TALLINNA
TEHNIKAÜLIKOOL

Ehituse ja arhitektuuri instituut

EHITUSTEHNOLOOGIA JA PLATSIKORRALDUSE ANALÜÜS TALLINNAS, LASNAMÄE TN 4 EHITATAVATE KORTERELAMUTE NÄITEL

ANALYSIS OF CONSTRUCTION TECHNOLOGY AND BUILDING SITE MANAGEMENT OF A RESIDENTIAL DEVELOPMENT AT 4 LASNAMÄE STREET IN TALLINN

EA70LT

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SISUKOKKUVÕTE EESTI KEELES:

Lõputöö teemaks oli valitud ehitustehnoloogia ja platsikorralduse analüüs Tallinnas, Lasnamäe tn 4 ehitatavate korterelamute näitel.

Lõputöös on antud ülevaade ehitusobjektist ja –tingimustest, hoone põhilistest konstruktsioonielementidest, sise- ja välisviimistlusest ning tehnilistest süsteemidest. Konstruktsiooni osas on konstrueeritud nelikant raudbetoonpostid. Hoone kompleksi betoonitööde maapealse staadiumi kohta on koostatud ehitusplatsi üldplaan. Määratud on rajatava hoone kompleksi tõstemehhanismidega varustatus ja paiknemine. Kirjeldatud on ajutiste teede, ladude, ehitiste ja tehnovõrkude andmeid ja teostatud on selleks vajalikke arvutusi. Määratud on ehitusaegne vee- ja elektrienergia vajadus, kus arvutuste tulemusena piisab projekteeritud ressurssidest, mis on olemas enne ehitustööde algust. Koostatud on koondkalenderplaan, mille tulemusena on hoone ehitustööde kestuseks 616 tööpäeva. Koostatud on kogu hoonemahu ehituseelarve ja võrreldud hoone kompleksi karkassi betoonitööde maksumust järjestikulise ja voolmeetodi vahel. Koostatud on töö- ja tuleohutuse ning keskkonnakaitse tagamise plaan.

Põhjalikumalt on lõputöö kolmes tehnoloogiakaardis käsitletud hoone karkassi betoonitööde teostamist. Tehnoloogiakaartidel on lahendatud küsimus, kuidas teostada hoone karkassi betoonitööd, mis on keerukad kitsaste tingimuste tõttu. Ehituse teeb keerukaks asjaolu, et krundi täisehitus on 65% ja kolme torni kõrgus maapinnast on 45 m.

Esimeses tehnoloogiakaardis on kirjeldatud kogu hoone kompleksi 0. korruse seinte ja postide betoonitöid ning kasutatavaid masinaid. Teises tehnoloogiakaardis on käsitletud hoone maapealsete tornide tüüpkorruse seinte, postide ja vahelae betoonitöid ning kasutatavaid masinaid. Mõlemal tehnoloogiakaardil on koostatud betoonitööde tööjõu- ja masinajakulu kalkulatsioon, raketiskilpide spetsifikatsioon ning tehnoloogilised arvutused koos betoonitööde betoonipumba valiku ja betoonisegurite vajadusega. Kalenderplaanide koostamisel on kasutatud voolehituse meetodit. Tehnoloogiakaartidel on kirjeldatud teostatavate betoonitööde kvaliteedinõudeid.

Kolmandas tehnoloogiakaardis moodustatakse kogu hoone kompleksi betoonitööde vool. Tehnoloogiakaart on koostatud koondkalenderplaanist lähtudes, kus töid teostatakse

järjestikulisel meetodil kinnistute ja korruste kaupa. Tehnoloogiakaardis on kirjeldatud nõudeid tööohutusele ning koostatud üldine kvaliteedi tagamise plaan.

Kolme tehnoloogiakaardi seletuskirjade toetuseks on koostatud graafilises osas kuus joonist 6/11…11/11.

Lõputööle koostatud lähteülesanne on täidetud.

Töö koostaja poolt saadud isiklik kogemus on erinevate ehitusprotsesside põhjaliku läbitöötamisega kaasnev teoreetiline teave mida saab kasutada edasises praktikas.

Tööl hetkeseisuga praktiline väärtus puudub, sest autor ei ole lõputöö teemaks oleva objektiga seotud.

SUMMARY OF MASTER THESIS:

Analysis of Construction Technology and Building Site Management of a Residential Development at 4 Lasnamäe Street in Tallinn.

The building chosen for this thesis is a commercial and residential building and extends over three plots as a single volume of building.

The thesis provides an overview of the object and conditions of construction, the building's main construction elements, its interior and exterior finish and its technical systems. With regard to the construction, the author has replaced the round columns on floors 2…13 in the Lasnamäe 4/3 tower block with partially constructed square reinforced concrete columns.

A general plan for the building site has been devised which sets out the concreting work in the complex to be performed on the ground, describing the planning logic of the building site during one of the most difficult construction stages. The chapter determines the hoisting mechanisms to be used in the project and their locations, based on the mounting parameters of two tower cranes at this stage of flow-method construction. The chapter provides information about temporary roads, warehouses, buildings and utility networks and the necessary calculations. The building's water and electricity demands were determined in the course of calculating the main resources. The results of the calculations indicate that the resources planned for the building complex, which were approved and allocated before the commencement of construction work, are sufficient for the construction period.

The author has devised a general schedule for the gradual construction work of the three buildings on the basis of the duration of the work and the table of required resources. Public holidays and standard working days were taken into account when devising the schedule. As a result, the estimated duration of construction of the building complex is 616 working days. The chapter provides a brief description of the planned construction work.

The financial section includes the construction budget for the entire building volume and compares the cost of the concreting work for the building complex's frame in the cases of gradual and flow-method construction. The construction cost of the building complex is

18.45 million euros, i.e. the net price per square metre is €1,203.10 The most cost-effective choice for the building complex's concreting work is the flow method, in which case 6.3% more sustainable use of resources will yield savings of €254,700.0

The thesis includes health and safety, fire safety and environmental protection plans.

The three process charts included in the thesis provide a more detailed overview of the concreting work for the building's frame. The process charts provide a solution to the question of how to perform the concreting work for the building's frame, which is complicated due to the lack of space. Construction is made more difficult again by the fact that the rate of the plot's full construction is 65% and the height of the three tower blocks is 45 m above ground.

The first process chart describes the concreting work for the walls and columns on floor 0 of the entire building complex and the required machinery. The author has calculated the working time of the labour force and machinery and provided the specifications of shuttering boards. The necessary technological calculations have also been performed. The schedule of the first process chart was based on the flow method. The duration of the works is 19 working days, while the uneven labour force distribution factor is 0.781. The process chart describes the quality requirements of the concreting work performed.

The second process chart describes the concreting work of the walls, columns and floors of a typical floor in the tower block above ground and the required machinery. The author has calculated the working time of the labour force and machinery and provided the specifications of shuttering boards. The author has also provided the necessary technological calculations together with the choice of pump and the requirements of the mixers for the concreting work. The schedule of the second process chart was based on the flow method of construction, where the uneven labour force distribution factor is 0.977. The process chart describes the quality requirements of the planned concreting work.

The third process chart sets out the concreting work flow for the entire building complex. The process chart is based on the general schedule, in the case of which the work is performed gradually, one building and one floor at a time. The thesis provides calculations for the working time of the labour force and machinery for the entire building complex and technological calculations for the flow method of construction. In the case of the schedule of the third process chart, the uneven labour force distribution factor is 0.630 for the

gradual method and 0.719 for the flow method. The process chart describes occupational safety requirements and provides a general plan for ensuring the quality of the concreting work.

The explanatory note to the process charts is supported by six figures in the graphic part of the thesis.