UNIKASSEL VERSITÄT

Institut für Bauwirtschaft IBW

Summary report

Subject:

Cost savings and rationalization effects through central logistics management in housing construction

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1 Aim of the research

The research project "Cost savings and rationalization effects through central logistics management in house construction", supported by the Federal Agency for Construction and Regional Planning (Bundesamt für Bauwesen und Raumordnung), was carried out at the Institute of Construction Management at the University of Kassel from October 2005 to July 2007.

The work examines principally the problem of whether and how suitable concepts of central logistics management can also be successfully employed in house construction. So far logistics activities have mostly been regarded as peripheral activities and taken on individually by the companies involved in the construction. In the constructional practice of large-scale projects of turnkey construction of office and commercial buildings, however, logistics organizational and co-ordination concepts are employed with the aim of centrally controlling the cross-functional tasks of supply and disposal logistics. Furthermore, there are concepts that provide for a transfer of these tasks to an external partner who specializes in logistics. Sub-contracting to a logistics service provider can lead to a decoupling and improvement of the logistics processes by means of the holistic approach to the production process. Holistic concepts that include logistics tasks from the delivery of construction materials to distribution of the same to the construction site together with the sorting and disposal of waste products and refuse have been employed so far rather sparingly in Germany. There is, however, a clear trend emerging to the outsourcing of services of this sort. So far the ranges of services offered by external logistics service providers as well as the costs incurred in outsourcing logistics services in the construction industry have not yet been examined in detail. This is the major reason for the currently low acceptance of specialist logistics service providers in the construction industry. Here there is considerable potential for rationalization as a result of the optimization of the logistics processes and the concomitant reduction of both time and costs.

The aim of the research report is to work out a concept for cost calculation, which enables one to make an evaluation of the expenditure involved in the logistics processes of large-scale house construction projects. This assessment permits one to draw conclusions about the form in which central management concepts can be employed within the framework of a construction project. Optimization and savings potential by means of central control of logistics processes are thus made clear and costs arising from logistics services in the construction process are rendered more transparent by the cost calculation concept.

Among the further aims of the current work is the development of a total concept "Central Logistics Management". Within the framework of this concept all logistics processes in housing construction are listed separately and thus create a basis in the form of the potential range of services that can be offered to external sub-contracting service providers whose speciality is the supply of materials in construction logistics. In addition the entire concept is intended to contain an instruction manual on how to control processes and costs as well as practical help in drawing up contracts in order to make the use of both in housing construction projects as realistically practical as possible.

2 Execution of the Research Work

The methodology of the study that has been employed in order to achieve the general objectives within the framework of the execution of the research project submitted here consists of both empirical and analytical approaches and parts. In order to get an overview of the status of the research and current practice in the area of logistics in construction a comprehensive survey of the literature available in both print and internet form was carried out at the beginning of the work presented here. The intensive research carried out revealed not only the origin and development of the concept of the term logistics, but also the various ways in which the scope and definition of the term "construction logistics" have been understood.

With theory as its starting point the present research work carried out and analysed a collection of empirical data coming from logistics companies and logistics service providers. In addition to the profit gained from extensive knowledge of logistics services and concepts of various logistics companies and service providers and the logistics concepts currently employed in construction practice, it was also possible to identify and demarcate all logistics processes used in the construction of housing units. The study which covers the whole area of the Federal Republic and targeted research with selected logistics companies also helped to do research into the market relevance of the concepts of logistics management and to make an initial assessment of the opportunities and risks of corresponding innovative concepts. In addition, the research also revealed reservations about central logistics control, which it is the aim of this work to dismantle. To analyse and document all of the logistics processes that come into play with the emergence of a new construction project and the expenditure involved in methods of construction time planning have been employed. The cost calculation analysis of the logistics processes based on these and the development of a concept for cost calculation were carried out on the basis of process cost calculation.

3 Summary of the Results

The large-scale potential for rationalization and cost savings as a result of the introduction of central logistics management concepts becomes clear when one considers and analyses the production processes in construction. A large part of the time is not devoted to productive work. Whereas the real productive work accounts for only a comparatively modest proportion of the time (about 31 %), 69 % of the work time is consumed by interruptions owing to personal and work-related reasons, absenteeism, time spent trying to locate materials, transportation time etc.[1]

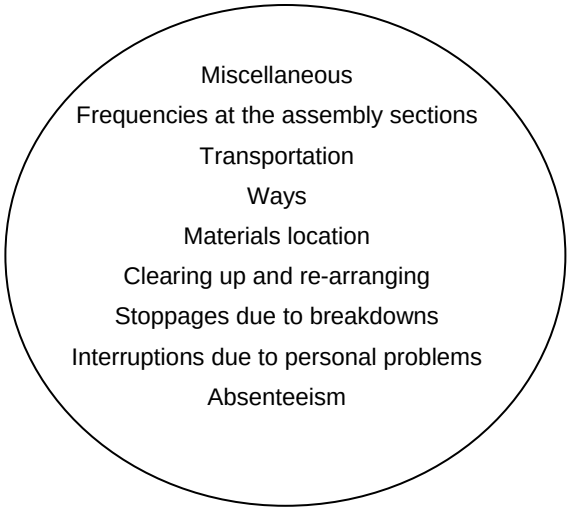

Fig. 1: Proportions of the activity measured against the total time of the production process in %[2]

By means of good logistics planning and execution the non-productive periods of time can be reduced, by optimization of the materials flow and demonstrably better co-ordination of the construction cycle. It is precisely by means of logistics concepts with central control that weak points in the construction cycle can be minimized and the productivity of the sub-contracting companies maximized. In addition to improving the production cycles by reducing obstacles, time spent trying to locate materials and securing a better regulated cycle in general the potential for savings, especially in the area of finance, can be redesigned and reused elsewhere. The staff can then work more effectively and concentrate on their real tasks.

The savings are the result of the possible reduction of construction times, which is due to quicker and more tightly co-ordinated materials movements on he construction site and the control of materials flow after they have been delivered to the site as well as the disposal of residue matter and waste. The result of these improvements in the construction cycle is that that the competition situation in the companies concerned will be strengthened. In addition, the delivery dates for materials, equipment and components, fixed and co-ordinated by the logistics co-

1 vgl. Boenert et al. (2006), S. 31
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ordinator, are to be positively evaluated for the companies involved in the construction because of their ability to be planned and their reliability in terms of delivery dates. As a result one can already begin to see early on the emergence of reliability in terms of planning and costs for the contractors and clients.The effectiveness of the individual assembly sections is increased considerably, because logistics costs, search times. damage to materials, obstacles, accidents and theft can be minimized by appropriate measures. Moreover construction security is also increased as an additional side-effect.

With the scale of the project and the complexity of the construction processes the requirements made of construction logistics tend to increase. These increased requirements imply, however, greater opportunities and advantages of the central logistics management concepts compared with a traditional use of construction logistics as an additional service. In addition to the location of the construction site and the cranes available the infrastructural links, the capacity of the storage areas available and the number of points at which delivery can be made are decisive factors that have to be taken into consideration. The result of a central logistics management is a continuous materials flow and all the advantages that are associated with this. One of the most important arguments for the deployment of a central logistics management is that the qualified expert staff of the individual assembly sections spends less working time with execution of the logistics processes and can thus concentrate more on core competencies.

But there are reservations and risks about the opportunities and advantages of central logistics management. The reservations about central logistics management concepts are located above all in the fact that a considerable proportion of the co-ordinating and controlling activities are transferred from the company construction site managers employed on the site to the field of competency of a local logistics co-ordinator. The advantage alluded to, namely that the individual companies active on the construction site are able to concentrate on their core competencies could be misunderstood by the companies concerned as interference in their independent planning and co-ordination of the works within the framework of their assembly sections. These reservations can be dismantled only by greater transparency of the range of services offered by a service provider and the evidence of increased efficiency compared with the traditional perspective of construction logistics.

Possible risks that can arise in connection with sub-contracting to logistics service providers or within the framework of a central logistics management are to recognized so far only with regard to the enormous range of external sub-contracting of logistics service providers. The comprehensive planning, co-ordination and controlling of all the logistics processes required on a construction site is a special task that has to be performed exactly so that all assembly sections are covered. Negligence in the logistics planning can have an immediate effect on the

entire construction cycle. But not only planning errors in the logistics concept are among the possible risks. The individual companies involved in the construction with their own structure and way of working have to be able to adjust totally and rely totally on corresponding concepts. It is important to co-ordinate, control and legally enforce these in such a way that all logistics activities that are necessary to create a work of construction are carried out on time.

If one considers the substantial savings potential that can be achieved by the deployment of central logistics management concepts and compares the extra expenditure for the planning, co-ordination and supervision of the logistics activities by a specialized service provider with these immense advantages, it becomes clear that concepts of this sort can be used without difficulty in housing construction. For the planning and execution of a holistic central logistics concept the costs currently amount to about 1.5 to 2 % of the contract price. The costs are thus dependent on the extent of work contracted. Even in the case of small-scale housing construction sites, where the construction sum is about 10 million Euros, cost savings can be achieved by the outsourcing of logistics services. It is precisely in a number of companies involved in the extension of a construction project that central logistics control from an external service provider can offer enormous potential.

Literature

Boenert, L. Blömeke, M. (2006): „Kostensenkung durch ein zentrales Logistikmanagement“, in: Uwe Clausen (Hrsg.): „Baulogistik – Konzepte für eine bessere Ver- und Entsorgung im Bauwesen“, Verlag Praxiswissen, Dortmund 2006, S. 29-41