Therefore a national survey was planned. However there is no literature documenting methodological issues in conducting a survey among this target population. This paper aims to make a contribution to the development of survey methods among construction workers in

developing countries by describing some of the problems faced and discussing how they were solved.

BACKGROUND

The main survey, entitled "Multi-provincial baseline study on social and health profiles of construction workers in Thailand", was designed as a multicenter cross-sectional study. The survey covered five zones of Thailand: Bangkok and 5 surrounding provinces, the Eastern Seaboard, northern, northeastern, and southern regions. Two provinces were selected for each zone.

This paper describing methodological issues relates to the part of the main survey which was conducted in the northeastern Thailand. Khon Kaen and Nong Khai were selected as the study areas. Khon Kaen is a major province located in the center of the region, about 450 km northeast of Bangkok, while Nong Khai is a province situated near the Thai-Lao border, about 180 km north of Khon Kaen or 630 km from Bangkok. The two provinces were selected because of their rapid economic growth. Two stage sampling was employed. First 20 sites, 10 large and 10 small sites, were to be selected from each province. Then 20 workers were to be randomly selected from each site.

SELECTION OF A SAMPLE OF SITES

The size of the sites, determined by the number of workers per site, is closely related to the social and health issues. Therefore, stratification by size

is necessary. For the national survey it was decided that two strata, large sites and small sites, were required. The size of a site could be determined by usable area or height of the building upon completion or directly by the number of workers. There is no readily available information about the number of workers per site. A usable area of 10,000 or more m² was suggested as the definition of a large site. For the study in the Northeastern region, however, data were obtained on the number of workers per site (Table 1).

Three out of 7 sites which were classified as large sites on the basis of area had fewer workers than some small sites; these were big building sites where construction work had only just started.

These data show that the usable area after completion was not a suitable surrogate measure for the number of workers. Therefore, it is necessary to obtain estimates of the number of workers for each site in order to stratify sites according to aspects of size which are likely to affect the social and health problems of the workers.

No specific cut off point for classification of sites according to the number of workers was available but Nopprakaraoh (1994) used 200 workers or more to classify the large sites. This definition was therefore used in the present study. After the stratification of sites, systematic sampling with probability proportional to size was used to select the study sites. Twenty-two sites in each of Khon Kaen and Nong Khai were chosen in this way.

ESTABLISHING A SAMPLING FRAME OF CONSTRUCTION SITES

The inclusion criteria for construction sites were: all sites were within the municipal areas as well as

those situated along the main roads and within 15 km of the municipalities; the buildings were at one or more of the following stages: basement preparation, pile foundation installation, wood and concrete work. A complete list of the construction sites was not readily available. Although the lists were obtained from the Department of Civil Works and the Municipality Office, they were not appropriate. The lists contained only the sites for which the owners had asked permission to construct the building, many eligible sites did not appear on the lists, however. There were a number of sites where construction had been started without permission being requested. The owner intended to do so some time before the construction was completed. This happened because the regulations concerning this issue are not fully enforced. Some sites on the list could not be found. There were a number of construction sites that had been approved but the owners had not yet started construction. Also there were some sites where construction had already been completed. Moreover there was insufficient information on the list to facilitate searching for the location of the site. The addresses given on the registration form were those of the owners but not the location of the construction sites. Most of the information about the locations was shown as the outline of a road instead of as a detailed map.

To solve these problems a list was obtained by driving along all roads within the municipal area using as a guide the most up-to-date map available with sufficient detail. The required information was gathered and a spot showing the location of each site was marked on the map. A snowball technique was also used: we asked the people at the current site whether there were any other sites being constructed near their site and where they were located. There were no refusals for inclusion of the

Table 1

Number of construction sites by the usable area after completion and number of workers per site.

Number of workers per site	Usable area after completion (m ²)			Total
	1,000 or less	1,001-9,999	10,000 or more	
100 or less	190	28	0	218
101-200	4	4	3	11
201 or more	0	0	4	4
Total	194	32	7	233

site in the sampling frame once the owner and the foremen were appropriately informed about the purpose of the study. Using these techniques, a complete sampling frame was obtained with a total of 233 construction sites, 164 in Khon Kaen Province and 69 in Nong Khai Province.

It was important that the selection of sites should be made and the survey conducted immediately after the sampling frame was established, otherwise the frame might not be valid because some of the selected construction sites could change quickly to stages that would no longer meet the inclusion criteria. From the sampling frame, only nine sites (4%), were excluded for this reason because since most sites were in more than one stage of construction at the same time so that at least one stage met the criteria of the study.

SELECTION OF A SAMPLE OF WORKERS

Some sites had more than one contractor or subcontractor (Table 2).

The original plan was that a sample of workers would be selected at each site with probability proportional to the number of workers for each subcontractor. This was not appropriate in the northeast since all workers at a site, no matter for which subcontractor they work, are exposed to the same living and working conditions because most of them were temporary workers who came from the villages. Thus random sampling within each site, without consideration of subcontractors, was appropriate.

Most of the sites had their own source list of workers (ID cards, daily checking books or signed

books) which could be used for performing the random selection of the workers. For the small sites without a list, the sampling frame was obtained easily. Once the sample of workers was selected we found that good co-operation was obtained as long as the researchers did not ask questions related to the labor law, such as wages, or the ages of the workers. Very few refused to participate and all refusals were attributable to inappropriate introduction of the interviewers to the workers.

ESTABLISHING A SAMPLING FRAME OF WORKERS AT EACH SITE

There were several sources of information for establishing the list of workers; identification (ID) cards, a daily checking book, or a signed book. The ID card provided by the construction company for registration and checking the working-time. The workers have to bring their ID cards to the site to have them signed every day they work. The payment of wages depends on the number of working days that have the signature of an authorized person from the company. However, there are three different ways the cards are kept. First, the worker will bring the card with him or her everyday, give it to the clerk of the company at the site in the morning, have it signed, and take it back at the end of the day. Second, the card is kept by the clerk and the workers have to ask for the card to be signed in the morning before starting work and in the evening after work. The third method, like the first, involves the worker keeping the card all the time; the clerk walks around the site and signs in the cards while the workers are working: this is done both in the morning and the

Table 2
Number of construction sites by the number of subcontractors.

No. of subcontractors	Khon Kaen (n = 22)	Nong Khai (n = 22)	Total (n = 44)
1	13 (59.1%)	19 (86.4%)	32 (72.7%)
2	1 (4.5%)	2 (9.1%)	3 (6.8%)
3	4 (18.2%)	1 (4.5%)	5 (11.4%)
4	3 (13.6%)	0	3 (6.8%)
5	1 (4.5%)	0	1 (2.3%)

afternoon.

Some sites used a daily checking book. This is a log book that the contractors or subcontractors prepare. Each page contains the workers' names and columns for the date and for morning and afternoon checking. The clerk brings the book to the site and makes a tick in the corresponding date and time for each worker when the worker is found to be on the site.

The third source of information is the signed book. This is also a log book kept by the clerk but signed by the workers before they start working in the morning and before they leave the site in the evening.

Finally, there may be no list at all. This is sometimes found on sites where there are fewer than 20 workers or where payment is made as a lump sum rather than twice monthly wages.

Of the 44 construction sites selected, 13 had a daily checking book. Another 10 sites used the signed book system. Workers who had their own ID cards were found only in ten large sites. The remaining 11 sites, all of them small, had no list at all; however these each had fewer than 20 workers and so a list could easily be made by the research team.

The lesson learnt from the study is that one method will not work for all sites and it is necessary to use whatever method is possible.

INTERVIEWING THE WORKERS

Part of the data collection involved trained interviewers administering a standardized questionnaire to each of the randomly selected workers.

Changes in the number of workers within each site over time were examined in a pilot study. Number of workers per day for three sites were observed prospectively for 30 days: May 1 to 30, 1995. A total of 228 workers, 156 males and 72 females were followed. The number of working days per month for each worker ranged from 1 to 27 days with the median of 24 days. Generally the employers paid the workers twice a month, on the 1st and the 16th of the month. There were sharp decreases in the total number of workers on the day after the pay days, that is the 2nd and the 17th. The numbers of workers per day on the 3rd and the 18th

were still lower than the usual level. For May, the month being studied, there were 3 public holidays on the 5th, 10th and the 18th. The number of workers on these days was not different from the other days (except the 18th when there was a number of workers due to being the date after the pay day). The number of newly recruited workers and those who ceased working were about the same, 3 workers per week or 1.3% of the total of 228 workers per week (Fig 1).

There is no weekend holiday for construction workers. They can stop working temporarily at any day just by informing the owner or the contractor in advance. But we found that most of the workers were prone to stop working on Sunday. As a result, Sunday had the smallest number of workers. Therefore it is important to avoid conducting the survey on this day. For the choice of the day of the month, the main consideration relates to pay days. Payment of the wages commonly on the 1st and 16th for each month and these two dates have the highest number of workers. Since one to two days following the pay days have the fewest numbers of workers, some sites even stop working automatically on these dates. Therefore, these are not recommended for conducting surveys. Days for conducting surveys should be randomly selected from the remaining days of the month (excluding public holidays, Sundays, 2nd, 3rd, 17th, and 18th days, and perhaps 1st, 16th). In practice random selection of days may be

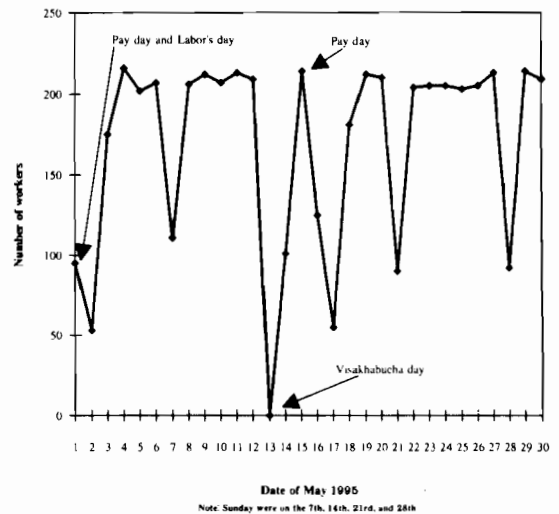


Fig 1—Number of total workers, newly recruited workers, and workers who stopped working permanently, by day within a month, May 1995.

infeasible and the dates for the survey may need to be negotiated with the owner, contractor or foreman.

The administrative office within the site is the most convenient place for interviewing for the researcher since it is possible for volunteer to bring the sampled workers to the office to be interviewed. However, we found that the workers who came to the office were not necessarily the ones who were sampled but those who were not busy at that time or those who were talkative. Aside from that, the workers were worried about being told to come to the office. They were frightened, so this is an inappropriate place for interviewing. Another possible place for interviewing could be at the site while the worker is working. This can be done only if the worker is working on a simple job and not moving about much. Although this was found to be good for the worker who was worried about being punished by the employer, it could lead the worker to concentrate less on the questions and the work, and thus might cause an accident. Thus this was also not an appropriate place for interviewing. An alternative was to conduct interviews at the site while the workers had stopped working. The interviewer asked the sampled worker to stop working for a while and started interviewing at or near that location. This could make the worker feel more comfortable than in the places mentioned earlier, and he or she could have a short rest during working time. Thus this would be a more appropriate setting to conduct interviewing.

Choice of an appropriate time for interviewing requires careful planning. The time before 07.00 hours, the usual time for starting work, was not possible since most of the workers arrived at the sites shortly before or after the exact time for start working. For the large sites the period between 07.00 and 10.00 hours is when the clerk of the site checks the workers. Therefore the list of the workers for the day is not yet available. The period from 10.00 to 12.00 hours is possible for interviewing. However, we found that most of the heavy work was set to be done during the first half of the day as the workers are still fresh and the weather is not so hot. The lunch break (12.00-13.00 hours) is the time that most of the owners or contractors proposed that the researchers conducted the survey. The bell always rings at exactly 1200 hours signaling the lunch break. Most of the workers brought their food from their home although some bought it

from a nearby food shop. They share the food and eat and stay together after they have finished their lunch. Most of them sleep after lunch. If we wanted to interview them we would have had to wake them up. Importantly, interviewing at this time makes it difficult to avoid interference from their colleagues. This activity attracts the interest of other and they join the interview. Some questions are not appropriate to be asked when the informant is watched by others. Also the time is short, less than 30 minutes approximately, left for the interview since the bell rings again at 12 : 50 calling for work to start again. Therefore, lunch time was not an appropriate time to conduct interviews. The second half of the day (13.00-17.00 hours), is the time when both the foremen and the workers are tired. We rarely found that heavy work was carried at this time. The workers were not forced to work hard and were even allowed to have a short break under certain conditions. Thus the workers were willing to be interviewed so that they could have a chance to rest. Therefore this was the most appropriate time to conduct the survey. The time after working hours was not appropriate for the temporary workers who lived in other places rather than within the camp site. (This was the major group of workers for the Northeastern component of the survey). Although after work might seem to be appropriate for those who stayed in the camp site, interference by their family members or neighbors is difficult to avoid during the interview.

Problems faced in data collection included difficulty in finding the selected workers and unavailability of the selected workers. For a site with many workers and more than one storey, the workers worked far apart from each other. This caused unexpectedly longer increases in the duration of the survey. Moreover, the interviewers might give up easily looking for the assigned workers and select new workers themselves. Providing more specific information about the selected workers to the interviewers helped to solve the problem. Such information included, for each worker, in addition to the name, their foreman and their type of work: masons, carpenters, iron workers, etc. Some selected workers were not available at the time of the survey. This was mainly due to the list of workers had not been up dated daily. These cases caused unexpected delays to completing the survey since the interviewers had to go back to interview the worker on the following day. If the selected workers were

not found after the second visit, the researcher leader selected new workers to be substituted. Close supervision of the survey by the research leader was necessary.

Data were edited mainly at the end of each day in the meeting. Each interviewer was assigned to code forms which had been filled in by another interviewer. All of them worked near each other so that they could ask questions of others in the team. Discussion in these meetings was invaluable for the survey, not only for data editing but for clarification of misunderstood points. It resulted in standardizing and correcting all procedures of data collection. Thus, editing the data in the questionnaires as well as coding at the end of each day of the survey is recommended.

CONCLUSIONS AND RECOMMENDATIONS

The lessons from this survey of construction workers were: 1) There was no readily available list of construction sites to be used as the sampling frame. A complete list of construction sites could be obtained by driving along all roads within the study area using the most up to date map with sufficient detail and using a "snowball technique" to enable the investigators to complete quickly the list with no site being missed. 2) Following the selection of sites, the survey should be carried out immediately so that the stage of construction does not be changed. 3) Most of the large sites had a list of their workers which could be used both to determine the number of workers and as the sampling frame. Stratification of the sites should be based on the number of workers per day. Such information needs to be collected during establishing the sampling frame of sites. 4) It is important to avoid conducting the survey on Sunday, or one to two days following the payment dates, that is the 2nd, 3rd, 17th and 18th. 5) Appropriate places for interviewing

the workers were on the site while the worker had stopped working. The second half of the day (13.00-17.00 hours) was the most appropriate time for interviewing. 6) Refusal to participate was very rare provided that the owners and the foremen were appropriately informed and no questions related to the labor law were asked.

ACKNOWLEDGEMENTS

This project was supported by the Health System Research Institute of Thailand and the International Clinical Epidemiology Network (INCLIN).

The authors gratefully acknowledge Associate Professor Aroon Chirawatkul, Khon Kaen University, Thailand, for his comment and encouragement.

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