UNIVERSITY OF CAMBRIDGE

Transforming construction: impact case study

Benefits to industry: more accurate scheduling of resource and works; less disruption; improved absenteeism; enhanced efficiency and productivity; valuable resource for the improved management of human resources.

Understanding workforce motivational factors to incentivise improved productivity in pre-cast concrete construction

The challenge to industry

Improving productivity in construction is a focus for government and industry. The drive to succeed in both domestic and international markets has increased pressure on the construction industry to deliver greater efficiency. While innovation and technology have a significant part to play in achieving this goal, labour remains an essential component of success.

The construction industry is one of the most people-reliant industrial sectors. Labour is the most uncertain factor among numerous contributions to project cost. Manpower, which constitutes 25 to 40 per cent of total construction costs, is almost wholly under the control of site management.

Workforce can significantly influence the schedule and quality of a project. The management of labour and its productivity is paramount in determining project success. With such dependence upon the performance of the site labour to meet productivity there is much to be gained from considering how to best achieve project goals.

The proposed solution

New technologies, smart design and planning can improve productivity, but there is an ever-present requirement for physical labour in current construction techniques.

This research brings focus to the productivity of the assembled workforce in order to understand the motivational factors that affect this specific group of workers. Knowledge of motivational factors was used to inform productivity improvements through incentivisation programmes. A better-informed programme offers managers a valuable resource for the improved management levels of human resources.

The approach

Semi-structured interviews were completed early in the study to assist in generating the first forms of questionnaire and site trials. Interview results showed the workforce of those interviewed could be more productive and motivated, yet the use of schemes to improve motivation was limited.

The UK's largest national concrete frame contractor utilising pre-cast concrete participated in this study. Workers directly involved in pre-cast concrete construction, along with their assisting trades and supervisors, were targeted.

An anonymous and concise questionnaire survey format was used to encourage response. Three sections collected:

- personal data to provide context (age, trade, time in trade, nationality)
- worker opinion of leading productivity factors
- motivational factors important to the workforce.

The questionnaire was piloted with a selection of 20 workers, followed by a project of 80 workers. With minor amendments, this was then distributed to a wider field of 400 workers, over eight projects. The returns from each project were collated separately to allow for reliability checking before being combined.

Descriptive statistics – a statistical distribution by age, nationality and time in trade against the productivity, personal and motivational factors – informed the ranking of personal and motivational factors by demographics.

Understanding the relationship between factors is key to knowing if an incentive scheme can be used to improve motivation or if a basic managerial approach is more suitable.

Motivation and productivity

Incentive schemes are universally used to improve productivity, but the specific factors affecting the relevant workforce must be fully understood in order to achieve optimal results. Research into factors affecting productivity in the construction industry has ranked motivation and incentivisation as highly important.

Evaluation of factors affecting productivity highlighted the importance of demographics, including age, trade, time in trade and nationality. From this study it is clear that there are differing drivers dependent upon demographics. Results identified the variability of perceived importance of personal and motivational factors, which can be applied (by targeting these factors) in the development of incentive schemes to improve productivity in pre-cast construction.

Data analysis established three factors perceived important by respondents, with significant relationship to age and time in trade:

- good communication
- quality of work done
- opportunity for promotion.

By better understanding the demographic of the workforce and their motivational factors, an effective incentive scheme can be designed to support and improve productivity.

Onsite incentive scheme

A series of site trials took place to collect further data. A pilot trial was completed on one site with 70 operatives between September and November 2014. This was extended to six sites by December 2014, capturing more than 400 operatives and monitored until June 2015. The incentive scheme was as follows:

- the primary incentive was a fixed financial reward based on meeting all scheme criteria, not upon meeting productivity targets
- attainment of the financial reward was based on safety performance and could be withheld for individual or collective safety failings. This was also the case for quality of completed works
- individual payments were made dependent upon the operatives completing a full week's shift pattern with no unauthorised absence.

Significant results

The data from the site trial incentive scheme highlighted a number of immediate benefits. A criterion of behaviour was linked to a minor financial incentive payment (approximately three per cent of weekly pay). For this limited cost the project team were able to improve individual behaviours towards absenteeism and improve whole shift attendance.

On the pilot site, there was an average 15.8 per cent improvement on whole weekly shift attendance, with a five per cent increase in hours worked by the total workforce.

The incentive scheme resulted in significantly improved attendance by the available workforce across all sites and as such increased the hours worked. Supervisors reported that being able to rely on operatives attending shifts enabled better planning and delivery of works.

Benefit to construction industry

The results of this research demonstrate that true benefits can be realised by following an incentive programme which is informed by the demographic of the workforce and their motivational factors.

Better understanding workforce motivational factors can incentivise improved productivity in pre-cast concrete construction. Reliable attendance enables management to schedule resource and works accurately and with less disruption.

The Laing O'Rourke Centre for Construction Engineering and Technology, in the University of Cambridge Department of Engineering, was launched in 2011 with industry partner Laing O'Rourke to fulfil a shared vision of transforming the construction industry through innovation, education and technology. The Construction Engineering Masters (CEM) degree programme is designed to shape the next generation of industry leaders and undertake innovative research projects that deliver value to industry.

Case study

This case study is based upon a Laing O'Rourke Centre for Construction Engineering and Technology Construction Engineering Masters dissertation titled: *Understanding workforce motivational factors to incentivise improved productivity in pre-cast concrete construction* (2016). The research is by Thomas Mullens, Project Leader, Laing O'Rourke.

Further details

For more details about this case study contact:
Centre Manager
Laing O'Rourke Centre for Construction Engineering and Technology
Department of Engineering
University of Cambridge
Tel: +44(0)1223 332812
Email: centre.manager@construction.cam.ac.uk
Website: www.construction.cam.ac.uk