GSI 인증시스템에 의한 지오그리드의 공학적 특성 평가

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Evaluation of Engineering Properties of Geogrids by GSI Certification System

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1. Introduction

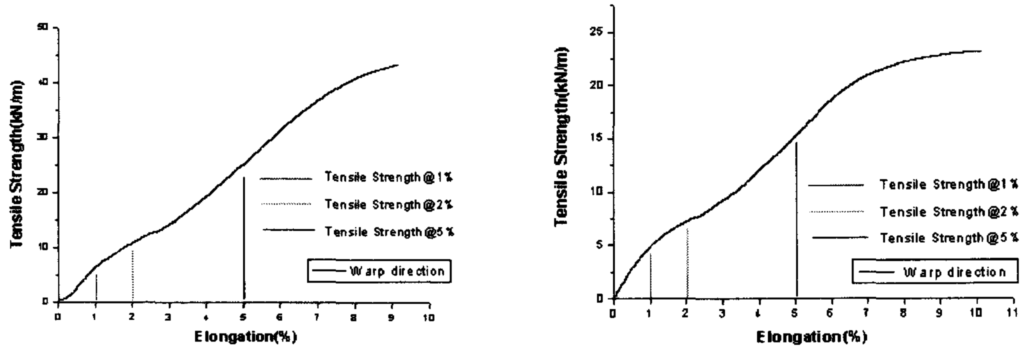
Bidirectional geogrids were made for the purpose of pavement reinforcement application. These bidirectional geogrids have advantages of textile and membrane type geogrids for evaluation of application fields and long-term design allowable tensile strength from mechanical properties. In this study, the main engineering properties of these bidirectional geogrids were tested and evaluated in accordance with the draft of GCI-PCP (Geosynthetic Certification Institute's - Product Certification Program) that assessed the manufacturing and quality systems of products evaluates manufactured products.

2. Experimental

Bidirectional geogrids A and B were specially designed and manufactured to develop the junction and creep properties and to compensate for the disadvantages of textile and membrane drawn type geogrids. Also, these bidirectional geogrids, A and B are made of fiber-reinforced polymer strips on weaving technology and welded junctions. Firstly, high tenacity polyester filament yarns were supplied with the optimum numbers of reeling and then woven by specially designed technology. All the required tests of bidirectional geogrids were performed in accordance with GCI-PCP.

3. Results and Discussion

Figure 1 shows the tensile strength vs elongation curves of bidirectional geogrids A and B. From this, it is seen that these two bidirectional geogrids have the similar tensile properties in both MD and CMD. It is expected that this behavior is very useful for the application to the pavement related fields. Pullout resistance is obtained by dividing the maximum load attained by the test specimen width. Interaction coefficient must be 0.8 and each product satisfied this requirement. The angle of friction was determined by slope of the plot from maximum shear stress versus applied normal stress. The friction angle between concrete sand and geogrids must be over 30°at certain stress. The friction angles of each product meet the requirement. The modulus of the rotation versus moment curve is the desired value of geogrid torsional rigidity in units of mm-kg/deg. Torsional rigidity should meet the requirement of specified class and each products meet the requirement. To determine the Ultra-violet resistance of geogrid, ASTM D 4355 was used. Percent retention of tensile strength should meet over 70% at 500hrs UV exposure and each product meet the requirement. To examine the long-term performance of bidirectional geogrid A, creep deformation behaviors were examined with additional creep load. However, it is recommended that the optimum and minimum test period of creep test is at least 10,000 hours. The result of this, it could be confirmed the creep limited strain of bidirectional geogrid A showed within 10%.(*Figure 2*)



(a) geogrid A (b) geogrid B

Figure 1. Tensile strength vs elongation curves of bidirectional geogrids

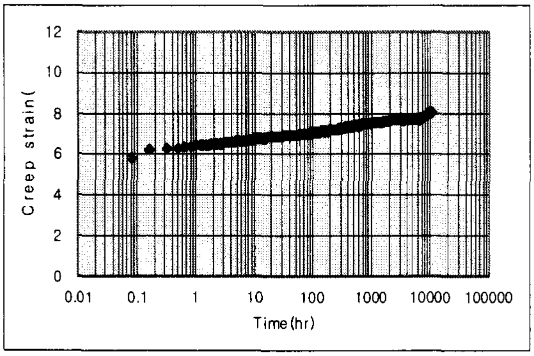


Figure 2. Creep behaviors for 10,000 hours of bidirectional geogrid A

4. Conclusion

Through the tests, we confirmed the evaluation value of each item was satisfied with the recommended and tolerance value ranges of GCI-PCP draft of bidirectional geogrids. New concept bidirectional geogrids A and B having good properties has been developed and is suited for pavement and any kind of soil reinforcement application.

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Reference

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