

## 지오네트의 장기변형거동 해석

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## Interpretation of Long-Term Deformation Behavior of Geonets

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### 1. Introduction

The most important parameter for the designing with geonets is its transmissivity, or in-plane flow capacity because of its primary function (drainage). To evaluate long-term compressive creep behavior either real long-term or short-term accelerated test will be available. In cases of a short-term accelerated creep test for the geonet, several works were performed and also presented its high reliability to its real long-term creep test. In this study, we interpreted the long-term behavior of geonet through the analysis of reduction factor.

### 2. Experimental

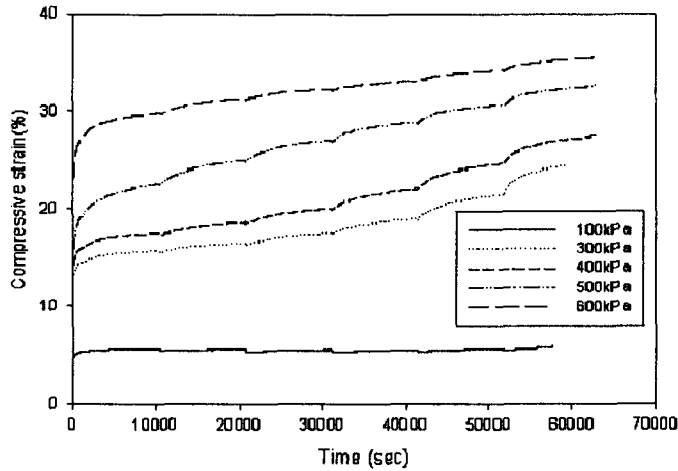
Bi-planar(sample A) and tri-planar(sample B) types of geonets were used to evaluate the designing normal pressure. All these samples are made by HDPE and have 5.6mm and 8.6 mm thick, respectively. SIM test was used for analysis of geonet's long-term behavior. The test specimen was subjected to a certain constant normal stress at the reference temperature and a dwell time of 10,000 seconds. Time durations for each temperature steps are all 10,000 seconds. The reference temperature was 23°C and total 6 temperature steps (7°C step) were used for the samples which were used in this study.

### 3. Results and Discussion

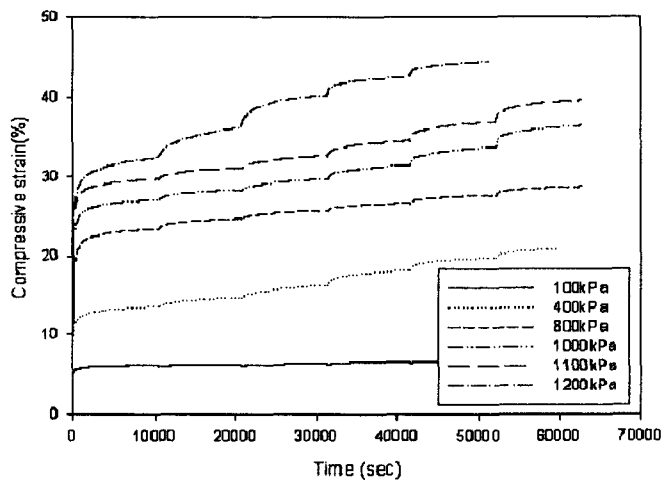
Figure 1 showed the SIM applied to a geonet specimen subjected to various compressive pressures, which are from 100 to 600 kPa and 100 to 1,200 kPa for the sample A and B, respectively. Also, Figure 1 showed the measured compressive creep strain as a function of time. Each time step is approximately 10,000 sec and each temperature step approximately 7°C. And the temperature steps begin at 23°C and end with 58 oC. There were thermal expansions at which the temperature step changed from the former step to the next. In this case, the thermal expansion was erased by conducting a vertical shifting process. The procedures of obtaining the master curve form SIM are well described and explained in the ASTM standards. Also, several published papers describe about its reliability and confirmed that this SIM method is a repeatable and recommendable test procedure.

### 4. Conclusion

The performance limit strains for bi-planar and tri-planar geonets were evaluated as 18% and 29%, respectively, at the performance limit normal pressure values, which are 500 kPa and 1,200 kPa. Considering the service life time of the geonet material which used in a certain landfill system as 35 years, the designing normal pressure was determined as 170 kPa and 890 kPa, respectively.



(a) sample A



(b) sample B

Figure 1. Compressive creep curves of geonets by SIM

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#### Reference

Narejo, D. et al, "Using the stepped isothermal method for geonet creep evaluating," Proceedings of EuroGeo3, Munich, Germany, pp.539-544(2004).