A more efficient construction site - use of a third part logistics company’s material handling services

This article is a summary of a master degree report authored by Patrik Lindgren and Tomas Ottosson at Lund University, Sweden (2008).

Introduction
30-35% of the production cost in construction projects comes from activities which do not add any value to the customer, waste. This waste has been estimated to cost the Swedish customers up to 5.5 billion Euros a year and results in e.g. high building costs. Most of the waste is in one way or another linked to the logistics within the construction sites.

Waste can be categorized into two groups, pure waste and necessary waste. Pure waste does not result in any value to the costumer and needs to be eliminated. Necessary waste is, as it sounds, necessary in order to finish the building but contains in most cases unnecessary factors.

The waste can take many forms and shapes and is to be found in basically all activities relating to the in-hose material flow e.g. waiting, searching, damages, thefts, controls, movement and production interference. Combinations of the waste categories make up to 50% of a construction workers day.

Lean construction is a philosophy that aims to reduce or eliminate waste. In short lean means to do more with fewer resources. Tools for making this possible are e.g. “just in time” deliverances and to continuously conduct case studies on site and evaluate them. Just in time means that the material arrives in the exact quantity at the right time and to the right place all according to a pre agreement.

Another tool is to outsource activities to companies which can manage them more efficient.

Question of issue
Is it possible or manageable to decrease the waste’s scope by using alternative methods instead of the traditional? If a construction site can be rendered more effective through the use of third part logistics companies’ services will be examined. In order to respond to this the following questions were asked:

1. How much is the actual total cost for plaster on selected construction sites?
2. How is the total cost influenced if a third part logistics company is engaged?

Purpose
The aim of the report was to describe and map out the total cost for plaster on construction sites and calculate what the entire process actually cost and at the same time visualize activities that could be classified as non value added (waste). The total cost was then compared with the total cost of an alternative method to manage plaster at.

Delimitation
The demarcation concerns only the construction material plaster from the time it arrives to a construction site till it is time to rig the plaster.

Method
The report is mainly based on case studies where the participants have been “well known non participants”. Quantitative studies constitute the spine of the research but also qualitative elements characterize the report through continuous interviews on the reference objects. During the case studies a holistic position has been applied when all events that arise on a construction site
influence and mould next event. The conclusions will mainly be deductive when it comes to the results of the total cost but also inductive conclusions grow forward as interviews are implemented on the reference objects.

**Case study**

The case studies have been conducted on two reference objects, one NCC and one PEAB construction site, both located in the centre of Malmö, Sweden. Both of them are handling the plaster the traditional way, thus placing construction material on the floor structure before the next floor structure is in place which means that the material is being stored a long time before the rig take place.

The third part logistics company which is analyzed in this study is called Bygglogistik GBG AB. There are two main differences between this company and the traditional way of handling construction material. First, the ordered material arrives the night before the rig will take place (just in time). Second, Bygglogistik GBG AB has its own workers, equipment and tools sparing the construction companies’ resources. In short the practical difference is that the building workers no longer have to spend time handling material and can focus on just to rig the material, consequently what they are educated to do.

The question is then if Bygglogistik GBG AB can conduct the handling more efficient then the construction companies?

It has to be mentioned that the figures from Bygglogistik BGB AB has risen from interviews and only interviews. Depending on how good the conditions are at the construction sites the total cost for handling a material varies. Non adequate conditions could result in longer handling times for the workers and therefore higher costs than if the conditions where to be optimal. Hence a “good” and a “bad” scenario have been calculated when Bygglogistik GBG AB conduct work at the reference objects.

**Results**

When good conditions apply Bygglogistik GBG AB conducts the handling of plaster on the reference objects between 12 – 19 % cheaper than when the reference objects conducted it themselves. When bad conditions apply the result lies between +4 and -7 %. These results are the direct outcome from the case studies and take no consideration to production disturbances.

At a comparison where production disturbances are included the results becomes as follows: When good conditions apply Bygglogistik GBG AB conducts the handling of plaster on the reference objects between 25 – 28 % cheaper and between 9 – 14 % cheaper when the conditions are bad.

The actual handling cost of the plaster does not differ very much at a comparison. The material cost though is one key to the results given. The material cost could be reduced by between 11 – 16 % when Bygglogistik GBG AB conducted the work due to that larger quantities could be handled at the same time. Just in time deliveries after working hours, which is the case when Bygglogistik GBG AB is involved, leads to e.g. lower damage costs, lower capital bindings and to a minimum production disturbance.

Bygglogistik GBG AB conducts the plaster more efficient thus they should handle it and not the building workers. NCC Construction can save 1.8 million Euros and PEAB Construction 1.7 million Euros annually by letting Bygglogistik GBG AB handling the plaster. All of Sweden’s construction companies can together annually save up to 12.8 million Euros. These results apply within the delimitation.
When more activities than those actually being observed are taken into consideration e.g. theft, health, wastage, safety and the environment the potential savings increase. NCC Construction could then be estimated to save up to 5.2 million Euros, PEAB up to 4.6 million Euros and all of Sweden’s construction companies up to 33.3 million Euros annually or 0.26% of the total building production cost.

This may not seem much at a quick glance but note that these results only concern plaster. The same potential savings can probably be done for other materials e.g. windows etc and the savings will grow further for each material Bygglogistik GBG AB will handle.

Conclusions
We consider that the results received during the case studies indeed can be generalized, i.e. the same results would have been and will be received on other reference objects.

To be able to achieve the “good condition” results it is essential to establish long term relationships and that the relationship take start in as an early stage as possible preferable at the drawing table. Continuous evaluations are also important to maximize the profits. All parties must understand each other’s business not only the directors but also the minor directors and the building workers. Engagement and work towards the same goal are important keys for a successful result.

Is it time to change material handling methods on construction sites? This report shows that much money can be saved using an alternative method to today’s traditional. Bygglogistik GBG ABs’ concept is already established on the market and the building workers no longer have to handle the material leaving them doing what they are educated to do thus direct value adding work. The handling occurs after ordinary working hours resulting in shorter building lead time. A shortage of the lead time results in e.g. faster turnovers, lower labor costs and lower rent costs for equipment and machines.

A paradigm change regarding the way to handle material must be implemented according to authors. It is time to use alternative handling methods like the one Bygglogistik GBG AB supplies.