A BLUE-COLLAR INSIGHT INTO IMPROVING CONSTRUCTION LABOUR PRODUCTIVITY

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This research is a follow-on study from a nationwide survey conducted among UK project managers, reported in Chan and Kaka (2003), aimed at identifying the potential areas of improving construction labour productivity, and represents one of the latest attempts in the UK to tap into the perceptions of the 'blue collar' sector of the construction workforce. The preliminary results presented in this paper stems from data collected from 59 site operatives and reveal a high potential in the areas of communication, usage of plant and equipment, specification and quality requirements, supervision and rework. A comparison between the results from the project managers' survey and this study highlights a gap in the thinking of 'white collar' and 'blue collar' workers, with the former more aligned to strategic issues and the latter more focused on the task to be completed.

Keywords: labour productivity improvements, perceptions, site operatives, questionnaire survey, UK.

INTRODUCTION

In recent years, there has been an immense effort to understand and tackle the people issues affecting construction work in the UK, following the Latham (1994) and Egan (1998) reports that resulted in Rethinking Construction, Movement for Innovation (M^4I) and subsequently Respect for People (RFP) initiatives. These initiatives, alongside a pan-industrial effort to measure performance through such criteria as the Construction Industry Key Performance Indicators (KPIs) produced jointly by the *Construction Industry Board (CIB)*, then *Department of Environment, Transport and Regions (DETR)* and the *Construction Best Practice Programme (CBPP)* in 1999, work towards a common goal of improving the overall performance of the industry. This research study forms part of an overarching Ph.D. research work investigating the issue of construction productivity (more specifically, labour productivity) – one of the KPIs.

Given the undoubted fact that the construction industry is a labour-intensive industry, the importance of integrating people issues is reiterated in a report from the M^4I's (2000: 13) working group on RFP entitled *A commitment to people 'our biggest asset'*, which asserted "that financial indicators must be augmented by a variety of non-financial measurement techniques including indicators on people issues… failure to respect people can damage the bottom line, perhaps irreparably." The M^4I goes on to suggest that defining, capturing and reporting on such indicators could potentially improve performance and safeguard one's reputation. The working group also warned of a "chasm between the respect demonstrated towards 'blue collar' workers and that

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shown for ‘white collar’ workers, yet project delivery is dependent on everyone”. In other words, to attain an improvement in performance, people issues need to be embraced from both camps. However, there has always been a bias towards the ‘white collar’ segment of the workforce. Macarov (1982: 14), in a book dispelling the myths of worker productivity, observed this bias as he wrote, “the criteria used by most researchers are closer to those of management than those of workers” and attributed this to the inevitable fact that “much research requires prior agreement on the part of management, if it is not actually management-sponsored”. He then expressed his concerns with regards researchers’ “tendency to add, or even to dwell upon, through-put items – satisfactions, participation, reinforcement, achieved expectancy… and a decided neglect of inputs – effort, hours, and personal investment”. Reviewing the wealth of literature on productivity research in the UK, Chan *et al.*. (2001b: 146) supported this gap by stating, “that there is a great emphasis placed on the processing of inputs, rather than the inputs themselves”. Furthermore, they highlighted that “there is little mention of how the differences in the workmen’s abilities account for differences in productivity levels”, emphasizing the disregard of the effort of the workforce mentioned earlier. Nonetheless, the culture of the UK construction industry is changing towards more involvement of the ‘blue collar’ workers. For instance, Murray *et al.*. (2001) initiated a debate on the provision of health and safety and welfare on construction sites by reporting on results on a self-perception questionnaire administered to a group of 16 – 20 year old trade apprentices across Scotland. They presented a rather bleak set of preliminary conclusions, which include the manifestation of bad practice in the provision of health and safety and welfare amenities and warned that this might lead to an undesirable eventuality of pushing young people away from the construction industry.

More recently, vast coverage of issues relating to site operatives were found in a number of industrial and professional periodicals. The Construction Manager (2003), for example, contained a grim headline in their April issue ‘Site for Sore Eyes’. In their article entitled ‘It doesn’t have to be this way’, they stressed on the exhausting nature of construction work, pointing towards the exposure to the elements of weather, risk and danger, and the harsh and aggressive working culture and claimed that these were the reasons as to why the construction industry is such a turn off. This was followed by publicity given in the Building (2003a) magazine on the London Heathrow Terminal 5 project in which the article addressed a rarely discussed topic – the potential sociological problem facing the site workers who, albeit earning a prospective salary of £55,000 a year, will be subjected to constant surveillance with the same security checks used in the Occupied Territories in addition to isolation from the outside world throughout the project. A week later, the Building (2003b) magazine focused on site operatives again and reported on the prevalence of foreign workers in London sites, with the associated problems of language and culture barriers, and ascribed this as the result of Britain’s skills shortage. Despite the problems raised, it is laudable that these examples present hope that the industry is beginning to deal with issues from the perspective of the most crucial input – the workers themselves. However, in terms of seeking productivity improvements in the UK, there is little evidence to suggest that the views of the ‘blue collar’ workers are taken into account. Olomolaiye (1990) evaluated the relationship between bricklayers’ motivation and productivity by using an operative questionnaire survey to identify motivating and demotivating variables. This is perhaps the only key research found to include the views of site operatives. Other non-UK examples include Kaming *et al.*. (1997) who employed the interview technique to extract the main productivity problems on sites

among bricklayers, carpenters and steel fixers in Indonesia; and Zakeri *et al.*. (1996) who collected similar data using a structured questionnaire survey across 31 sites in Iran.

Sebastien and Borcherding (1979), cited in Kaming *et al.*. (1997), noted that construction workers know more about their productivity problems than any other individual. Oglesby *et al.*. (1989: 153) reaffirmed that "one of the best ways to find the problems in an on-site construction organization or with individual operations is to ask those who are involved day after day… experience has shown that workers often have a better perception and greater knowledge of situations on site than higher-level management, particularly if management's principal source of information is through a formal reporting system". In view of this and the apparent lack of updated evidence from the 'blue collar' workers, this research study aims to extract the perceptions of site operatives with respect to the potential areas of labour productivity improvements in the UK.

It is also worth noting that the research design draws inspiration from similar studies conducted in the US (Arditi and Mochtar, 2000) and among UK project managers (Chan and Kaka, 2003). An attempt will therefore be made to compare the initial findings of this study to its predecessors to see if there exists any commonality in the productivity trends. It is hoped that the results from this paper will facilitate the modeling of construction labour productivity, which ultimately culminates in the devising of an appropriate strategy in improving construction labour productivity. The paper first outlines the research method employed in this study. Thereafter, the preliminary findings are presented and the implications then discussed.

DATA COLLECTION

As mentioned earlier, the inspiration of this research study derived from a similar study conducted in the US and is a follow-on study from an earlier survey administered to project managers in the UK. The questionnaire survey[2] used in this study is principally identical to the one used among project managers with a number of exceptions. For instance, general information relating to the organization, e.g. annual turnover, size and nature of business, were omitted from this survey. This was replaced by a request for individual particulars, which include such information as age, trade (craft) represented, number of years of experience and nature of employment (directly employed or sub-contract staff). Another omission from this survey is a section investigating the attitudes towards improving construction labour productivity. This section, in the project managers' version, contained questions with a definitive end, and asks if a respondent would like to do a specific task relating to productivity improvements. As this section was felt to be more appropriate for management personnel to complete, given the fact that they are probably the ones with the power to subscribe to these tasks in any organization, it was left out in this survey. The key section in the project managers' version, however, remains the same and this comprises a list of 59 variables that was felt to have a bearing on construction labour productivity. This section uses a likert-scale of 1 to 5 (1 being "virtually no impact" and 5 being "very high impact"), and respondents are required to work through the list and tick the appropriate number that best reflects their views. Keeping in mind the target group of respondents, short descriptors follow each variable in simple and

[2] Please refer to Chan and Kaka (2003) for a full explanation behind the design of the questionnaire survey used in the study.

straightforward language, so as to facilitate the understanding of the prospective respondent. For the purpose of this paper, this section now reports the data collection from one of the sites visited in Sheffield. The data collected from this site also forms the basis of the preliminary findings reported here. The project concerned is part of an urban regeneration programme in the Devonshire quarter of Sheffield and involves the mixed development of luxury apartments, leisure facilities, office accommodation and retail outlets. The 2-years design and build contract of approximately £35 million is managed by one of the major building contractors in the UK, with operations concentrating within the Northern region of England. The site employs a maximum of around 450 workers during peak times and it is interesting to note that the building contractor concerned employs a high proportion of directly employed labour in the traditional trades (e.g. bricklaying and joinery), an exception rather than the rule in the UK construction industry. This is perhaps due to the fact that Sheffield is the fourth largest city of England, with a working population of over 1 million living within 1 hour's drive from the city center, embedded in a rich history in the steel industry (Sheffield City Council, 2003). Access was given for administering the questionnaire survey. Due to the nature of the survey, it was intended for a respondent to complete within 15 minutes. As the site operatives were working under time constraints, it was not possible to gather all the workers in one space to complete the survey, and so it was a case of moving around the site to seek volunteers. In some respects, this was desirable for a number of reasons. First, it would be easier for the researcher to monitor the manner in which the respondent dealt with the survey and offer assistance where needed on a one-to-one/small group basis as opposed to having to deal with a large group of workers. Second, from a logistical viewpoint, many site operatives (apart from the supervisors or gang chargehands) do not carry writing materials with them and therefore, it was again relatively easier to control this often taken for granted aspect. An attempt was made to get as many participants as possible during the lunch hour. However, it was discovered that very few workers made use of the "canteen" facilities on site. This was because the facilities were mainly rest areas, since the contractor did not provide for a canteen that sells food and drink. Another reason observed was the fact that the weather was dry and sunny during the lunch hour and this probably accounted for the lack of usage of the relatively dimmer rest areas.

PRELIMINARY FINDINGS

In spite of the rather ad hoc nature of the data collection, 59 operatives completed the questionnaire survey from such trades as bricklayers (10%), joiners (12%), scaffolders (7%), electricians (7%), roof sheeters (14%) and plasterers/tilers (2%). It is important to note that reassurance had to be given to encourage respondents of the fact that completing the questionnaire will not affect their employment and that information provided will not be communicated to their employer. Furthermore, the response in terms of facial expressions given to the researcher when the respondents were informed that their employers have no involvement with the survey except for allowing access was startling. Many respondents were surprised to hear that their employer (i.e. management) would be interested in participating in a study aimed at listening to their views, indicating a traditional "them and us" attitude. One respondent even went to the extreme of pouring his thoughts out in a chain of vulgarities. Yet, one can only feel comforted that this is a positive instance of breaking down barriers between management and operatives and it is believed that this had spurred some of the operatives in offering their views. The characteristics of the respondents can be found in tables 1 and 2 below. A high proportion of the respondents (71.19%) are over

31 years of age. This differs from studies done in developing countries by Zakeri *et al.*. (1996) and Kaming *et al.*. (1997), both reporting a relatively lower age group (under 30) of respondents. While both studies attributed the necessity for the construction workforce to be young due to the strenuous physical nature of the work, a comparably higher mechanized industry in a developed country like the UK could perhaps explain for the somewhat older group of respondents in this study. It is felt, however, that a more likely explanation for this phenomenon is the difficulties in recruiting and retaining young people in the construction industry as a result of greater competition for the working population by "more comfortable" jobs and a lack of skills training provision and culture in the UK. The fact that 30 respondents (51%) are directly employed labour – workers who often have worked for an organization for more than 10 years – further justifies the age distribution shown in table 1 below.

Table 1: Operatives' age distribution

Age Group	Number	Percentage
Not given	2	3.39
15 – 20	5	8.47
21 – 30	10	16.95
31 – 40	22	37.29
Over 40	20	33.90
Total	**59**	**100.00**

Table 2: Operatives, construction work experience

Years (In industry)	Number	Percentage	Years (In current trade)	Number	Percentage
Not given	8	13.56	Not given	14	23.73
0 – 2	4	6.78	0 – 2	8	13.56
3 – 5	5	8.48	3 – 5	8	13.56
6 – 10	7	11.86	6 – 10	9	15.25
11 – 20	20	33.90	11 – 20	11	18.65
Over 20	15	25.42	Over 20	9	15.25
Total	**59**	**100.00**	**Total**	**59**	**100.00**

Table 3: Potential areas of labour productivity improvements as perceived by site operatives

Code	Description	Mean	Rank	Group Mean	Group Rank
	Work Content Issues			**3.4355**	**3**
	BUILDING COMPONENTS	***3.3206***	***(9)***		
A01	Standardization	3.2281	41		
A02	Prefabrication	3.6250	19		
A03	Size of Components	3.4107	34		

Table 3: (Continued)

Code	Description	Mean	Rank	Group Mean	Group Rank
	Work Content Issues			**3.4355**	**3**
	BUILDING COMPONENTS	***3.3206***	***(9)***		
A04	Availability of Components	3.8393	7		
A05	New Products	2.5000	53		
	BUILDING DESIGN	***3.5843***	***(5)***		
A06	Uniqueness	3.4211	31		
A07	Simplicity	3.1429	44		
A08	Quality Requirements	4.1579	1		
A09	Specifications	3.8246	8		
A10	Construction Technology Involved	3.3750	35		
	PLANNING	***3.4017***	***(7)***		
A11	Cost Control	3.1887	42		
A12	Resource Allocation	3.5556	24		
A13	Scheduling	3.4182	32=		
A14	Experience of Planner	3.4444	29=		
	Work Environment Issues			**3.6545**	**2**
	SITE FACTORS	***3.5635***	***(6)***		
A15	Congestion	3.5690	23		
A16	Weather	3.4630	28		
A17	Sequencing and Interference	3.4138	33		
A18	Rework	3.7857	9=		
A19	Information Flow	3.5862	21		
	MATERIALS	***3.6298***	***(4)***		
A20	Procurement	3.7500	13		
A21	Delivery	3.7636	12		
A22	Storage	3.5818	22		
A23	Packaging	3.2857	39		
A24	Availability	3.7679	11		
	PLANT AND EQUIPMENT	***3.7701***	***(1)***		
A25	Capacity	3.6786	16=		
A26	Availability	3.6786	16=		
A27	Simplicity	3.6727	17		
A28	Maintainability	3.7857	9=		
A29	Utilization	4.0351	3		
	Workforce Issues			**3.3461**	**4**
	SITE MANAGEMENT	***3.6531***	***(3)***		
A30	Supervision	3.7719	10		
A31	Communication within gangs	3.9286	5		
A32	Communication within company	3.4286	30		
A33	Communication with sub-contractors	3.6429	18=		
A34	Communication with suppliers	3.1818	43		
A35	Health and Safety Management	3.9649	4		
	PERSONNEL MANAGEMENT	***3.3975***	***(8)***		
A36	Turnover	3.3091	37		
A37	Availability	3.5357	25		
A38	Level of pay	3.3393	36		
A39	Bonus Schemes	3.0185	47		
A40	Training Investment	3.4182	32=		
A41	Job Prospects	3.5185	26		
A42	Welfare Amenities	3.6429	18=		

Forty-two respondents (71.18%) and twenty-nine respondents (49.15%) possess more than five years of work experience in the construction industry and the current trade

respectively, suggesting that the operatives surveyed would not only be knowledgeable about construction activities, but also familiar with the issues and problems relating to their trade (see table 2 above).

Craftsmen's perception of potential areas of labour productivity improvement

It is surprising that regulations should emerge as top of the four groups of potential areas (see table 3 above). One would have expected that regulations represent rigidity since the time needed to introduce, amend or enforce any legislation can be quite considerable. If the scores were closely examined, it appears that Health and Safety and Construction (Design and Manage) [CDM] 1995 regulations ranked 2nd of the list of 59. This complements the score for Health and Safety Management under the group *workforce issues*, which ranked 4th. Chan *et al*.. (2001a) noted an "obsession with health and safety" in the UK construction industry and suggested that this was a consequence of the introduction of the CDM 1995 regulations and the stricter enforcement of penalties for breaches in health and safety. The Building (2003b: 39) magazine reinforced this phenomenon with a conclusion from a series of interviews with foreign site operatives, "one thing all workers agree on is the tough safety standards on British sites". Perhaps more predictable are the two group rankings that follow – *work environment* and *work content* issues respectively. Chan and Kaka, when interpreting the results of the project managers' questionnaire survey, commented that "work environment issues… are conventionally known to be manageable… therefore, these are the aspects of the work, which the respondents naturally feel they would have a greater control over and thus influence the outcome productivity" (2003: 587). Indeed, the list of variables under the *work environment* heading relate very much to the task of getting the job done and so factors such as utilization and maintainability of plant and equipment should appear as very high-impact variables – ranked 3 and 9 respectively. The scores also reaffirm the general view that site operatives are perhaps more inclined towards being task-oriented and taking pride in their work and skills (e.g. Edwards and Eckblad, 1984 and Olomolaiye 1990). This is probably why quality requirements (ranked 1) and specifications (ranked 8) scored favourably under the *work content* heading; whilst prefabrication (ranked 19) and standardization (ranked 41), both implying a lesser need (or opportunity) for workers to display their skills, were not one of the top 10 list of variables.

Despite the fact that the survey was aimed at investigating the site operatives' views on increasing labour productivity, it is remarkable that workforce issues should surface as the least potential group of factors aimed at improving productivity. Nonetheless, communication within the gangs (ranked 5) and supervision (ranked 10) were perceived to have a high impact. The importance placed on communication also goes to show the significance of camaraderie, as Edwards and Eckblad (1984: 154) puts it, "the (workers') need for opportunities for friendship with other workers". Another interesting finding lies in the scoring for the variable *rework*, identified in various productivity literature as a key barrier towards improving productivity. Although *rework* is not placed under the *workforce issues* heading, the presence of rework could insinuate the workers into thinking that they were producing poor quality output and this could have negative repercussions on their working morale and attitudes towards the project. Design changes, which are not highly unlikely on a design and build project, account for one of the common causes of rework and could offer an explanation as to why the workers had scored rework as a high-impact factor. Other probable causes of rework include unclear and poor instructions due to

communication problems and poor workmanship (Zakeri *et al..*, 1996, and Kaming *et al..*, 1997).

Other workforce issues such as availability of labour (ranked 25), labour turnover (ranked 37) and bonus schemes (ranked 47) were unexpectedly low in the ratings. This could be due to the fact that the respondents perceive these to be management's responsibility, which they do not necessarily have the right to exercise control over. An observation that supports this view came from one of the respondents who commented in a rather dismal manner as he came across the variable *bonus scheme*, "Huh! Bonus schemes… what bonus scheme! Our company doesn't give us no bonus!" And with that, the respondent marked it as a variable with virtually no impact. This may have provoked a single instance of such a reaction, but appeared to be a common feeling across a number of respondents as the survey was administered. On the skills front, it was disappointing to note the low rankings of the various qualifications listed. Yet, in an industry where practical experience is valued above paper qualifications, the level of site experience (ranked 14) should emerge as a highly ranked variable.

Table 4 below sums up the top 10 potential areas for improving construction labour productivity as perceived by the site operatives, and presents a comparison of the rankings with the US study, and the survey conducted among UK project managers. It is evident that communication is a vital component across the three surveys. As mentioned earlier, communication is a binding tool to foster a closer working relationship with other colleagues, and an important function to ensure that the task is completed appropriately so as to avoid rework. Additionally, supervision is perceived to be an important factor in the UK. At first glance, one can highlight fundamental differences in the rankings between the perceptions of 'white collar' and 'blue collar' workers. Management tend to align themselves with the strategic issues (of both the organization and the industry), placing more importance on such factors as design issues, prefabrication and standardization; whereas site operatives tend to be more task focused, with more emphasis on the availability of components, overall usage of plant and equipment, quality and specifications.

Table 4: Comparison of perceptions between US sample, UK project managers and this survey, top 10 potential areas

Rank	US	UK Project Managers	UK Site Operatives
1	Training	*Supervision*	*Quality*
2	*Quality control*	Simplicity of design	Health and Safety Legislation
3	Design practices	Level of site experience	Utilization of plant and equipment
4	Scheduling	Information flow	Health and Safety Management
5	*Standardization*	**Communication**	**Communication**
6	Cost control	Delivery of materials	Building regulations
7	*Prefabrication*	Availability of materials	Availability of components
8	**Communication**	Site congestion	Specifications
9	Value Engineering	*Prefabrication*	Maintainability of plant and equipment
9			Rework
10	New products	*Standardization*	*Supervision*

FUTURE WORK

The results presented here derive from a small sample population of 59 operatives of a single construction site. This undoubtedly creates a latent problem with regards validity of the conclusions drawn and the unavoidable emergence of bias in the data. In spite of this, the study marks the beginning of a potentially significant contribution towards incorporating the views of the 'blue collar' workers with the aim of improving industrial performance. Indeed, the questionnaire survey is currently administered to more site operatives across the UK and further, more rigorous analyses will be reported in future publications. From this study, differences in the thinking of 'white collar' and 'blue collar' workers have emerged, supporting the gap between the two camps mentioned earlier. Since success is dependent on everyone working in the industry, it is therefore proposed that the reasons behind the discrepancies be further explored. Finally, as this forms part of an overarching Ph.D. research project into construction labour productivity, it is envisaged that the results from this study will aid in the formulation of productivity improvement strategy by identifying, and later assessing the impact of, key factors affecting construction labour productivity.

CONCLUSIONS

The questionnaire survey conducted in this study marks the latest attempt in the UK to extract the perceptions of site operatives with respect to the potential for improving construction labour productivity. Preliminary findings emphasize the importance of communication, usage of plant and equipment, specification and quality requirements, supervision and rework.

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