



TALLINN UNIVERSITY OF TECHNOLOGY
SCHOOL OF ENGINEERING
Department of Materials and Environmental Technology

**ACCELERATED CHEMICAL DEGRADATION OF GEOGRIDS
IN VIEW OF CHEMICAL RISKS IN ESTONIAN PAVEMENT
CONSTRUCTIONS**

**GEOVÕRKUDE KIIRENDATUD KEEMILINE VANANDAMINE
ARVESTADES KEEMILISI RISKE EESTI TEEDEEHITUSES**

MASTER THESIS

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SUMMARY

Geosynthetics have been actively used in construction over the last three decades. Reinforcement geosynthetics are increasingly being used in pavement construction in Estonia. As a result, the life-time durability of geosynthetics used in Estonia pavement construction needs to be assessed. However, the assessment is focused on the chemical risk peculiar to Estonia that could result in possible degradation of for reinforcement and in road construction.

This study focused on the potential chemical risks of Estonian road construction that could shorten the lifetime of geosynthetics. The aim of the study was to assess the impact of potential chemical risks on the most common geogrids in Estonian road construction, based on their polymeric nature.

The results obtained from the experiment showed that geogrids of PP and HDPE are resistance to chemical aging of Estonia risk factors, while PET geogrids were more sensitive to chemical degradation, particularly to alkaline environment.

From the research was also concluded that duration in the environment has more impact on degradation than elevated temperatures. Therefore, in future studies the time in the environment should be longer to see the aging impact of possible chemical risks on geogrids, especially on HDPE and PP, but also on PET in acidic and saline environment.

KOKKUVÕTE

Geosünteeete on viimase kolme aastakümne jooksul aktiivselt ehituses kasutatud. Eesti teedehituses kasutatakse üha enam geosünteeete armeerimise eesmärgil, mistõttu on vajalik hinnata Eesti teedehituses kasutatavate geosünteeetide pikaajalist vastupidavust.

Antud uuringus keskenduti Eesti teedehituse võimalikele keemilistele riskidele, mis võivad geosünteeetide eluiga lühendada. Töö eesmärgiks oli hinnata potentsiaalsete keemiliste riskide mõju Eesti teedehituses enamlevinud geovõrkudele, lähtudes nende polümeersest olemusest.

Läbiviidud katsetustest järelalus, et PP ja HDPE geovõrgud on võimalike keemiliste riskikeskkondade suhtes vastupidavad. PET geovõrgud on aga tundlikumad, eriti just aluselise keskkonna suhtes.

Uuringust järelalus ka, et ajaline kestvus riskikeskkonnas mõjutab geosünteedi vananemist rohkem kui kõrgendatud temperatuur. Sellest tulenevalt peaks tulevastel uuringutes geosünteeetide ajalisi kestvusi keemilise riskikeskkonnas pikendama. See võimaldaks riskikeskkondade mõju paremini hinnata, eriti HDPE ja PP geovõrkudele, aga ka PET geovõrgule happelises ja soolases keskkonnas.