

# **CITB-ConstructionSkills action learning project – supply chain integration, logistics and e-trading**

## **Efficiency and effectiveness in construction logistics, a research report into Transport, Stockholding and the Efficient use of On-site Labour**



**DENNE**



March 2006

## Contents

	<b>Acknowledgements</b>	2
	<b>Foreword</b>	2
	<b>Introduction to the logistics research</b>	3
<b>1</b>	<b>Transport, introduction</b>	5
1.1	Lorries have empty or part loads	5
1.2	Lorry travel distance	7
1.3	Drop-off and pick-up	7
1.4	Waiting of lorries	8
1.5	Scheduling of material unloading	10
<b>1.6</b>	<b>Summary and conclusions</b>	12
<b>2</b>	<b>Stockholding, introduction</b>	13
2.1	Stockholding scenarios	13
2.2	Efficiency of storing materials	15
2.3	Length of time materials are stored on site	17
2.4	Degree of double handling	19
2.5	Extent to which the right materials arrive at the right time	21
2.6	Positioning of materials in the most appropriate location	25
2.7	Degree of damage and material waste on site	26
<b>2.8</b>	<b>Summary and conclusions</b>	27
<b>3</b>	<b>Efficiency of on-site labour, introduction</b>	30
3.1	Degree to which skilled people are able to apply themselves uninterrupted to their work	30
3.2	Provision for managing material handling and distribution	36
3.3	Degree of reworking	37
<b>3.4</b>	<b>Summary and conclusions</b>	38

## **Acknowledgements**

I wish to express thanks to all those involved in supporting this research project. This includes Ben Cartwright of CITB-ConstructionSkills for leading the research initiative. It also includes Steve Reed, Contracts Manager at Denne Construction, for the two projects reviewed in this research, and the Project Managers, Pat Leyden at Ordell Road and Chris Page at Talwin Street, who discussed the issues at length and helped to review the various drafts of the report. I would also like to thank the numerous trade contractors, lorry drivers and site staff who provided valuable insights. This includes in particular Ian Hayes-Coles, Site Manager at Ordell Road.

Nicholas Fowler  
Centre for Performance Improvement  
March 2006

## **Foreword**

This research explores issues that were raised in the Strategic Forum's Construction Logistics Group's report 'Improving Construction Logistics' which was published in

August 2005. The report identified four key areas in which to focus attention. These areas are:

- design
- transport
- stockholding
- more efficient use of on-site labour.

This report represents the findings of research into three out of the four areas identified by the Strategic Forum's Construction Logistics Group. Design was omitted on the basis that much of the design work had already been completed by the time this research commenced.

The research was carried out on two projects being undertaken by Denne Construction.

The first project (Ordell Road) consisted of the construction of 146 one and two bedroom apartments set within three blocks, and 14 town houses. The scheme was undertaken on a design and build basis using traditional brick and block construction. The scheme commenced in December 2003 and delivered to programme in September 2005. Both projects provided a great deal of useful research material, as they were inner city sites involving a high level of construction activity.

The second project (Talwin Street) consisted of three blocks of flats ranging from four to five stories constructed with a reinforced concrete frame and a block of three storey flats built using brick and block construction. This project commenced in July 2004 and was completed on schedule in December 2005.

## **Introduction to the logistics research**

This research project reviewed the factors that affect three areas of logistics activity: transport, stockholding, and the efficient use of on-site labour. The purpose was to explore the issues affecting these three areas and to see how they are currently managed in order to gauge their impact on construction projects.

The management of logistics on the two sites chosen for this research project, Ordell Road and Talwin Street in Tower Hamlets, could both be regarded as examples of good practice in the industry. So as well as an exploration of logistics issues this research report also highlights elements of good practice. Both of these projects were subsequently short listed for an award under the Considerate Contractors scheme.

This report examines the efficiency and effectiveness of the construction management process. So before starting on the review it is worth exploring the basics of how construction activity takes place. The construction process can be seen as the execution of a series of activities. A construction programme sets out a logical sequence in which these activities, or tasks, are to be performed. Within any programme there will be some flexibility as to the order in which some of the tasks are carried out.

For any activity or task to be performed there are a number of conditions that must be satisfied. These conditions consist primarily of the availability of certain resources at the time in which the task is to be performed. These conditions consist of the availability of:

- appropriately skilled labour
- materials
- access to the area

- plant and equipment
- design information
- completed previous task(s)
- an agreed method and permissions in which to operate

and

- acceptable weather conditions.

If one of these conditions is not satisfied then the task cannot be performed and the construction process is delayed. Coordinating resources so that the first seven of these conditions can be satisfied is essentially the process of logistics management. The higher level processes of planning, managing, and reporting on these activities fall under the title of project management. A useful distinction to make is that logistics deals with efficiencies while project management deals with effectiveness.

One of the issues to emerge from this report is that efficiencies in operational matters within logistics do not necessarily improve the effectiveness of the construction process. The effectiveness of the construction process can best be judged by how well the project is able to deliver the objectives of building to budget, programme and quality.

The research turned up many examples of practices or events that could be described as inefficient in the sense that they involved 'waste'. By the term waste we use the 'lean thinking' definitions of transportation, stockholding, waiting, scrap etc. However, in a project environment, which is subject to considerable levels of uncertainty, many of these practices were logical and enabled the projects to be delivered effectively.

The other issue relating to effectiveness is differentiating between activities that are on the critical path and those that are not. Improving the efficiencies of tasks that are not critical will not necessarily lead to any improvement against the construction programme.

What is clear from the report is that there are significant areas that the industry can work upon to improve both its effectiveness and its efficiency. Doing so will allow projects to be delivered faster and will also improve profitability for all organisations involved in the construction process.

One of the key points that this research revealed is that successful logistics management derives from investment in site prelims and supportive management practices. Site prelims cover such items as site office set up, welfare facilities, plant and equipment, storage facilities etc. Supportive management practices include the establishment of a logistics plan, scheduling material deliveries and crane usage, the development of supply chain arrangements etc. These management practices are paid for out of the project and company overheads.

One of the conclusions that we can draw from this is that to derive improved performance on our construction projects we need to invest more in our site prelims and overheads. However, current practice in procuring projects based on lowest site prelims, lowest overheads and lowest profits, is encouraging the opposite to happen.