

# Improving construction logistics

Logistics and supply chain management in the New Zealand construction industry are poorly understood and inefficient. Using an Auckland building project as a study, BRANZ research has started to fill in the gaps.

**MATERIAL COSTS TYPICALLY** amount to 50-60% of an average construction project cost. Their timely delivery controls 80% of the project's schedule, and transportation costs of construction materials equate to 30% of the total construction costs.

## **Transport costs are significant**

The implication is that about half of the cost of materials is directly related to the physical movement of materials from source to building site. However, these transportation costs tend to be invisible because they are embedded in the total pricing of materials.

There are two key reasons for the significant transport costs:

- Construction materials are generally relatively low value but have a high volume and mass, making transport proportionately more significant. When mass and volume is high, it is much more cost-effective to optimise transportation.
- Most delivery vehicles arrive full and leave empty - at best, loading on vehicles is only 50% efficient.

Construction logistics are far from an optimised system. However, transportation optimisation is rarely, if ever, incorporated into non-price attributes for supplier selection in construction projects.

Other industries have far better transport planning. For example, the supermarket sector employs logisticians that plan for optimal use of all transportation movements, including backhaul loads.

## **Room to improve logistics**

Industry logistics traditionally involve either the contractor going to the supplier to pick up materials or materials are delivered to site.

These deliveries occur on an ad hoc basis to various locations

locally and nationally. Only limited management skills and information exchange are commonly employed.

Techniques for improving construction logistics include:

- implementing strategic logistics planning across the full supply chain
- utilising consolidation centres
- just-in-time delivery to the workplace
- adding a logistics specialist to construction project teams.

These are mutually inclusive techniques, and other countries have found that construction consolidation centres can reduce 50% of vehicle movements and 35% of material waste.

Systematic application of supply chain management techniques will address most critical logistics issues and thereby reduce construction costs and improve industry performance. However, these known techniques are hardly used in the New Zealand industry due to inertia and fragmented processes and responsibilities.

## **Research to understand supply chain logistics**

BRANZ, in partnership with the Auckland University of Technology (AUT), is researching the current nature of the building and construction sector's supply chains and logistic processes in Auckland.

The research, *Mapping of Auckland's construction lifelines*, aims to:

- build understanding of current industry practice and attitudes in construction supply chain management
- develop baseline data on material transport flows associated with building and construction projects in Auckland.

To increase understanding of current practice in New Zealand, the research captures the views of practitioners on adopting a more structured approach to organising construction logistics processes.

### **Auckland project a case study**

A large commercial construction project is being studied in the Auckland CBD. This includes collecting data on typical material transport deliveries and examining the organisation and the handling of its supply chains so that their structure, responsiveness and efficiency in the dense urban conditions can be assessed.

Working in environments such as Auckland's CBD brings additional challenges. Material deliveries have to be closely matched with actual work demand due to the limited on-site storage space.

Only the smaller quantities required for 1 or 2 days' work can typically be accommodated. This results in more frequent smaller deliveries that often underutilise the capacity of supply vehicles.

### **Limited access hours has impact**

Construction projects in the inner city have strict operating hours on working days. This means that construction logistics are forced to use congestion-sensitive inner-city roads during peak hours.

Factors such as essential volumes of materials, limited on-site storage space and more frequent and peak hour deliveries have considerable impact on construction and the urban built environment.

The case study is identifying essential cost and organisational factors driving suboptimal logistic planning. Once the transportation cost factors in the supply chain are identified and linked to the organisational structure, those that would benefit from efficient logistics planning can be recognised.

### **Efficiency gains would increase productivity**

Unfortunately, overseas research suggests that the people required to do things differently often don't gain direct benefits from a more optimised logistics planning model.

For example, the current subcontracting models used by main contractors transfer all responsibility for the purchase and delivery of materials to subcontractors under conditions that mean they cannot gain any direct monetary benefits from coordinating transportation and stimulating logistics optimisation.

This is a major impediment to optimising construction logistics. As solutions depend on recognition, the costs of construction logistics in the material price need to be addressed and recognised before proposing options on how to improve construction logistics performance for higher efficiency and productivity.

### **Study continues and will assist project teams**

The baseline data collected on material transport flows can be used for developing scalable benchmarks and guidelines to help the main contractor improve site planning, storage planning and on-site planning.

Well planned loading bay areas, efficient material management and reduced handling waste should increase construction productivity.

Insights from the case study should encourage construction project teams and their suppliers to implement integrated construction logistics planning, reducing overall project costs, improving productivity and mitigating negative impacts on the local urban environment. ◀



The Auckland CBD project in the case study.