

Weatherability and Reduction Factor of Geosynthetics under Outdoor Exposure Condition

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Abstract

6 woven geotextiles for reinforcement were used to examine the effects of weatherability and reduction factor on the tensile properties. Decrease of tensile strength as the tool of these evaluations of woven geotextile was examined.

Introduction

PET and PP woven geotextiles were generally used as reinforcement materials for the soft soil reinforcement. These woven geotextiles were exposed under sunlight and UV during the installation period. For this case, the tensile strength of woven geotextile decreases by the reduction factor and this value could be determined by the difference of tensile strength retention before and after exposure.

In this study, the effects of weatherability and reduction factor of woven geotextiles on the tensile properties were examined by the decrease of tensile strength decrease.

Experimental

6 woven geotextiles which have 4 ton/m design strength were prepared as specimens

Table 1 shows the specification of these woven geotextiles.

Table 1. Specification of woven geotextiles to be used in this study

Specification Geotextile	Design Strength (ton/m)	Drawing Condition	Weaving Machine Type
GT1	5	4~6	Water-jet
GT2			Rapier
GT3			Rapier
GT4			Water-jet
GT5			Rapier
GT6			Rapier

Outdoor exposure and tensile tests were performed in accordance with ASTM D 5970 and

5034, respectively. Reduction factor was determined by the difference of tensile strength retention after 180 days exposure.

Results

Table 2 shows the strength decrease of woven geotextiles after 180 days outdoor exposure. GT4 showed the most excellent tensile strength decrease under exposure condition and GT3 and GT6 showed the severe tensile strength decrease.

Table 2. Tensile strength decrease of woven geotextiles after 180 days outdoor exposure

Geotextile		GT1	GT2	GT3	GT4	GT5	GT6
Decrease(%)							
Tensile Strength	MD	64.6	44.2	38.4	62.5	41.4	35.3
	CMD	29.6	22.2	14.5	57.3	20.1	13.7

Table 3 shows the reduction factors which influence the long-term performance of woven geotextiles during the installation period.

Table 3. Reduction factor of woven geotextiles after 180 days outdoor exposure

Geotextile		GT1	GT2	GT3	GT4	GT5	GT6
Reduction Factor	MD	1.8	2.1	2.4	1.7	2.1	2.4
	CMD	3.2	4.8	6.8	2.1	5.1	7.2

From this, it was seen that decrease of tensile strength of woven geotextile should be influenced by polymeric property, spinning condition, drawing condition and weaving condition etc.

References

1. R. A. Jewell MA, *Soil Reinforcement with Geotextiles*, Chapter 5, CIRLA Special Publication, Thomas Telford, Westminster, 1996.