Streamlining construction industry with a system for delivery planning

Viktor Reutherborg

NCC Construction Sverige, avd. för processutveckling
Lunds tekniska högskola, avd. för teknisk logistik
130514

Current supply system

The present supply chain in the construction industry has not developed in the same pace as other industries. The preconception regarding the material supply in the construction industry is correct, although frequently exaggerated. This article deal with the current construction supply process and make suggestions how to improve it by implementing a system for delivery planning. An available system has been evaluated and suggesting measures for improvement are presented.

There are two different kinds of purchases; project purchase and assortment purchase. *Project purchasing* and associated delivery planning works well but there is room for improvement. Planning ahead is ordinarily, while it is increasingly common to require clear labeling of goods. The purchase is implemented at an early stage when suppliers leave an offer based on drawings and descriptions. The delivery service is considered but not top priority. After the purchase is made, delivery planning is conducted through meetings, emails or communication through phone, usually between a construction engineer and the supplier. One problem is that the contractor usually order materials before it needs to be in place. This result in disorder at the sight but the contractor normally makes the decision that quick delivery of material is of greater importance than the additional cost that might occur due to early delivery. Another problem is that there is no structured way to exchange information. Each supplier and contractor has a different way to share information regarding delivery planning. The most common is a compilation of deliveries in an Excel document by dividing the material into packages and assigning delivery dates. The risk using an excel document is that the the parties involved are using different versions of the document. Changes are frequent, especially if the project consists of co-operative apartments, townhouses and villas. If a change occurs the contractor or the supplier changes the document and sends to the other part. When the number of different versions of the document increases, there is also a greater risk that the wrong revision of the document is being used.

Contractors normally require a certain sorting and marking of the material that is delivered to the construction site, a service that normally costs extra. The label contains information as position and content. It does make things much easier on the construction site which makes this more common even if there is an extra cost

attached. Materials that are labeled are unloaded in the right place. If the material is not marked with position, it is unclear where it belongs, especially when it is not the answerable person who receives the material. If the material is stored in a storage space, it is vaguely where the material should be positioned unless it is labeled.

Regarding *assortment purchases* there is a large improvement potential. The purchase is being performed through a purchasing portal. In the portal the contractor can search for materials and make the purchase. Purchases are normally made one or two days before the material is required on the sight. This means that the supplier must have an unnecessarily large stock and have to transport not fully loaded trucks. When the sight is used as a storage non-value adding activities occurs when materials often have to be moved to make room for new materials or activities.

Common today is packages with plaster divided in apartments to be able to unload the plaster and studs with a crane before the next landing or roof is in place. Contractors have to pay a fee to get the material flat packed and marked with a felt pen but the profit is considerably larger than the extra cost.

There is no general procedure regarding unloading equipment, which normally is ordered over the phone when the purchase is made or in connection with delivery. Misunderstandings in the communication can lead to absence of unloading equipment when the packages arrive.

Payment will be made by the site manager who gets an invoice, normally in connection with the delivery. The invoice is sent to the company's finance department, scan if necessary and sent to the site manager. The site manager checks the invoice against the ordered materials and assigns account codes. The invoice is also verified by the site manager's manager who has to approve it. The large amount of invoices, making this a major work and creates a desire for efficiency. To automatize the process is however not desirable today. The site manager does not trust an automated system. If this is to be introduced the contractor must rely on both an atomized system and the supplier.

Evaluation of supplier occurs after the project ends. This is done by functions in purchasing portal where project suppliers and subcontractors are reviewed. Skilled contractors and subcontractors do not get acclaimed, it is the contractors and subcontractors who have made a less good job that get the attention.

Future supply system

An issue today is the lack of forward planning and structure. Materials are too late and many non-value adding activities occur. By implementing the order of materials in an earlier phase, it is possible to reduce supplier lead times and materials are unloaded in the accurate position right away. To accomplish this construction industry has to use available technology to a greater extent. Step one is that the contractor has to make all quantifications in an early stage. All materials should be

bought and divided in packages based on their position. By doing this with foresight and placing the packages in a system the contractor and supplier will get an insight how the material needs will look like during the construction time. If the contractor needs to make changes, they are made in an online document and the supplier is automatically notified that a change has been made. By implementing a system there will be no misunderstanding when both contractor and supplier use the same system. Deliveries should be displayed visually for everybody involved to clarify future occurrences on sight, preferably in a calendar or a schedule. When arriving at sight the packages should be labeled with position, recipient and content. It should be possible to scan a barcode on the label or an attached RFID tag to inform the system that the material has arrived. In the long term all contractors and suppliers should use the same system to simplify and make further development of supplier system financially viable.

The system evaluated meets the desired features that are suitable in the current situation for the construction industry. It is possible to create packages with a predetermined position. All packages end up in a list and a calendar. The supplier does accept the delivery by confirming the date. For each package there is a freight flag with position, recipient and content printed. The label has a barcode but there is no reader connected with the system.

The system includes a delivery calendar and everyone who needs material has to make a reservation in the calendar. The construction site has a logistics manager that accepts or declines the inquiry. When approved the reservations are displayed in various colors and patterns depending on the unloading zone and necessary resources. This gives a huge advantage if the workplace is narrow to evade multiple deliveries at the same time on the same unloading zone and to obtain an overview of all deliveries.

The system has great potential but it needs to keep improving and develop. The usability has to improve and clear manuals have to be available prior to a system release in full scale. It should be possible to scan the label to tell the system that material has arrived, preferable with a smartphone to avoid unnecessary spending on readers and to avoid missing the reader when needed. Next step should be to interconnect the delivery system with purchasing portals and to enable equipment reservation in conjunction with purchase.

To summarize the results of the study, the construction industry needs to keep improving, preferable by using available technology. The system needs to keep develop parallel to an increasing amount of pilots. When the available system is ready it should be released in full scale.