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CONSTRUCTION LABOUR PRODUCTIVITY IMPROVEMENTS

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ABSTRACT: Arditi and Mochtar (2000) reported in the *Construction Management and Economics* journal the productivity improvement trends in the US, based on surveys conducted with the top 400 contractors across the country over the last three decades. This research study draws inspiration from the US surveys and represents one of the first attempts in the UK to tap into the perceptions of management personnel with regards the potential for improving construction labour productivity. The preliminary results reveal a high potential in the areas of supervision of site labourers, communication particularly with sub-contractors, and the ability to retain an experienced workforce. Additionally, the simplicity of building designs and the management of information flow are also perceived to have a positive impact on construction labour productivity.

KEYWORDS: Labour productivity improvements, questionnaire survey, project managers

1. PURSUING LABOUR PRODUCTIVITY

“People have been seeking ways to increase productivity since the beginnings of recorded history. In some cases the goal is to increase output, and in some others it is to reduce the amount of human labour needed, but the desire for greater output, or the same amount for less input – both of which spell productivity – has deep historical roots.” (Macarov, 1982:43)

The understanding of productivity has consequently been an important focus in industry and has been heavily researched into by construction researchers over the last fifty years. Yet, as Macarov (1982: 16) rightly points out that measuring individual worker productivity on the surface presents few difficulties. However, when a broader view is taken, problems arise. Citing Huizinga’s (1970) work on applying Maslow’s need hierarchy to the work situation, Macarov goes on to quote, “it is very difficult, if not impossible, to obtain adequate approximations for productivity because it has so many short range and long range aspects, of which hourly output, creative ideas, turnover, absenteeism, and waste are only a few”.

Tracing the vast literature available in construction productivity research, these aspects translate to research within the areas of construction duration, motivation and incentive programmes, business process reengineering and lean construction. Insofar as these try to advance the pursuit of labour productivity improvements, they represent a fragmented approach in dealing with an ubiquitously complex issue (Radosavljevic, 2001); a concept that is difficult to measure and is often defined by reference to the basic resources used, which can be useful in showing trends, but do not necessarily give an accurate picture (Cheetham and Lewis, 2001). Chan (2002), reporting on an exploratory study into the personal constructs of site management personnel, called for a need to fully comprehend the factors influencing construction labour productivity before discussing about productivity improvements and lamented on the lack of drive towards understanding the construction workforce with reference to their productivity by construction researchers. As Sebastian and Borcharding (1979), cited in Kaming *et. al.* (1996), noted that construction workers know more about their productivity problems than any other individual. Presumably, the other individual includes the observer – the construction researcher.

This paper reports on a questionnaire survey that was sent out to management staff in construction companies throughout the UK, based on a similar study conducted in the US by Arditi and Mochtar (2000) and following a series of focus group interviews reported in Chan (2002). The objective of this study is to extract the perceptions of construction managers with respect to the potential areas of labour productivity improvements. An attempt will be made to compare the initial findings with the study in the US to see if there exists any commonality in the productivity trends.

2. PRODUCTIVITY IMPROVEMENTS IN THE US

In 2000, Arditi and Mochtar offered an analysis in *Construction Management and Economics* of the current trends of construction productivity gathered from the results of surveys of the top 400 US contractors conducted in 1979, 1983 and 1993. In their interpretation, they identified that “cost control, scheduling, design practices, labour training, and quality control are functions that are perceived as having considerable room for productivity improvement, whereas materials packaging and foreign developments in construction technology are perceived as functions that do not have much effect on improving construction productivity”. (2000: 15) It is notable that this analysis stems from the views of top executives of the contractors involved, representing the voice from the industry, as opposed to mere observations by the researchers themselves. While the investigations into the potential productivity improvements have been continuous over the last three decades, it is surprising that no such similar study exists in the UK. Given the demands of Latham (1994) and Egan (1998) for the UK construction industry to become more productive, it is therefore on this premise that this research study is undertaken. However, it is also important that the US survey be modified to reflect the differences in context between the two countries and this will be described below.

2.1 Sample Population

The US surveys had hitherto been administered to the top 400 companies. This is felt to produce a certain bias towards the larger firms and may not necessarily embrace the views from the Small to Medium sized Enterprise (SMEs), which account for the majority of construction employers (Hillebrandt *et. al.*, 1995: 6). Thus, it is crucial that in this research study, a more representative sample population needs to be sought.

2.2 Construction Industry – A People-Oriented Industry?

Arditi and Mochtar (2000: 18) believed that “productivity in the construction industry is influenced not only by labour, but also by other factors such as equipment, materials, construction methods, and site management”. Hence, the analysis of the surveys reported in their paper took the view of “total productivity where inputs include labour, materials, equipment, construction methods, and site management”.

However, it is important to state that the central tenet in this study is the firm believe that that insofar as many factors affect the overall output of construction productivity, the construction industry is still very much a people-oriented industry. In 2000, the Movement for Innovation (M⁴I), a steering group resulting from the much cited Egan (1998) report, attributed the poor performance of the industry to the overlooking of the people issues in a report *A commitment to people “our biggest asset”*. As the steering group emphasized that “change and improvement will only happen through people, and in particular the efforts of all people working in the industry – it is they who ultimately determine practice and

performance”. (2000: 6) As such, this study looks distinctively at the aspects that influences construction labour (specifically referring to on-site labour) productivity.

2.3 Factor Model of Construction Labour Productivity

Thomas *et. al.* (1989) attempted to understand the influencing variables of the productivity of brickworkers and subsequently developed the factor model of labour productivity. Essentially an input-conversion technology-output model, they suggest a three-tier model in which *work environment* (e.g. weather, congestion etc.), *work to be done* (e.g. specifications and quality requirements, work content etc.) and indirect causes (e.g. overtime, shift work etc.) explain the variations of labour productivity levels.

Chan *et. al.* (2001b) observed that this and many other models of productivity fail to recognize explicitly the role of the most important input in construction, i.e. the workers themselves. Chan (2002) then adopted a qualitative approach and extracted rich information about what makes workers more productive through focus group interviews with site management personnel. Through this study, a fourth dimension is now added in this survey to the earlier three – *workforce issues* (e.g. site welfare, training and experience etc.).

Bearing in mind the fact that the central focus of this study is construction labour productivity, variables highlighted in the US studies have been repositioned to fit the four key areas of *work environment*, *work content*, *workforce* and *regulations*. Note that the variables under *indirect causes* have also been relocated. Therefore, variables deemed to affect total construction productivity and not specifically construction labour productivity such as computer utilization in the drafting of drawings, marketing and governing regulations applicable solely in the US have been omitted from the list of variables in this questionnaire survey.

3. METHODOLOGY

Postal questionnaires (see Appendix A) were sent out to management personnel of 400 different construction companies during Summer 2002. The list of construction companies was randomly selected from a computerised database system set up by the Chartered Institute of Building (CIOB).

The questionnaire can be viewed to contain three distinct segments. The first segment covering questions 1 to 9 are aimed at understanding more about the organizational profile of the responding company, in particular the size and nature of business. Questions include such issues as type of business, annual turnover, employment (personnel and equipment) structure and geographic location.

The second segment covering questions 10 to 12 form the most essential part of the questionnaire, and are targeted at the respondent’s views on construction labour productivity. Question 10 investigates the reality of productivity measurements in the industry by asking if the respondent actively monitors labour productivity levels. This is followed by the key question, which is directed at the respondents’ views as to what aspects of their labourers’ work would have a great impact on improving construction labour productivity. A total of 59 aspects were highlighted and the list had been selected from the US studies, the factor model of labour productivity and the focus group interviews mentioned earlier. A likert scale of 1 to 5 (1 being “virtually no impact”; and 5 being “very high impact”) is being used in this question, and respondents simply work down the list by ticking the appropriate number that reflects their views. Explanations of each individual aspect was also provided on a separate sheet in the survey.

The final segment covering questions 13 and 14 explores the respondents' attitude towards improving construction labour productivity. Unlike question 11 on productivity improvements, which merely subjects the respondent to a hypothetical situation, this segment contains questions with a definitive end and directly asks the respondents if they would like to do a specific thing about improving construction labour productivity. As respondents are mainly asked to tick the appropriate boxes, the questionnaire was designed so that respondents would not spend more than 15 minutes to complete it. An opportunity for the respondent to make additional comments about the general topic of construction labour productivity was also given at the end. It is also worth to note that the questionnaire was piloted to various academic members of staff and industrial partners to test the feasibility and understandability of the questionnaire.

4. MAIN FINDINGS

There was a return rate of 22% (85 companies) from the questionnaires. It is felt that in general, the respondents took the effort to properly complete the questions, and the data received may be taken as representative. Of the 85 companies, 9 companies did not offer any views due to the fear of disclosing sensitive information, reducing the effective response rate to 19% (76 companies).

Organisational profile of responding companies – 75% of the effective respondents were senior managers (e.g. director, partner, CEO), 17% were represented by middle management (e.g. project manager, construction manager etc.), 1% were junior staff (e.g. secretary), 3% were surveyors and 2% of the respondents did not disclose their job function within the responding companies. 66% of the companies engaged in building works; 11% engineering; 34% house building; 26% conservation and restoration; 8% specialist works and 8% were not specified. The total does not add up to 100% because some companies undertook more than one type of construction activity (see tables 1 and 2). This applies to the geographic spread of the companies as well. As expected, the greatest concentration (43%) of companies operates within the London and Home Counties region.

Table 3 summarises the key characteristics of the responding companies. With 47% of the responding companies earning less than £5 million in annual turnover, it is evident that the group of responding companies can be taken to be a representative group not merely in terms of geographic location, but in terms of size as well. This is distinctly different from the US surveys with a greater proportion of respondents from the higher turnover group since the US surveys concentrated on the top 400 firms across the country. Moreover, the nature of the responding companies appears to be consistent throughout the various categories highlighted in table 3. For example, 46% of the responding companies employ less than 100 subcontracting personnel at any given point in time, whilst 57% of the companies also employ less than 100 directly employed personnel. This implies that a majority of the responding companies can be classified as a Small to Medium sized Enterprise (SME). It is also worth to point out that the majority of the responding companies (91%) do not employ more than 25% of their annual turnover in construction equipment. This augments the fact that the British construction industry is an inadequately mechanized industry (Clarke and Wall, 1996: 57).

Perceptions of construction labour productivity improvements – More than half of the responding companies (53%) do not actively monitor labour productivity levels on their projects. Out of the 36 companies that do, 7 employ activity sampling technique; 9 employ work study; 9 employ time study and the remaining 11 do not use a specific technique to establish labour productivity levels. More specifically, the companies that do not use a specific technique to measure productivity levels tend to base their judgement of performance on gut feeling and experience of dealing with contract schedules. It is therefore not surprising to find

that 18 responding companies rely on quantity surveyors to monitor productivity levels since the principal role of quantity surveyors is to administer contracts. Nevertheless, it is still appalling to find that a greater proportion of the responding companies do not take an interest in establishing productivity levels, especially since one cannot really manage something that is not measured. This, however, does not seem unreasonable given that measuring productivity can be an arduous, time consuming and somewhat academic (activity sampling, work study and time study) task to undertake in an industry that is trying to retain and recruit people. Even the more recent CALIBRE technique developed by the Building Research Establishment (BRE) may be too expensive and deemed unnecessary for contractors to employ on site. Hence, none of the responding companies actually adopt the CALIBRE technique in establishing productivity levels.

Table 1: Breakdown showing personal profile of responding participants

	Percentage of respondents*
Senior management (e.g. CEO, director, partner etc.)	75 (57)
Middle management (e.g. project manager, construction manager, contracts manager etc.)	17 (13)
Junior staff (e.g. company secretary etc.)	1 (1)
Surveyor (e.g. quantity surveyor etc.)	4 (3)
Not given	3 (2)
	100 (76)

* The number in parentheses represent the actual number of respondents.

Table 2: Breakdown of geographical location and type of business of responding companies

Geographical location	Percentage of respondents	Type of business	Percentage of respondents
London & Home Counties	43	Building	66
South East England	34	House Building	34
Midlands	33	Conservation & Restoration	26
South West England	26	Engineering	11
Yorkshire	24	Specialist Works	8
North West England	22	Others	8
Scotland	22		
Wales	18		
Northern England	13		
Northern Ireland	5		
Ireland	4		
Other locations	7		

Table 4 tabulates the perceptions of the respondents with regards the potential areas of labour productivity improvements. From the table, it can be seen that emerging top of the groups of variables are the work environment issues. This is coherent to popular believe since work environment issues include factors that are conventionally known to be manageable such as site congestion, sequencing and interference, information flow and materials management. 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. Work content issues ranked second out of the four and this relates to the technicalities of construction projects, e.g. use of technology, quality and specifications, standardization and prefabrication. Though not directly manageable by on-site managers, the choice of undertaking a particular project in a productive way may be governed by the procurement route, in particular the choice of whether

to tender for a project. As the scope of change during the early stage of a project tends to be highly possible and most economical, proper planning during this stage is crucial in order to achieve optimum productivity.

Table 3: Breakdown of profile of responding companies

	Percentage of respondents		Percentage of respondents
Annual turnover		Total no. of direct employees	
Less than £5 million	47	Less than 100	57
£5 - £10 million	17	100 – 500	24
£25 - £50 million	8	500 – 1,000	7
£50 - £100 million	7	1,000 – 5,000	11
More than £100 million	21	More than 5,000	1
	100		100
Percentage of administrative personnel		Amount of work (£) sub-contracted	
Less than 25%	64	Less than £25 million	18
25% - 50%	18	£25 - £50 million	24
50% - 75%	9	£50 - £75 million	33
75% - 100%	9	More than £75 million	25
	100		100
Estimate no. of sub-contractors		Value of construction equipment as a percentage of turnover	
Less than 100	46	Less than 25%	91
100 – 500	24	25% - 50%	8
500 – 1,000	11	50% - 75%	1
1,000 – 5,000	14	More than 75%	0
More than 5,000	5		
	100		100
Percentage of construction equipment leased or rented			
0%	20		
Less than 25%	53		
25% - 50%	3		
50% - 75%	11		
More than 75%	13		
	100		

Ranked third are workforce issues. This is alarming, as one would have expected that workforce issues should be top of management's priority given the labour-intensiveness of the industry. Perhaps the rise of self-employment in the 1970s and the regular use of contract labour, together with the virtual non-existence of an appropriate training structure (and culture), could explain the respondents' lack of confidence in managing the workforce to achieve a higher rate of productivity. This may also be the reason as to why much research in the field of productivity tended to focus on such issues as lean construction and robotics. The lack of confidence in the training structure within the UK construction industry is also mirrored by the scores of the sub-group *skills training and qualifications*. Ranked 10th out of 11, the individual scores of the various qualifications are also rated very poorly by the respondents. With the exception of the modern apprenticeship scheme (which ranked 34 out of 55), it is evident that the respondents perceive such schemes as the CITB short courses, NVQs/SVQs, Construction Skills Certification Scheme (CSCS) and the Investors in People (IIP) as not very important when it comes to improving the performance of projects. This reinforces the idea that many of these schemes offer only lip service to the industry [Callender, C (1992); Clarke, L and Wall, C (1998)].

Table 4: Potential areas of labour productivity improvements as perceived by respondents

Code	Description	Mean	Rank	Group Mean	Group Rank
	Work Content Issues			3.5661	2
	Building Components	3.5401	(6)		
A01	Standardisation	3.9333	10		
A02	Prefabrication	3.9595	9		
A03	Size of Components	3.1486	41		
A04	Availability of Components	3.7808	19		
A05	New Products	2.8784	51 =		
	Building Design	3.5859	(4)		
A06	Uniqueness	3.0822	44		
A07	Simplicity	4.3600	2		
A08	Quality Requirements	3.5205	26		
A09	Specifications	3.5342	25		
A10	Construction Technology Involved	3.4324	32		
	Planning	3.5740	(5)		
A11	Cost Control	3.3425	33		
A12	Resource Allocation	3.8082	16		
A13	Scheduling	3.6933	21		
A14	Experience of Planner	3.4521	30		
	Work Environment Issues			3.6694	1
	Site Factors	3.9525	(1)		
A15	Congestion	4.0000	8		
A16	Weather	3.8514	15		
A17	Sequencing and Interference	3.9324	11		
A18	Rework	3.7945	18		
A19	Information Flow	4.1842	4		
	Materials	3.6647	(3)		
A20	Procurement	3.8919	12		
A21	Delivery	4.0270	6		
A22	Storage	3.3378	34 =		
A23	Packaging	3.0405	46		
A24	Availability	4.0263	7		
	Plant and Equipment	3.3911	(8)		
A25	Capacity	3.3014	37		
A26	Availability	3.5867	22		
A27	Simplicity	3.2432	39		
A28	Maintainability	3.2703	38		
A29	Utilisation	3.5541	24		
	Workforce Issues			3.3818	3
	Site Management	3.8967	(2)		
A30	Supervision	4.3684	1		
A31	Communication within gangs	3.8767	13		
A32	Communication within company	3.7703	20		
A33	Communication with sub-contractors	4.0541	5		
A34	Communication with suppliers	3.7973	17		
A35	Health and Safety Management	3.5135	27		
	Personnel Management	3.3914	(7)		
A36	Turnover	3.4459	31		
A37	Availability	3.8667	14		
A38	Level of pay	3.4933	28		
A39	Bonus Schemes	3.1233	43		
A40	Training Investment	3.4730	29		
A41	Job Prospects	3.3108	36		
A42	Welfare Amenities	3.0270	48 =		
	Skills Training and Qualifications	3.0950	(10)		
A43	Secondary School Qualifications (GCSE)	2.8784	51 =		

Table 4: Continued

A44	HNC / HND	3.0274	47		
A45	Degree / Postgraduate Qualifications	2.9589	50		
A46	Modern Apprenticeship	3.3378	34 =		
A47	CITB Short Courses	3.0270	48 =		
A48	NVQs / SVQs	3.0135	49		
A49	Construction Skills Certification Scheme (CSCS)	2.8356	52		
A50	Investors in People (IIP)	2.4865	53		
A51	Level of Site Experience	4.2895	3		
	Work Time	3.2380	(9)		
A52	Working Hours (include overtime)	3.5600	23		
A53	Shift Work	3.1351	42		
A54	Travelling Time to Work	3.1892	40		
A55	Site Administration Duties	3.0676	45		
	Regulations	2.6475	(11)	2.6745	4
A56	Building Regulations	2.8784	51 =		
A57	Health and Safety and CDM	3.3158	35		
A58	Equal Opportunities Act	2.1216	55		
A59	EU Directive on Working Time	2.2740	54		

Despite the somewhat bleak picture painted on the confidence of managing workforce issues, it is interesting to note that within this group contains three of the top five ranking variables, namely supervision (rank 1), level of site experience (rank 2) and communication with sub-contractors (rank 5). Ranked 4 and 5 are information flow and simplicity of building design respectively. Supervision, level of site experience and simplicity of building design further emphasizes the shortage and deficiency in the skills and training of the workforce; whilst communication with sub-contractors supports the fact that the industry is dependent on contract labour. Relating to skills and training, an overwhelming 82% (62 respondents) perceived a strong link between training and labour productivity level.

As predicted, regulations came out as the least potential group of factors aimed at improving productivity. It is, however, notable that Health and Safety and CDM (rank 35) should rate relatively more favourable than the other regulations. Chan *et. al.* (2001a: 400), in a report covering the skills training of the UK construction industry, observed an “obsession with health and safety” and revealed that “companies seem willing to undertake training in health and safety”. He attributed this phenomenon to the introduction of the Construction (Design & Manage) [CDM] 1995 regulations and the stricter enforcement of penalties for breaches in health and safety. Perhaps this could offer an explanation for the ratings for the study here as well.

Attitude towards improving productivity – it is found that most of the respondents would like to serve as a member of a group that identifies construction labour productivity problems (12%), conduct (15%), evaluate (17%) and disseminate (17%) the results of a project aimed at improving construction labour productivity. However, contributing funds to support labour productivity improvement programmes (6%) and subscribing to a construction labour productivity information service (2%), which might imply some form of financial contribution, appeared to score less favourably among the respondents as anticipated. This reflects the short-termism and emphasis of the bottom line, i.e. profits, of the industry.

Table 5: Respondents' willingness to participate in improving productivity

	Percentage of respondents
Serve as a member of a group that identifies construction labour productivity problems	12
Contribute funds (together with other companies) to support programmes aimed at improving construction labour productivity	6
Help develop a project aimed at improving construction labour productivity	13
Conduct (or participate in) a project aimed at improving construction labour productivity	15
Evaluate the results of a project aimed at improving construction labour productivity	17
Disseminate the results of a project aimed at improving construction labour productivity to your workforce through training	17
Attend construction labour productivity conferences and meetings	14
Subscribe to a construction labour productivity information service	4
Others	2
	100

4.2 Is the quantitative data real?

Marking perceptions using a likert scale may at times inhibit the true feelings of the respondent. As McQueen and Knussen (2002: 89) affirmed the “problem with asking subjects to choose a numerical value indicating a particular view or attitude is sometimes people are unclear as to how their feelings can convert to a number; or they may be reluctant to select extreme values, or unsure of how one scale value differs from the next”. Respondents were therefore given space in the questionnaire to offer additional comments where appropriate. This section shall briefly look at some of these comments and establish any consistencies with the results already presented.

Although *workforce issues* ranked third of four groups, the majority of the comments were geared towards recruiting and retaining experienced site labourers. Site welfare (ranked 48 out of 55) seems to play an important role in boosting construction labour productivity as the managing director of an SME based in the Midlands writes:

“...if you make each person of the labour force feel they are an essential and valuable part of the team and their views and welfare are important, together with treating them in a fair and reasonable manner, coupled with job security (ranked 36 out of 55), this would increase productivity. To achieve this, the employee needs only to be on average wages because they would trade high wages for the above benefits.”

This is reiterated by other respondents who claim that making the industry more attractive to potential recruits and ensuring that training is relevant would not only boost the recruitment and retention of valued experienced staff, but aid in improving productivity levels. Prefabrication and standardization were also suggested to be the way forward, but as the project manager of a major national contractor qualified:

“...this cannot be sustained without the long-term support required. In recent years, clients who claim to be progressive in their attitudes really only care about short-term profits.”

Perhaps the lack of investment in terms of personnel development (e.g. training and welfare) and job enhancement (e.g. equipment) represents the lack of long-term support and

reiterates the mercenary nature of the construction industry mentioned earlier. As an Irish contractor sums up the importance of investment:

“...Productivity will be increased by the use of proper equipment, plant and tools; reduction in actual physical effort required; dry, comfortable working environment, and; establishment of more pride in the jobs.”

5. DISCUSSION OF RESULTS

The preliminary results of this research study presented in this paper form the exploratory stage of an overarching Ph.D. research project and further similar surveys are expected to be conducted among the blue-collar sector of the industry as the coming stages unfolds. As such, this paper offers the reader a flavour of the results, as opposed to definitive trends obtained through rigorous statistical analysis.

A comparison of the ranking between the US and UK surveys are depicted in table 6 below. Despite the unquestionable differences between the set up and analysis of the US and UK surveys, the rankings indicate a number of similarities by surface comparison with the US surveys. For instance, prefabrication and standardization, which rated high in the US studies, emerged as 9 and 10 in this study respectively. Arditi and Mochtar (2000) highlights that “with increasing architectural and structural complexity... material standardization has become more effective than before in improving productivity”. This is also supported by the importance of design practices in the US (ranked 3) and simplicity of building designs in the UK (ranked 2).

Table 6: Comparison between the US studies and this survey of the top 10 potential areas

Potential area	US ¹	UK
Supervision ^a		1
Level of site experience of the workforce ^a		3
Information flow ^a		4
Delivery of materials		6
Availability of materials		7
Site congestion ^a		8
Training ^c	1	
Quality control	2	
Design practices	3	
Simplicity of design		2
Scheduling	4	
Standardisation	5	10
Cost control ^b	6	
Prefabrication	7	9
Communication	8	5 ^d
Value engineering ^b	9	
New products	10	

¹ US ranking based on average scores in the 1993 survey

^a Not in the US survey (included to reflect the addition of workforce issues)

^b Not in the UK survey (due to inappropriateness specifically to construction labour productivity)

^c Further classified into various training schemes and qualifications in the UK survey

^d Related particularly to communication with the sub-contractors in the UK survey

One striking difference from the rankings would be the issue of training. Emerged top in the US surveys, this is remarkably different in the UK. Arditi and Mochtar (2000) explained that this was due to “the decline of union membership and union shop contractors... inevitably makes contractors rely on a workforce that may or may not have been trained properly in

their respective trades”, a trend that is not dissimilar in the UK [Clarke and Wall, 1998, Chan *et. al.*, 2001a]. There is a possibility that while the US respondents indicated the steps they would like to see taken to improve labour productivity; many of the UK respondents feel that training investment (ranked 29 in the UK survey) should be provided by a third party e.g. the CITB. In other words, unless it is legislated (e.g. Health and Safety and CDM, as evident in the scores above), UK contractors feel that the training of the workforce is beyond their control and thus will not aid in improving productivity. This is further supplemented by the fact that both US and UK contractors are willing to reap the benefits of projects aimed at improving construction labour productivity, but are reluctant in paying for it.

6. CONCLUSIONS AND RECOMMENDATIONS

The questionnaire survey conducted in this study marks the first attempt in the UK to extract the perceptions of contractors with respect to the potential for improving construction labour productivity. The key motivation to this research study stems from similar surveys conducted in the US over the last three decades. Preliminary findings emphasize the importance of supervision, communication, retention of experienced labourers, simplicity of building designs and management of information flow. The training of the workforce and the provision of welfare amenities, both of which improve recruitment and retention in the industry, are also vital as evident in both the US and the UK. Given the attitudes of UK contractors with regards improving construction labour productivity, it is therefore suggested that the government and training bodies such as CITB take a more active role in encouraging change.

7. ACKNOWLEDGEMENTS

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Appendix A

Name : (Optional) _____
 Company/Organisation : (Essential) _____
 Job Function : (Essential) _____ Years of Experience : _____
 (in the Construction Industry)

Please tick where appropriate.

1. Type of Contractor

Building (Educational, Commercial etc.)	<input type="checkbox"/>	Conservation & Restoration	<input type="checkbox"/>
Engineering (Infrastructure etc.)	<input type="checkbox"/>	Specialist Works	<input type="checkbox"/>
House Building (Residential etc.)	<input type="checkbox"/>	Others (please specify)	<input type="checkbox"/>

2. Annual Turnover (£ million)

Under 5	5 – 25	25 – 50	50 – 100	Over 100
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Total Number of Direct Employees

Under 100	100 – 500	500 – 1000	1000 – 5000	Over 5000
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Percentage of Administrative Personnel (i.e. Non-Tradesmen)

Under 25%	25 – 50%	50 – 75%	Over 75%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Amount of Work (£) Sub-contracted on Average

Under 25%	25 – 50%	50 – 75%	Over 75%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Estimate Number of Subcontractors (Number of People) Per Financial Year

Under 100	100 – 500	500 – 1000	1000 – 5000	Over 5000
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Total Value of Construction Equipment as a Percentage of Turnover

Under 25%	25 – 50%	50 – 75%	Over 75%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Percentage of Total Construction Equipment Leased or Rented

None	Under 25%	25 – 50%	50 – 75%	Over 75%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Geographic Location of Projects

London & Counties	<input type="checkbox"/>	South West	<input type="checkbox"/>	Wales	<input type="checkbox"/>
Midlands	<input type="checkbox"/>	South East	<input type="checkbox"/>	North West	<input type="checkbox"/>
Yorkshire	<input type="checkbox"/>	Northern	<input type="checkbox"/>	Scotland	<input type="checkbox"/>
Northern Ireland	<input type="checkbox"/>	Ireland	<input type="checkbox"/>	Others (please specify)	<input type="checkbox"/>

10. Does your company/organisation actively monitor labour productivity levels on the projects?

Yes No

If yes, please indicate which method(s) your company/organisation adopts and state who is responsible for this activity. (Please tick all those that apply.)

Activity Sampling	<input type="checkbox"/>	CALIBRE	<input type="checkbox"/>	Who is responsible?
Work Study	<input type="checkbox"/>	Others (please specify)	<input type="checkbox"/>	_____
Time Study	<input type="checkbox"/>	_____		_____

11. Using the following scale, please tell us if you think the following areas have a great impact on improving construction labour productivity. (Please ONLY TICK ONE that applies.)

1: Virtually no impact 2: Little impact 3: Average impact 4: High impact 5: Very high impact

Work Content Issues

Building Components

Standardisation	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Prefabrication	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Size of Components	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Availability of Components	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
New Products	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

Building Design

Uniqueness	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Simplicity	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Quality Requirements	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Specifications	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Construction Technology Involved	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

Planning

Cost Control	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Resource Allocation	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Scheduling	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Experience of Planner	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

Work Environment Issues

Site Factors

Congestion	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Weather	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Sequencing and Interference	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Rework	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Information Flow	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

Materials

Procurement	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Delivery	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Storage	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Packaging	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Availability	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

Plant and Equipment

Capacity	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Availability	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Simplicity	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Maintainability	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Utilisation	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

Workforce Issues

Site Management

Supervision	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Communication within gangs	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Communication within company	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Communication with sub-contractors	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>
Communication with suppliers	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>

1: Virtually no impact 2: Little impact 3: Average impact 4: High impact 5: Very high impact

Health and Safety Management 1 2 3 4 5

Personnel Management

Turnover 1 2 3 4 5

Availability 1 2 3 4 5

Level of pay 1 2 3 4 5

Bonus schemes 1 2 3 4 5

Training Investment 1 2 3 4 5

Job prospects 1 2 3 4 5

Welfare amenities 1 2 3 4 5

Skills Training and Qualifications

Secondary School Qualifications (e.g. GCSE) 1 2 3 4 5

HNC/HND 1 2 3 4 5

Degree/Postgraduate Qualifications 1 2 3 4 5

Modern Apprenticeship 1 2 3 4 5

CITB Short Courses 1 2 3 4 5

NVQs/SVQs 1 2 3 4 5

Construction Skills Certification Scheme (CSCS) 1 2 3 4 5

Investors in People (IIP) 1 2 3 4 5

Level of Site Experience 1 2 3 4 5

Work Time

Working hours (include overtime) 1 2 3 4 5

Shift work 1 2 3 4 5

Travelling time to work 1 2 3 4 5

Site administration duties 1 2 3 4 5

Regulations

Building Regulations 1 2 3 4 5

Health and Safety and CDM 1 2 3 4 5

Equal Opportunities Act 1 2 3 4 5

EU Directive on Working Time 1 2 3 4 5

Please rank the groups of potential areas of labour productivity improvement according to the level of importance, with '1' being most important and '4' being least important.

Work Content Issues

Work Environment Issues

Workforce Issues

Regulations

12. Do you see a strong link between the level of training and the level of labour productivity?

Yes No

13. Please indicate the type(s) of action your company/organisation would take in the interest of improving construction labour productivity. (Please tick all those that apply.)

Serve as a member of a group that identifies construction labour productivity problems

Contribute funds (together with other companies) to support programmes aimed at improving construction labour productivity

Help develop a project aimed at improving construction labour productivity

Conduct (or participate in) a project aimed at improving construction labour productivity

Evaluate the results of a project aimed at improving construction labour productivity

Disseminate the results of a project aimed at improving construction labour productivity to your workforce through training

Attend construction labour productivity conferences and meetings

Subscribe to a construction labour productivity information service

Others (please specify) _____

14. Please tick the box if you (or your company/organisation) wish to be contacted during the course of this research for a further discussion on construction labour productivity.

If you tick the box, please leave a contact name, address, telephone number and email address.

Name : _____

Address : _____
Postcode: _____

Telephone : (Include STD) _____

Email : _____

We value your comments relative to problems or solution directions for construction labour productivity. Please make these comments in the space below, or on a separate sheet of paper (if necessary), and return to us via the prepaid reply envelope enclosed.