



TALLINNA TEHNIKAÜLIKOOL
INSENERITEADUSKOND
Tartu kolledž

**TARTUS, PAJU TN 2 E HITATAVA BÜROOHOONE
EHITUSTEHNOL OOGIA JA PLATSIKORRALDUSE PROJEKT**

**CONSTRUCTION TECHNOLOGY AND BUILDING SITE MANAGEMENT FOR
OFFICE BUILDING IN TARTU PAJU STREET 2
MAGISTRITÖÖ**

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KOKKUVÕTE

Lõputöös lahendati Tartus Paju tn 2 asuva büroohoone ehituskorraldus ning kontrolliti Ratu juhendmaterjalide kasutatavust.

Lähteandmetes, eritingimustes ning arhitektuurses osas anti ülevaade hoone projektist ning ehitust mõjutavatest tingimustest.

Ehitusplatsi üldplaani lahendati ehitusplatsi ruumiline korraldus ning määrati ära põhiliste ehitusmasinate asukohad, lahendati ehitusplatsi liikumisskeem ning planeeriti ajutised trassid ja ehitised pidades silmas ehitusplatsi ohutust. Lisaks sellele markeeriti laoplatside suurused ning asukohad lähtudes ülejäänud ehitusplatsi korraldusest. Sellega vähendati ehituse käigus ajutiste ehitiste täiendavat rajamist ja liigutamist ning tagati ehitustegevuse efektiivseks seisakuteta toimumiseks vajalikud teed ja platsid.

Kalenderplaani toodi välja kõikide tööde tööjõu ning põhiliste ehitusmasinate vajadus ning planeeriti tööd vastavalt nendevahelistele seostele. Hoone planeeritavaks ehituskestvuseks kujunes üks aasta ning kuus kuud. Hoone roostvärkide ning karkassi ehitamiseks kulus sellest kaheksa kuud. Valdava osa ehituskestvusest on tööjõuvajadus platsil 30 kuni 40 töölisi ning tipp hetkel 51 töölisi.

Tehnoloogilistes kaartides leiti betooni- ja montaažitööde mahud ning tööjõukulud, toodi välja hoone kandevkonstruktsioonide betooni- ja montaažitööde jaoks vajalikud põhilised ehitusseadmed ja tööjõud ning leiti neile vastavad kestused haardealade kaupa. Nende alusel on võimalik planeerida ehitusmaterjalide tarneid ning korraldada alltöövõtu ning vajalike ehitusmasinate hankeid.

Ratu juhendmaterjalide võrdluses DMG Ehitus OÜ poolt koostatud ajanomide puhul leiti, et DMG Ehitus OÜ tööjõukulud on suuremad, kui on toodud Ratu juhendmaterjalides. Suurim erinevus elementide lõikes oli kuni 7,2 meetri pikkuste õõnespaneelide montaažil, kus DMG Ehitus OÜ tööjõukulu oli 95% suurem. Põhilisteks väljapakutud tööjõukulu vähendamise meetmeteks oli ratastelt montaaži rakendamine, seinapaneelide vuukide betoneerimine torkreetimise meetodil ning montaažimeeskonna liikmete arvu vähendamine neljalt inimeselt kolmele tööhõive suurendamiseks. DMG Ehitus OÜ osutus antud võrdluses valituks, kuna lõputöö koostamise ajal oli lõputöö koostajal võimalik kontrollida DMG Ehitus OÜ ajakulu montaažitöödel.

Järgnevates uurimustöodes võiks analüüsida erinevaid tööjõu- ja ehitusmasinate tootlikkuste kombinatsioone kulupõhiselt leidmaks optimaalse kombinatsiooni arvestades tööjõu ja ehitusmasinate kulusid.

SUMMARY

There are several problems due to missing or incomplete planning of construction activities in the case of large-scale construction works. The main ones are the additional costs caused by delays and poor coordination of works, which causes the costs of construction activities increase for both the client and the builder. In addition to cost, in densely populated areas, traffic restructuring, noise and other disturbing factors are involved, which disrupt the daily life and productivity of the surrounding residents and businesses. These undesirable phenomenon's can be reduced by a well-thought-out construction arrangement.

The master thesis solved the construction management for the office building at Paju street 2 in Tartu and checked the usability of Ratu instructional materials for montage.

In the input, special conditions and architectural part, an overview was given of the design of the building and the conditions affecting the construction.

The general plan of the construction site solved the spatial organization of the construction site and determined the locations for main construction machines, solved the construction scheme of the construction site, and planned temporary routes and buildings with the safety of the construction site in mind. In addition, the sizes and locations of the storage sites were planned based on the organization of the rest of the construction site. This reduced the additional construction and relocation of temporary buildings during construction and ensured the roads and sites necessary for the efficient performance of construction activities without downtime.

The calendar plan specified the need for manpower for all the work and the main construction machinery and planned the work according to the requirements between them. The planned construction duration of the building was one year and six months. It took eight months to build the building's grillage and structural frame. For most of the construction duration, the need for labor on the site is between 30 to 40 workers and at the peak 51 workers on site at the same time.

In the technological maps, the volumes of concrete and assembly works and labor costs were found. In addition, the main construction equipment and manpower required for the concrete and assembly works of the building's load-bearing structures were pointed out, and the corresponding durations were found by coverage areas. Based on them, it is possible to plan deliveries of construction materials and organize subcontracting and procurement of necessary construction machinery.

In the comparison of Ratu instruction materials, in the case of the time sheets prepared by DMG Ehitus OÜ, it was found that the labor costs of DMG Ehitus OÜ are higher than those given in Ratu instruction materials. The biggest difference between the elements was in the assembly of hollow core panels up to 7.2 meters long, where the labor cost of DMG Ehitus OÜ was 95% higher. The main measures proposed to reduce labor costs were the implementation of wheel assembly, the concreting of wall panel joints by the punching method and the reduction of the number of assembly team members from four to three in order to increase employment. DMG Ehitus OÜ turned out to be chosen in this comparison, because during the preparation of the dissertation the author of the dissertation was able to check the time spent by DMG Ehitus OÜ during assembly works.

Subsequent research could analyze different combinations of labor and construction machinery productivity on a cost basis to find the optimal combination considering labor and construction machinery costs.