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Construction workers in developing countries: a case study of Sri Lanka

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This paper addresses human resource development (HRD) issues in the Sri Lankan construction industry. It reports an analysis of the occupational structure and characteristics of the construction work force as an aid to meeting the challenges of maintaining a skilled craft work force. Information was collected through on-site structured interview surveys of 3300 construction workers and a questionnaire survey of contractors, consultants and clients which included 56 organizations. Results indicate that the work force consists of 51% unskilled workers, 33% masons, 10% carpenters and 1–2% each of plumbers, bar benders, painters and electricians. The highest percentage of skilled workers is aged 30–39 years. Approximately 80% of the work force is casually employed, only 40% is fully utilized and 86% of the skilled work force have received informal training only. More than 20% of the work force is dissatisfied due to low income, lack of job security and difficulty in finding regular work. Comparing HRD practices to those in the USA and the UK indicates that Sri Lanka needs to adopt a more structured approach, including a more formal training system and proper grading of the skilled work force.

Keywords: HRD, Labour force structure, characteristics, construction industry, Sri Lanka

Introduction

Many of the challenges faced by the construction industry arise through a need to maintain a skilled and competitive craft work force (Rowings *et al.*, 1996). In addition to changing demographic characteristics, difficulties in maintaining a skilled work force are compounded by rapid changes in the economic, social, organizational and technological environment, and also from a lack of accurate statistics, particularly in developing countries like Sri Lanka. These challenges can be effectively addressed only by a thorough understanding of the structure and characteristics of the skilled work force and trends and needs of the industry.

This paper presents a case study of Sri Lanka aimed at meeting these challenges with the following objectives:

(a) to establish the occupational structure of the skilled work force;
(b) to understand the work force demographics;
(c) to establish workers' skill levels;
(d) to determine the adequacy of the work force and mode of employment;
(e) to investigate workers' job satisfaction;
(f) to establish industry needs and trends with regard to the skilled work force; and
(g) to identify future strategies to satisfy HRD needs in the industry.

HRD issues in the construction industry

Most construction industries around the world are characterized by unstable levels of activity (Rosenfeld and Warszawski, 1993). This is compounded by inadequate investment plans and changing government priorities due to various sociological, economic and political constraints inherent in developing countries. Liberalization of the economy, particularly in Asian developing countries, has led to the emergence of more

small contractors. Competition then increased, self-employment and subcontracting prospered, private sector involvement increased, public sector contractors diminished, major contractors shed most of their work force and in-house training declined. These phenomena also exist in developed countries (Agapiou *et al.*, 1995a). Today, many construction workers are hired on a project basis and made redundant on project completion. As a result, the construction industry in most developing countries is characterized by a pool of local labour who work for a variety of contractors in different branches of the industry, such as industrial, residential, non-residential and heavy construction (Uwakweh and Maloney, 1991). Contractors will employ workers from the local labour pool and when no longer required will make workers redundant and force them to return to the labour pool.

In the absence of manpower planning and development, the size of the local labour pool fluctuates, causing shortages and surpluses. This is the situation in most developing economies for the reasons previously mentioned, and hence manpower planning and training can no longer be expected from contractors. In Sri Lanka, for example, training of craftsmen by contractors is virtually non-existent except in specialized areas such as irrigation, water, railways and power, which are still under government control. This results in poor quality, high wastage and long term productivity decline in the industry. Construction, being one of the most important industries in any country, particularly in developing countries, requires the HRD aspects to be addressed by a central body directly responsible to the government or a body consisting of interested parties. These mechanisms exist in developed countries. For example, training requirements of the UK construction industry are partially regulated by the CITB (Agapiou *et al.*, 1995a) and in the USA are controlled by the Bureau of Labor Statistics through its construction labour demand system (Uwakweh and Maloney, 1991). Moreover, there have been attempts to produce forecasting models, be it for supply (Greer and Armstrong, 1980; Hooper and Catalanello, 1981), or demand of labour (USDL, 1970; Walker 1980; Rosenfeld and Warszawski, 1993; Agapiou *et al.*, 1995b; Tang *et al.*, 1990) or even for diagnosis of manpower problems (Fyfe, 1981).

Reliable labour force data and proper investment plans are pre-requisites to such accurate labour models. This is the problem in most countries. Although a plethora of labour force data is usually available from many sources, many are unreliable or too general to provide accurate signals on a specific industry. For example, Agapiou *et al.* (1995a) report that there is an absence in almost every European country of a single reliable source of construction labour force data. This problem is worse in developing countries, and the following case study is the first such attempt to produce labour force data of the Sri Lankan construction industry.

A case study of Sri Lanka

Sri Lanka has a total land area of 25 322 square miles (half the size of England) with a population of 18.1 million (DC&S, 1996). The construction industry in Sir Lanka is one of the largest, comprising more than 6% of the GDP (Central Bank, 1995) and employing 4.7% of the total labour force (DC&S, 1996). With the liberalization of the economy by the then government, construction investment substantially increased in both the public and private sector after 1977. In 1981, construction was booming and the government established the Construction Industry Training Project (CITP), similar to the CITB in the UK in certain respects, with financial assistance from the World Bank aimed at training craftsmen and equipment operators to meet the human resource needs of the industry. By 1986, the demand for skilled workers was largely met and the CITP was renamed the Institute for Construction Training and Development (ICTAD) and its activities were expanded to other areas of development. Today, ICTAD is the authority on construction industry operations in Sri Lanka. Its emphasis has shifted from producer to facilitator/enabler, and it is involved in several facets such as industry development, training, research and development, registrations of contractors and consultants, development of contract conditions and other standards for the industry.

Training programmes provided by ICTAD and its predecessor CITP were guided by one-off manpower surveys (Teams, 1989a,b; Devenco, 1993), but HRD in the construction industry as a whole, was carried out haphazardly by a multitude of training authorities operating under different government departments and providing training of varying quality at different levels. However, a large number of the young unemployed, particularly from rural areas, continued to enter the pool of construction workers, because it was the only industry which could provide employment for those without any qualifications even though continuous employment was not guaranteed. These youngsters initially worked as unskilled workers but quickly became 'skilled' or 'semi-skilled' craftsmen following only a little on-the-job training. Consequently, the quality of workmanship deteriorated and clients, contractors and even politicians complained of the difficulty in finding sufficiently skilled craftsmen, not only for traditional trades but also for emerging

specialist needs. Thus, a study was sponsored by ICTAD to address these problems and to develop a Labour Market Information System (LMIS) which aimed to capture periodic labour market signals with a view to assisting the process of policy making on various HRD aspects of construction workers in Sri Lanka. This paper presents some of the more important findings of the study.

Methodology

First, the HRD factors that were to be addressed and their associated signals were established from interviews with construction industry leaders, brainstorming sessions with the ICTAD task force members, and a review of literature concerning labour market information and HRD (Chottepanda, 1983; Ritcher, 1984; Teams, 1989a; Federle *et al.*, 1993). The factors so identified included labour force availability, utilization, demand versus supply, training inputs, manpower trends, worker's perception and demographics. Second, mechanisms were identified, and suitable surveys developed and executed to capture the associated signals. The study examined many facets of HRD issues including those of managerial and supervisory personnel. This paper looks at the HRD aspects of the skilled work force, and therefore the explanations in the methodology, the presentation of the results and the discussions are limited to the objectives previously mentioned.

Data collection

The study required mechanisms to obtain information: (i) from the skilled work force; (ii) from employers and clients; and (iii) to determine the occupational structure.

Questionnaire surveys have been the most widely used mechanism to obtain information from construction workers in the past; albeit with variations in implementation. For example, Olomolaiye (1990) investigated bricklayer characteristics in the UK, Zakeri *et al.* (1996) investigated Iranian construction operatives and Rowings *et al.* (1996) studied the craft work force in the USA, all by distributing questionnaires among workers for them to complete and return. However, Borcherding (1977) studied foreman characteristics in the USA and Kaming *et al.* (1997a,b) studied the Indonesian industry, by adopting the structured interview survey technique, where answers to verbal questions are recorded by the interviewer.

The methodology used for this study was the structured interview survey technique and was adopted because of its effectiveness in obtaining accurate information from a work force with a low level of education and its guaranteed response rate. The questionnaire was designed to obtain information on demographics, worker skill levels, work force utilization, employment and unemployment status, migration patterns, recruitment basis, training needs (from the workers' view point) and their job satisfaction.

On-site survey was found to be the only realistic way to obtain the information necessary for this study. This is because of the lack of a proper sampling frame for construction workers and the transient nature of the skilled work force, which made it impractical to approach them through employing organizations.

A geographically representative sample was necessary in order to provide results at national level. This was achieved by two-stage sampling of construction sites in each administrative district in the country. The two stages involved selection of small administrative divisions, called PS divisions (similar to borough councils in the UK) as primary sampling units (PSUs) and active construction sites within the PS divisions as secondary sampling units (SSUs). At the first stage, 2 PSUs were selected randomly from the list of all PSUs for each district. At the second stage, 15 SSUs were selected from the complete list of SSUs in each PSU selected at the first stage. Selection of 2 PSUs in a district and 15 SSUs in a PSU is somewhat arbitrary but was decided considering practicability, economy and reliability of results with an initial estimate to survey 3000 workers from the entire country. All the workers employed in the selected sites were included in the survey without any omissions for the reasons previously mentioned. The number of workers surveyed in a district varied between 164 and 219. In this manner, approximately 3300 construction workers were surveyed, representing a cross-section of workers on different types and at different stages of construction activities.

Information required to establish industry needs and trends with regard to the skilled work force was obtained from contractors, consultants and clients through a postal questionnaire survey, a method used successfully for similar purposes (Choronokos and McKee, 1981; Arditi and Mochtar, 1996). The sample covered 107 contractors listed in the National Registry of Contractors (ICTAD, 1995a) including all major contractors, the 45 consultants listed in the National Registry of Consultants (ICTAD, 1995b) and 9 large client organizations directly involved in the construction industry. Thirty questionnaires were received from contractors, 20 from consultants and 6 from clients with response rates of 28%, 44%, and 80%, respectively.

Results

Occupational structure

The site survey data were segregated to obtain the occupational structure of the industry (Figure 1). This occupational structure indicates that the Sri Lankan industry is dominated by unskilled workers and has only six traditional skills, compared with over 18 main skills in the USA (McFillen and Maloney, 1986). Although there is a need for specialist skills (as will be discussed in the latter part of the paper) lack of awareness, a slow response from training agencies and the industry's inability to provide lasting employment opportunities for specialist trades are some possible reasons for this scenario. Sri Lankan workers are 'all-rounders' within their broad field. For example, masons very often do all work related to their trade such as bricklaying, concreting, plumbing, plastering, tiling, scaffolding and even bar bending, whilst carpenters often erect form work and false work, fabricate door and window frames, fit glazing and so forth. These practices are common in house building, although workers tend to be assigned to their most productive work when employed by major contractors on large projects.

Demographics

Demographics include the age profile of construction workers, their training, education, remuneration, gender and migratory work patterns.

The age distribution of workers in each occupation is shown in Table 1. The largest percentage of skilled workers in most occupations are aged 30–39 years, while average age is 31–36 years, depending on the occupation. There seems to be a sharp decline in the number of workers beyond the age of 50 for all trades, and hence this may be considered the retirement age. A comparison of the age distribution of the combined skilled work force was carried out using the findings of Rowings *et al.* (1996), Zakeri *et al.* (1996), Olomolaiye (1990) and Kaming *et al.* (1997b) for the USA, Iran, Britain and Indonesia, see Table 2. Interestingly, age distribution in Sri Lanka is very similar to that of the USA, although there are no apparent similarities between the construction industries of the two countries. Compared with Iran and Indonesia, Sri Lanka seems to have a more mature skilled work force. Caution is required when comparing data of the British industry since the results reported are for bricklayers only.

Educational attainment was measured in terms of the highest educational level attained by workers, see Table 3. Schooling up to 8th or 9th grade has the highest frequency in most occupations. Approximately 87% of the combined skilled work force have passed year 5 schooling or beyond, which is in line with the national literacy rate. Although it is difficult to compare the education of workers from different countries due to the lack of a common basis, cursory examination reveals that Sri Lankan skilled workers are less educated compared with counterparts in the USA. Here 80% have completed 12th grade or beyond (Rowings *et al.*, 1996). However, compared with Iran, where only 41% of workers are literate (Zakeri *et al.*, 1996), Sri Lankan workers have a higher educational attainment.

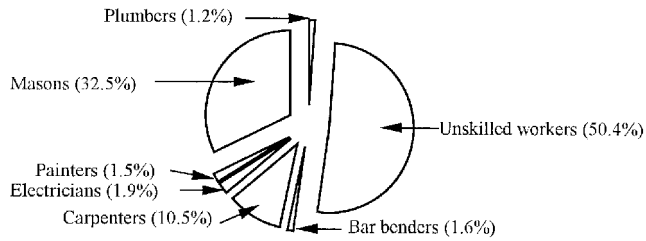

Figure 1 Occupational structure of the construction workforce

A large percentage of plumbers and electricians have passed the General Certificate of Education (Ordinary Level) held at the end of year 10, with a significant proportion having passed the General Certificate of Education (Advance Level), which is also the university entrance examination. There are two main reasons for this. First, the traditional trades like masonry and carpentry are considered to be of low social standing in Sri Lanka compared with emerging specialist trades like plumbing which have a higher reputation. Second, a significant proportion of plumbers and electricians are formally trained in an institution which requires some level of educational attainment as a prerequisite.

Approximately 99% of the Sri Lankan skilled work force are males, compared with 94.8% in the USA (Rowings *et al.*, 1996), indicating a slightly more male dominated Sri Lankan industry. Most trades do not have any female workers. However, some training agencies currently encourage female participation and consequently an increasing number of women are entering into traditional male dominated trades.

Daily remuneration (which is the usual payment basis) for the majority of skilled occupations lies between Rs.200–299 (£2.30–3.50 Sterling). However, there is a diversity of rates for a given occupation, this being due to difficulties in determining skill levels of workers, without a proper skill grading system.

The majority of skilled workers are employed on a temporary basis, see Figure 2. Detailed analysis showed

Table 1 Age distribution of construction workers

Occupation or trade	Percentage in different age group (years)						Average age (years)
	15–19	20–29	30–39	40–49	50–59	Above 60	
Masons	1.8	29.9	35.6	22.0	8.7	2.0	35.5
Carpenters	4.0	24.2	37.2	22.3	9.5	2.8	36.2
Plumbers	11.1	22.3	36.1	27.8	–	2.7	33.2
Electricians	7.0	40.4	33.3	15.7	1.8	1.8	31.0
Bar benders	–	30.7	36.7	14.3	16.3	2.0	36.7
Painters	2.1	57.5	25.5	6.4	2.1	6.4	30.4
All workers	2.7	29.9	35.4	21.3	8.3	2.4	33.8

Table 2 Comparison of age structure of craft workforce between countries

Age group (years)	Sri Lanka (%)	USA (%)	Iran[a] (%)	UK[b] (%)	Indonesia (%)
15–19	2.7	3.0	1.4	16.0	8.6
20–29	29.9	28.0	41.1	35.0	45.3
30–39	35.4	35.0	37.6	15.0	30.0
40–49	21.3	22.0	19.8	23.0	10.3
50–59	8.3	10.0	–	11.0	5.8
Over 60	2.4	2.0	–	–	–

[a]Last value corresponds to percentage over 40 years.
[b]Last value corresponds to percentage over 50 years and averages shown are only for bricklayers.

Table 3 Educational attainment of construction workers

Occupation or trade	Highest educational attainment (percentage)					
	No schooling	Year 1–4	Year 5–7	Year 8–9	G.C.E. (O/L)	G.C.E. (A/L)
Masons	2.0	13.0	30.2	39.6	14.7	0.5
Carpenters	0.9	9.9	32.9	39.0	16.0	1.2
Plumbers	–	2.8	30.5	25.0	38.9	2.8
Electricians	–	5.3	5.3	26.3	50.9	12.2
Bar benders	20.0	4.1	24.5	44.9	22.5	2.0
Painters	4.3	8.5	17.0	55.3	14.9	–
All workers	1.7	11.4	28.5	39.3	17.8	1.3

that 82% of the combined skilled work force and 93% of the unskilled workers are employed on this basis. This indicates contractors' reluctance to employ workers on a long term or permanent basis due to the unstable nature of the construction market. Although government investment plans are available they quickly become outdated due to changing priorities. The present situation is that only the core work force is retained by the contractor, and the balance is employed on a project basis either as casual workers or through labour sub-contracts.

Skill levels

The test used to measure skill levels of craft workers in Sri Lanka is the National Trade Test (NTT), equivalent to NVQs in the UK. This test is available for all major trades at three different skill grades, and is aimed at evaluating both theoretical knowledge and practical ability. However, analysis indicates that on average only 33% of skilled workers are aware of the NTT, only 2% have sat the test and only 1% have actually obtained the qualification. This is far from satisfactory.

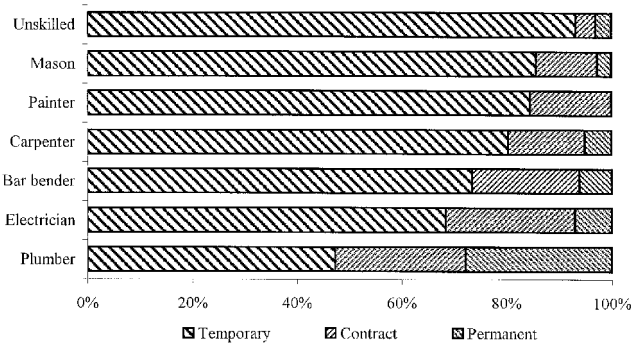

Figure 2 Different modes of employment for each trade

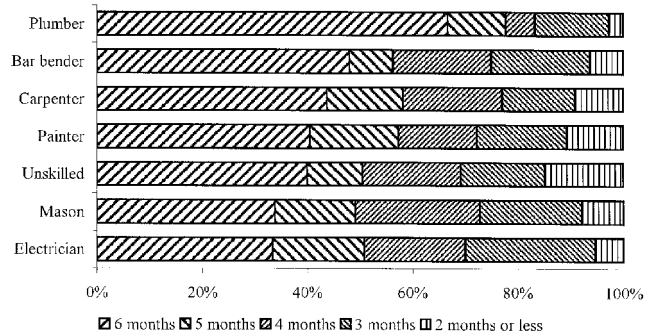

Figure 3 Utilization of construction workers during last 6 months

The contrast is clearly evident when compared with the work force in the USA, where 74% have completed craft training programmes, 73% apprenticeship programmes, and 76% have received on the job training (Rowings *et al.*, 1996).

There are several reasons for these very low statistics in Sri Lanka. First, contractors and clients do not demand workers have trade test qualifications for employment. Second, the majority of tradesmen have undergone training informally under the supervision of a master craftsman (Figure 4), thus making them either unaware of or reluctant to take the test, perhaps due to a lack of theoretical knowledge. Third, workers find it difficult to give up current employment and follow formal training programmes due to family commitments and financial obligations.

Due to these circumstances, as an alternative measure of skill levels, experience of workers was considered (Table 4). In most of the occupations and trades, 50% of workers have at least 6 years experience. In contrast, Rowings *et al.* (1996) reported that the majority of skilled workers in the USA have 11–20 years of experience, indicating that Sri Lankan craftsmen are comparatively less experienced. However, Sri Lankan workers seem to be more experienced compared with their counterparts in Indonesia. Here 52.3% of skilled workers have less than 5 years experience (Kaming *et al.*, 1997b) as against 37% in Sri Lanka.

Labour force utilization and training

During the site survey, construction workers were asked to identify the effective number of months out of the last six, for which they had been in full employment, and provide reasons for any unemployed periods, as a measure of the demand for labour. Utilization levels were established in terms of the effective number of months employed. Figure 3 shows that a considerable proportion of skilled workers have not been practising their trade full time. This is further evident in Table 5 where on average over 60% of the skilled work force is under-utilized. Reasons for unemployed periods together with percentages are given in Table 5, which shows that on average 64.7% of under-utilization has been due to lack of work. This indicates that at the national level there are no skill shortages in terms of the number of workers. A significant percentage (14.8%) indicated that they had other work, such as farming, and this percentage can be expected to rise considerably during harvesting and cultivation periods.

Table 4 Experience of workers

Occupation or trade	Percentage in different experience levels in years					Average experience (years)
	0–5	6–10	11–15	16–20	Above 20	
Masons	36.0	25.3	16.2	10.7	11.8	9.8
Carpenters	31.2	28.0	14.0	12.8	14.0	10.5
Plumbers	58.5	22.0	7.3	7.3	4.9	6.9
Electricians	50.0	27.6	8.6	1.7	12.1	7.9
Bar benders	41.0	23.1	12.8	5.1	18.0	9.8
Painters	67.7	11.8	8.8	2.9	8.8	6.7
All workers	37.0	25.8	14.8	10.3	12.1	9.7

Table 5 Reasons for construction worker unemployment during last 6 months

Occupation or trade	Total (%) under-utilized	Reasons for unemployment (as a percentage of under-utilized)				
		No work	Other work	Illness	Training	Other reason
Masons	66.2	68.0	15.7	14.2	1.0	6.3
Carpenters	56.3	59.2	15.6	15.1	1.7	4.5
Plumbers	33.3	75.1	–	8.3	8.3	8.3
Electricians	66.7	71.1	15.8	7.8	–	5.3
Bar benders	52.0	56.0	12.0	12.0	–	16.0
Painters	59.6	75.9	10.3	10.3	–	3.5
All workers	60.9	64.7	14.8	13.5	1.1	5.9

Table 6 Current training needs of construction workers

Occupation or trade	Training required (%)	Area of training		Full time/part time	
		Own trade	Other trade	F	P
Masons	52.0	75.4	24.6	20.5	79.5
Carpenters	48.5	77.4	22.6	31.3	68.7
Plumbers	62.9	76.2	23.8	23.8	76.2
Electricians	75.4	85.3	14.7	23.5	76.5
Bar benders	56.8	59.1	40.9	24.0	76.0
Painters	51.1	13.0	87.0	31.8	68.2
All workers	60.3	73.6	26.4	23.4	76.6

As mentioned earlier, most skilled workers enter the industry and receive informal training from a master craftsman, rather than following a formal course conducted by an institution (Figure 4). Excluding electricians, over 80% of workers in all other occupations have acquired training informally compared with 49% in Britain (Olomolaiye, 1990). The same situation exists in other developing countries. For example, 86% of skilled workers in Indonesia (Kaming *et al.*, 1997b) and 95% in Iran (Zakeri *et al.*, 1996) are informally trained. Although the current trend suggests an increase in formal training, the existence of a such a vast informally trained sector has created a lot of confusion in terms of skill grading.

Training needs, job satisfaction and emerging specialist needs

General training needs of construction workers are presented in Table 6, which shows that over 60% of the combined skilled work force would like to undergo further training, and that over 73% of those who would like further training would prefer it to be in their particular trade. The rest (26.4%) is not satisfied with their current trade due mainly to a lack of regular work, and hence would prefer training in a new trade. Furthermore, due to family commitments, over 70% of workers requiring further training would prefer part-time training, this allowing them to continue earning a wage.

Percentages of workers not satisfied with their job and reasons for this are shown in Table 7. Clearly, job satisfaction is one of the important attributes of a motivated and a reliable work force. Workers of each occupation were asked to select the causes of their dissatisfaction, many of whom indicated more than one reason. As seen, about 25% of all skilled workers are not satisfied with their job. The three most significant reasons for dissatisfaction (in descending order) were found to be low income, lack of job security and difficulty in finding work. Surprisingly, only 3.1% of those dissatisfied indicated that low social status is the cause of dissatisfaction, indicating that workers already in the pool do not consider low social standing as a problem.

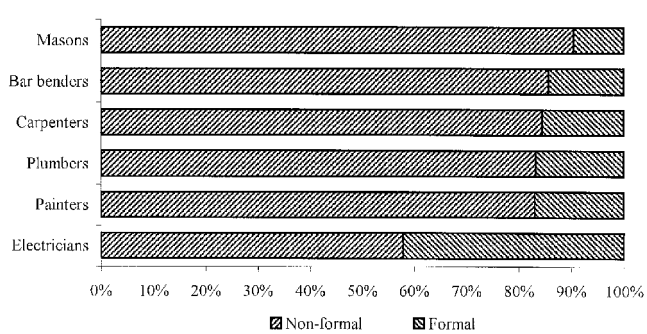

Figure 4 Training status of different occupations

Table 7 Job dissatisfaction of construction workers

Occupation or trade	Not satisfied (%)	Reason for dissatisfaction[a] (as a percentage of not satisfied)						
		1	2	3	4	5	6	7
Masons	24.3	59.5	4.6	28.3	12.7	14.8	5.1	2.9
Carpenters	22.2	54.9	2.8	19.7	16.9	12.7	8.4	1.4
Plumbers	38.9	64.3	–	21.5	7.1	7.1	–	–
Electricians	22.8	46.2	–	23.1	23.1	38.5	7.7	–
Bar benders	26.5	61.5	–	7.1	15.4	15.4	–	7.7
Painters	34.8	43.8	–	31.2	–	25.0	–	–
All workers	24.6	46.6	3.1	20.6	10.8	12.7	4.8	2.0

[a]1, Low income; 2, low social status; 3, lack of job security; 4, too difficult; 5, difficult to find work; 6, difficult to travel, and 7, other.

Emerging specialist skill needs in the construction industry were determined from the responses of contractors, consultants and clients. The emerging specialist skills with high demand were found to be tilers, plasterers and aluminium workers.

Conclusions and recommendations

The findings of the study revealed important labour force statistics, characteristics, trends and perceptions of the construction workers, employers and clients. Indeed, the findings are of immense importance to anyone involved in the construction industry, particularly training organizations and policy makers in their mission to maintain a skilled, competitive and adequate work force able to meet the future demands of the industry.

The study indicated that over 60% of the skilled work force is not fully utilized, due mainly to lack of full time employment. It showed further that over 80% are informally trained, and that a large percentage require further training either in their own or a new trade. This implies that in terms of size, the skilled work force is adequate, albeit informally trained and having low levels of education, training and skill (as evident in the poor levels of workmanship experienced in a considerable proportion of construction work). Therefore the attention of policy makers and training organizations should be directed towards the provision of further training, rather than encouraging new recruits, as at present no such further training programmes exist (ICTAD, 1995c). These training programmes preferably should be on a part-time basis (to meet the needs of the majority of workers) and strategies should be identified to encourage existing workers to enrol. One strategy might be to provide on-the-job training by mobile training units. This will allow workers to remain in their hometown with their families and continue with their present employment.

Skill grading has long been a major challenge for the reasons previously discussed, and the existing number of qualified tradesmen (1%) is far from satisfactory. However, this does not mean that only 1% of the work force is sufficiently skilled, but rather that the absence of proper controls and incentives has discouraged part-qualified or potential candidates to take up the test. This situation can be improved only by a three pronged approach: (a) restricting the practice of unqualified workers; (b) motivating the work force to acquire such qualifications by providing sufficient compensation in terms of increased wages; and (c) facilitating existing workers to take up the trade tests. This is more easily said than done, due to the enormous implications of such an approach, but some implementation strategies might include: (i) preventing employment of unqualified workers in public construction projects, the idea being the gradual recognition of the NTT qualification by other clients; (ii) provision of increased wages in recognition of such qualifications; and (iii) marketing/advertising such tests and facilitating workers to attempt tests at their work places. An increase in wages may be best achieved through an understanding between the parties involved, namely, ICTAD, examining authorities, contractor and craft associations.

The occupational structure shown in Figure 1 indicates that the Sri Lankan work force consists predominantly of traditional trades. However, contractors, consultants and clients indicate that specialist skills are needed. Although specialist training programmes are required to satisfy these emerging needs, such specialists may find it difficult to secure continuous work. Nevertheless, there is a demand for some of these skills in the enormous domestic house building market in Sri Lanka. Here, most work is carried out by informally trained craft gangs, although specialist skills are required for small quantities of work. These requirements were revealed during the detailed analysis of training requirements of the workers and in another study as well (CMU, 1993). Thus, further training

programmes discussed above should also be geared to meet this requirement. This should not cause undue difficulty since the educational level of the Sri Lankan skilled work force is sufficient standard.

Career guidance and models are the two areas which have not received sufficient attention in any of the HRD programmes in Sri Lanka. The results reported in this paper, particularly on the labour force structure, age distribution, education level, under-utilization, training needs, job satisfaction and modes of employment can be used to develop career guidance programmes and models for skilled workers such as those developed in the USA (Federle *et al.*, 1993). Future and further research in this area is recommended.

One of the key issues to maintaining a qualified and skilled work force is the ability to attract and retain candidates of acceptable calibre. Low public perception of a construction career discourages young aspirants. One recent study (Rosenthal, 1990) reports: 'The term "construction worker", embodied as the unskilled manual labourer, has negative connotations for young people. To youngsters, "construction workers'' are ditch diggers they see calling obscenities to passer-by[sic], loafing on the job. Most commonly associated with dirt, sweat, and a gruff demeanor, the construction worker lacks prestige, class, and respectability'. This situation is true for Sri Lanka as well, but can be overcome by positive public relations generated within the industry through trade associations, perhaps with the assistance of ICTAD. Such bodies will require the support of the national media to publicize positive aspects of construction. Entrance mechanisms and minimum entry standards should be established for crafts, and occupations should be identified by respectable names (not simply be referred to as 'construction worker'). The career model discussed above should facilitate progressive education and training for career advancement. An action plan should also be developed by employers and trade associations to improve job security.

In conclusion, the insights provided by this paper should form a basis for HRD, in order that future challenges may be overcome and a skilled, strong and competitive workforce may be established.

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