SUMMARY

Since the latest 20 or 30 years, with the development of the chemistry industry, various Geosynthetic products have been produced. Geonet is one of the products. It is a kind of highly densed polythene plastic product. It forms a kind of open synthetic material whose pore is rhombus or square by two groups of almost round polymer net rope crossed according to a certain angle. Now, there are more than 10 factories produce it in China. This kind of material has a high intensity, good corrosion resistance and anti-ageing, construction convenience, a certain stretching rate and so on. It is widely used in water conservancy, highway, railway and harbour's slope protection and earth strengthening works. But the subject of its mechanics character, reinforcement mechanism and stability analysis theory is not mature. It will be fulfilled and developed quickly in engineering practice. On the base of this, I do measurement of the test data and calculating analysis. Now, the calculating analysis of reinforced earth embankment uses the ultimate balance method commonly. The strain of the earth isn't taken into account in the analysis in this method and it quotes many supposes in the calculating as well as the form of the reinforcement and the method of the destruction can't be reflected well. As the study of the constitutive equation of the engineering material is developed day by day, the finite element method is developed very quickly in the calculating analysis of the reinforced earth embankment. Most of the studies out of or in the country discuss. The influence of reinforcement to the embankment's displacement, without the function of the pore water pressure being taken into account. In the fact, the displacement of the reinforced system is influenced by the pore water pressure and the reinforcement of the reinforced materials. Quoting BIOT consolidation theory can reflect the relationship of the three well.

In the consolidation non-linear finite element analysis model of the reinforced earth structure system, the earth and the reinforced materials are taken into account separately, quotes Goodman contact face units between the two, founds the successive equation of the structure, works out problems together. Because of this the article does individual test of the materials and gained the needed calculating data.

The stress-strain relation of the foundation earth and the embankment foundation earth uses Duncan〔1980〕E-B non-linear elastic model. This model has these characteristics such as easy to gain calculating data through the normal triaxial experiment, the physical sense of each data is clear. At the same time of handing in finite element calculating data, also did elementary study of the influence of the test results by the cutting velocity under the

condition of the consolidation-drained test. It terrifies that it is feasible to fasten shear velocity for the clayey.（≤0.033mm/min）

Geonet uses one-direction flexible cable unit which only can be pulled but can't be pressed. Because the intensity in practice is not over strain, so the article choose the linear elastic model and gain the intensity data. As there aren't test rules and authoritative data to follow for Geonet tensile test in China, and the test width has a dramatic influence on the constitutive models, so the article does vertical and transverse comparison test about Geonet CE131 which is made in Taian No.1 plastic factory on the electric omnipotent material test machine（RSA250）which is made in Germany, and the width of the test sample is from one hole to many holes. The test terrifies that it is good for the stability of the test result to use wide strip which is 200mm wide.

The boundary face characters of the earth and the Geonet are imitated by Goodman units and the needed data are measured through in-doors direct shear test. The tangent shear stress and the relative slipping can be expressed well using double curve. I found that the shear face of the Geonet and the earth is like an uneven board, the Geonet stretches about 1.5-4.0mm along the shear direction, and the more the vertical load is , the longer. So I suggest that when calculating shear stress the area is as 1.5 times as the area of the shear box for this kind of two faces earth filled, non-one direction and non-two directions shear.

On the base of having decided the data, I edit a finite element analysis program about the consolidation plane problem using FORTRAN language which is 2050 sentences long. The construction and water storage period are imitated using raise method. The earth unit, Geonet unit and Goodman unit being destroyed are modified. I conveniently draw the isohyetal line charts of the embankment's stress level, horizontal displacement and vertical displacement under the two conditions of finish construction period and storage water period using the Graphtools software with self-made data link program. It arrives at the aim of being capable for seeing of the calculating results.

To discuss the influence of the embankment's strain given by reinforcement deeply, I do calculating analysis for these four projects: non-reinforced, the embankment slope is 1:2.5;non-reinforced, the embankment slope is 1:1.5;the embankment bottom is reinforced, the embankment slope is1:1.5; the embankment top and bottom is reinforced, the embankment slope is 1:1.5. And also do comparison analysis for the fourth project through choosing different boundary face modulus and different Geonet modulus. The result state clearly that the embankment slope have dramatic influence on the reinforcement distribution, the reinforcement have much influence on the embankment's horizontal displacement but have little influence on the embankment's vertical displacement, the Geonet's tensile modulus almost have no influence on the embankment's stress standard, horizontal and vertical displacement, but have much influence on the boundary face modulus between the reinforcement and the earth, with the adding of each grade of load, the stress distribution of

the Geonet is even firstly and changeable lately. These results have certain meaning for guiding the engineering design and the engineering monitor.

The stability design and analysis method of the reinforced system are still the importance and the difficulty for the studying of the engineering field. The article does stability analysis for the reinforced embankment body using the ultimate balance method and the ultimate balance method based on the finite element results. The former is based on the traditional effective stress method of the simple BISHOP slice method of homogeneous earth, the reinforcement force is added to and its direction is taken into account, supposes two models according to the different direction. I edit WSP.FOR program and gain factor of safety of the reinforced embankment body. In addition, this program can do reverse optimizing analysis of the reinforcement interval and length according to the known factor of safety. The program can also do the judgement of stability failure's form of the reinforcement material's pullout and tensile failure. The later starts from the conception of the traditional factor of safety, supposes circular face, uses the stress result calculating through finite element method, adds to the factor of safety, edits calculating program. This method is a good taste. It's engineering practice uses must be studied deeply. The calculating analysis states clearly that if uses the same calculating data for the earth, there is a far cry between the two methods. So we will study deeply in order to find a set of method suited for available stability analysis of the embankment on the soft foundation.