# 지오그리드의 화학 및 생물학적 분해에 의한 감소인자 해석

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# Interpretation of Reduction Factors by Chemical and Biological Degradations of Geogrids

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## 1. Introduction

Geogrids placed in compacted earth structures are susceptible to mechanical damage during construction. Such construction induced damage may cause changes in geogrid properties such as short-term tensile load response, long-term tensile load response(creep), or resistance to chemical or biological degradation. So, as a part of the design it is therefore required to evaluate what kind of mechanical damage might be expected and what are the consequences of the damage in terms of ability to fulfill its intended function in the structure. In this study, reduction factors by chemical and biological degradation of geogrids were examined.

## 2. Experimental

Textile and membrane drawn type geogrids of 8 ton/m(design strength), e.g. 8TK and 8TM were used in this study. For chemical degradation test, modified EPA 9090 method was adopted. For biological resistance test, geogrids were incubated in two types of conditioned box. First box was filled with soil composed with weathered granted soil and second box was filled with sewage sludge. At time periods of 30, 60, 90 and 120 days one sample from each container was removed, cleaned and cut for test specimens to be used in GRI test methods GG-1. The rib strength before and after for the above two tests was evaluated.

## 3. Results and Discussion

*Figure 1* shows the chemical resistance results of geogrids under different deposition conditions. In the case of 8TM was merely small amount of decease in both acidic and alkaline conditions. However, 8TK showed the similar tendency as 8TM in acidic conditions but the tensile strength decreased about max. 45% in severe alkaline condition. For biological degradation, there are some decrease of strength for geogrid samples (<3.0%), but these values can be contained within specimen variation and test errors. From these results it can be concluded that all of both geogrids

were not influenced by biological degradation. *Table 1* shows the reduction factors of both geogrids by chemical and biological degradations but no significant change was not found.

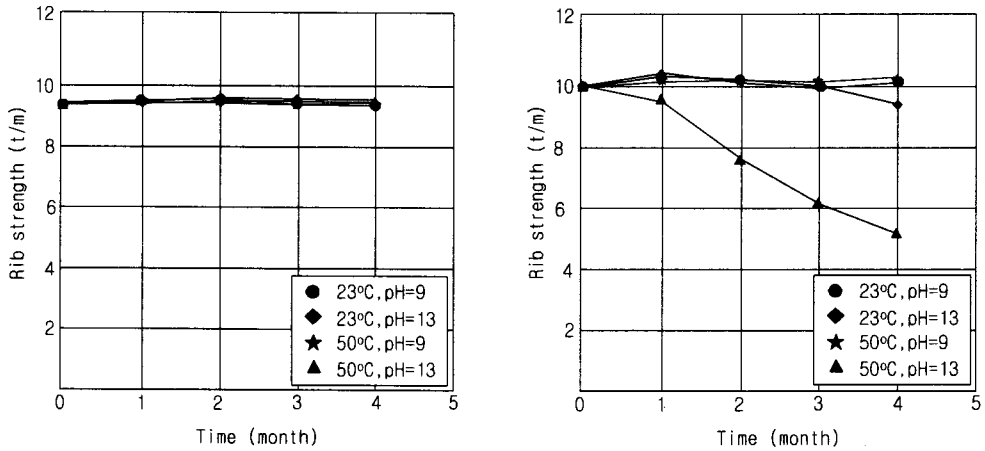


**Figure 1. Rib strength change of geogrids by chemical degradation**

**Table 1. Reduction factors of geogrids**

| Reduction Factor \ Geogrid | 8TM | 8TK |
|---|---|---|
| $RF_{CD}$ | 1.0 | 1.05 |
| $RF_{BD}$ | 1.0 | 1.0 |

## 4. Conclusion

8TK geogrid has low resistance to the alkalic circumstance (pH>12) and high temperature. But, in the case of low alkalic conditions (= site-specific conditions), it has satisfied resistance to its circumstance. The biological resistance of the warp knitted geogrid was estimate that it has very strong resistance to the biological environment. 8TM drawn geogrid had high resistance to the critical alkalic and acidic conditions because of its polymeric property of HDPE. To consider the critical site-specific application, this membrane drawn geogrid can be used any additional consideration about the chemical resistance. The biological resistance of the membrane drawn geogrid was estimate that it has very strong resistance to the biological environment.

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