Title
Research on Permeability test of loess in Heifangtai Platform under different consolidation pressures

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Research on Permeability test of loess in Heifangtai Platform under different consolidation pressures

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1. Introduction

Heifangtai Platform, located in Yongjing county, Gansu province of China. It covers an area of 13.44 km². It is one of the largest benches.

1. Test Plan

The main topics

1. Introduction
2. Test Plan
3. Test Results
4. Finite Element Simulation
5. Conclusions

1.5 times a year
4.4 times a year

In 1967

The in-door experiment
Simple equipment
Low cost
The test is carried without loading
Rebound generated after unloading

The field test
Permeability coefficient
The actual pressure is considered
It can not be used in the deeper soil

Alternative
Advantages
Low cost
Simple equipment
The actual pressure is considered

2. Test Plan—Instrument

ZL200710018038.1
Invention patents

The instrument after improved

The permeameter
The shear creep apparatus
Pulley block

The permeability test of loess in Heifangtai Platform under different consolidation pressures

Xi’an, China

School of Geological Engineering and Geomatics, Chang’ an University, Xi’an, China
2. Test Plan - Samples

Main profile of sampling point

3. Test Results

The change of permeability coefficient under different consolidation pressures

Physical parameters of three point samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>Void ratio Test</th>
<th>Density Test</th>
<th>Plastic limit Test</th>
<th>Plasticity index Test</th>
<th>Overlying pressure Test</th>
<th>Consolidation pressures Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 1st point sample</td>
<td>0.760</td>
<td>1.62</td>
<td>1.11</td>
<td>2.89</td>
<td>1.29</td>
<td>0.89</td>
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<tr>
<td>The 2nd point sample</td>
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<td>1.72</td>
<td>1.14</td>
<td>2.67</td>
<td>0.48</td>
<td>0.78</td>
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<tr>
<td>The 3rd point sample</td>
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<td>1.40</td>
<td>1.27</td>
<td>2.69</td>
<td>0.89</td>
<td>0.78</td>
</tr>
</tbody>
</table>

4. Finite Element Simulation

The initial simulation of slope in Heifangtai platform

The influent seepage simulation of slope in Heifangtai platform
Conclusions

- For different samples, if a same consolidation pressure was exerted, the permeability coefficients of those with higher initial void ratios tended to change more largely but reached a stable value finally, which showed that in actual working conditions, as long as the thickness of overlaying soil was not increased, soil horizon of a certain depth should have a stable permeability coefficient.

- In an indoor conventional penetration test and a penetration test under consolidation both targeted the loess from Heifangtai Platform, permeability coefficient of different soil horizons resulted form the former was 25-40 times as high as the latter, which showed the results from the conventional test had overestimated the permeability coefficient.

- When the permeability coefficient resulted from the penetration test under consolidation was introduced into SEEP software to conduct a irrigation influent seepage simulation for slope, the results were consistent with actual reconnaissance ones, indicating that the data from the penetration test under consolidation are more likely to reflect practical phenomena, thus have more practical application.

Thank you for your attention!