ҚАЗАҚСТАН РЕСПУБЛИКАСЫ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ
Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ

ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ

ЖАС ҒАЛЫМДАР КЕҢЕСІ

Студенттер мен жас ғалымдардың «ҒЫЛЫМ ЖӘНЕ БІЛІМ - 2016» атты XI Халықаралық ғылыми конференциясының БАЯНДАМАЛАР ЖИНАҒЫ

СБОРНИК МАТЕРИАЛОВ XI Международной научной конференции студентов и молодых ученых «НАУКА И ОБРАЗОВАНИЕ - 2016»

PROCEEDINGS of the XI International Scientific Conference for students and young scholars «SCIENCE AND EDUCATION - 2016»

2016 жыл 14 сәуір
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The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов и молодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

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регулятор температуры обогреваемой среды после рекуперативного теплообменника [1]. Приоритетным выбором является регулятор расхода отопления, так как при больших тепловых нагрузках и вынужденном понижении расхода воды подобное регулирование позволяет сохранить энергетический потенциал города. При внештатном повышении температуры воды в подающем трубопроводе выше необходимой по проекту не приводит к нарушению режима отопления. Кроме того, регулятор отопления при расчете отпуска теплоты по совместной нагрузке позволяет ориентироваться на типовую относительную величину $(Q_{г.в.}^{ср.н}/Q'_{о})_{т}$, которая может быть различной.

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EQUIPMENTS FOR PILE TEST ACCORDING TO AMERICAN AND KAZAKHSTAN STANDARDS

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1. Introduction

Development of high-rise buildings and constructions in complex of hydro-geological condition of some regions of Kazakhstan requires reliable design of foundation, this leads to improvement of the geotechnical Standards. Nowadays many international projects are realized in Kazakhstan, this demands to using international Standard, moreover, for realization unique project is required using leading foreign high-tech, economic, ecological and energy-efficient technology, including technology for pile installation, equipment for geological investigation, as well as laboratory testing. Unfortunately, present Standards are confined application of modern technology of pile foundation installation, indicating incomplete usage of advanced technology. So necessities are occurred for scientific reasoning and using of traditional and international Norms give or take geotechnical situations [1]. The results of research will directed to modernization of the Kazakhstan Standards and oriented to advanced geotechnologies adaptation.

2. Static load test regarding GOST 5686-94 (Kazakhstan)

Static tests of piles considered regarding requirement GOST 5686-94 «Soils. Field test methods by piles»(Kazakhstan).

So configuration for static pile test must include as follows: device for loading of pile (jack); bench system for feeling of reaction force (system beam with deadmans); device for determination

of displacement piles in test (bench system with gage). Device for loading pile must provided coaxiality and central transference of loading for pile, capacity of transference of loading in discrete steps, constant pressure on each step of loading.

Displacement axial of testing pile must to be at least 3d but more 1,5m till deadman. Device for determination of displacement of piles (deflectometrs) must provided measurement inaccuracy not more 0,1mm. Quantity of devices must to be at least two which to adjusted symmetric at equal distance (not more 2 m) from testing pile.

Displacement of piles determined as arithmetic mean value of all devices. Steel wire of diameter 0.3 mm used on measurement by deflectometrs. Of the beginning of measurement steel wire must be pilot strain on 2 days by load 4 kg.In the testing load on the wire must be 1-1.5 kg.

Measurement range and scale factor of pressure gauge which used for determination load for pile selected relation from maximum load for pile in pile testing. Loading of pile tested even load, without blow value of load installed by program of testing and equal not more 1/10 from maximum load on pile. The first three stages equaled 1/5 from maximum load on pile. Reading from all devices determined for all stage of loading pile for measurement of deformation as follows:

- zero reading- before of loading of pile;
- first reading- after that loading;
- then serial four reading with 30 min of interval;
- then through horally till stabilization of deformation.

The criteria of stabilization of deformation in testing are velocity of pile settlement on loading than value not more 0.1 mm for last as follows:

- 60 min if occurred sandy soil, clay from dry slag till flexible consistent;
- hours of observation if occurred clay from bumpless consistency till fluidity.

Value of loading must to be which value of settlement of pile at least 40 mm.

The maximum loading not increased of calculating resistance of pile in retesting. Maximum load should not exceed calculation resistance of pile on material at control pile test. Unloading of pile executed after maximum loading step by step Measuring is determined immediately after each step of unloading and after 15 min of observation by devices for measurement deformation.Observations of the elastic displacement of piles should be carried after complete unloading during 30 minutes with sandy soils, 60 minutes for clay soils. Test registered and results of pile test formed of graphs which showed dependence settlement of pile from load.

3. Static load test on construction site in Astana according ASTM

Construction site located at South-East part of capital of Republic Kazakhstan. Territory of Astana city arranged in Kazakh shield so territory isn't seismicity. Construction site located at South-East part of capital of Republic Kazakhstan. Territory of Astana city arranged in Kazakh shield so territory isn't seismicity Loam, clay, eluvial formation presented by loam with inclusion of gruss and ballast stone, sandstone, siltstone. Geology-lithologic cut of construction is Groundwater of construction investigation dissected by all bore hole in depth 1.2-2.3 m, absolute note of sustained level is 349, 40÷347, 70 m.

Permeability coefficient for precipitation as follows: for alluvial loam and clay – 0,53m/day;for gravel soil– 55,5 m/day;for eluvial loam– 0,0094 m/day; for crashed stone - 0,21-1,66 m/day.

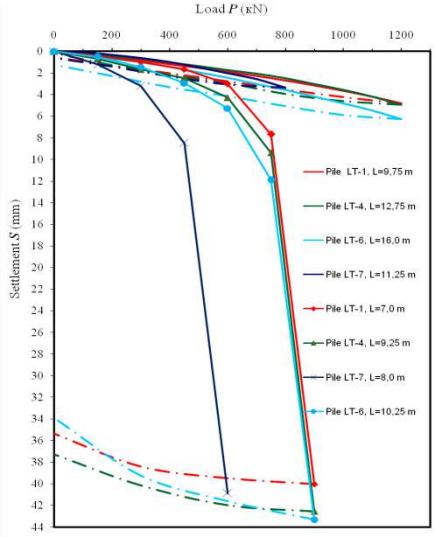
A static pile test of steel H-piles was carried out after the "rest" of pile after driving.Results of static test of steel piles before heightening of pile length shown in Figure 1.

4. Discussion

Technical specificity of ASTM D1143/D1143M-07 has some differences with national Kazakhstan standard GOST 5686-94. Some devices and control equipment didn't use by requirement of GOST 5686-94 "Soils. Field test". In practice requirements by American Standard showed that results of test more safety. Because use many control equipment and devices for

determination, requirements of both by jack. But GOST to provide by jack. It's important for correct test.

Sometimes displacement of pile used for receiving



measurement reverberated.By standards on loading pile transferred does not consider that each jack need manometer if we used more than one control of work of jack and to do

ASTM provided fit of reformer of axed bottom relational of it top. Tensometer data of pile load [2].

Figure 1. Graphics of dependence of settlement S from load P

Forloadabove 1000kNmustbe useddynamometer for measure theforce. Measurement accuracy should not be below 0.01 $P_{max.}$ Dynamometer allows to compensate forpossible errorsin the hydraulic systemand promptlyremove it. Also safety increase consequence testing accuracy because have additional system of determination load. Transducer of axled displacement installed on the top of pile of therequirementsfor the measurement accuracy are same regarding GOST and ASTM.

ASTM recommended indicator of displacement but GOST recommended indicators, deflectometers with registration ofthe results of measurements ondevices forautomatic recording ofdeformation[3]. However as opposed to GOST, ASTM provided reserve system of axialdisplacement batter level, laser level meter and steel wire attached of top of pile.Use of thereserve systemmakes measurementsmore reliablebecausethe main system insuredin case offailure of this system.

In some casestransmitters ofaxial displacementpiles can show multidirectional displacements that explain as follows: nonparallel beam and horizontal plane ofthe piletop; misalignment of jack and pile; lack of support of jack.

But GOST 5686-94 doesn't give instructions in this case. ASTM prescribes that need lateral displacement transducer installed before beginning test for following of monitor of eccentric loads when center of load transfer displaced to axis of pile and balanced by calculation methods. This requirement helped exclude incorrecttest resultsorfailure. ASTMprovides forthe installation of twoindicators ofdisplacement on theopposite sides of thepile ormonitor of scale which attached for pile by theodolite. Envisage accuracy is about 2.5 mm. Also mandatory requirement regarding American standard provided jack with floating support for reducingthe radialload onrod.

Axial displacementtransducerused for measure displacement bottom of pile. So we get compression of pile and elasticityofthe material during unloading. This measurement can more correct determine settlement of ground and if pile have voids measurement help to find real settlement of ground from pressure of unsound pile.

For the purposes, ASTM proposes to use a system of measurement of the indicator displacement, installed on top of the pile.

In case of not axial device installed device of two rods and indicators at the same distancefrom the axis ofthe pile oppositelyto one another. Pipe is equipped for rods in which they can move freely inside. The pipesare installed in theholebefore fillingitwith concrete.Pipesshouldrest againstthe platefixedto thepile.

Force transducer to measure the lateral resistance pile used to measure the friction force on his side the entire length of the pile. Thus, we can determine the distribution of the lateral resistance

of piles. GOST requires that need static load tested for determination integral characteristics of lateral resistance of pile.

However, thesetestsare cumbersome anduneconomicalcomparedwith thetransmittersaccording to ASTM.

5. Conclisuion

Since 1994 year Kazkhstan Standard has not changed, ASTM standard was updated in 2007, and therefore takes latest developments in technology and technical terms and provides for the use of more modern equipment [4].

The analysis in the article shows that the tests with ASTM makes them more reliable and gives detailed information about the process of testing and the results.

Actual question today is to update the national standards, harmonization with international standards.The introduction of innovations described will avoid making wrong results of test. Along with TC55 work Design Academy "KAZGOR" (Kazakhstan) conducts research on the existing international experience of echnical regulations to ensure the safe construction processes and productsAnd members of these Committees registered that in practice tester sometimes has situations when make wrong design because in normative isn't detailed information.

ASTM showed new improvement in pile tests. Method of pile testing regarding Kazakhstan Standard comparison with American Standard it is becomes obvious disadvantage.

Unfortunately, present Kazakhstan Standard are confined application of modern pile technology and big difference between experimental bearing capacity obtained by static loading test (SLT) and design value obtained by Kazakhstan Standard indicated incomplete usage of modern pile technology technology. And so research of advanced pile technologies w is very important for the feature Kazakhstan geotechnic development.

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ПРИБОРЫ НЕРАЗРУШАЮЩЕГО КОНТРОЛЯ ДЛЯ ОБНАРУЖЕНИЯ СКРЫТЫХ ДЕФЕКТОВ ЖЕЛЕЗОБЕТОННЫХ КОНСТРУКЦИИ

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В современном строительстве широко используется монолитное домостроение. Это комплекс производствКуенных работ, который проходит непосредственно на строительной