GEOTEXTILES AND MICROPLASTICS

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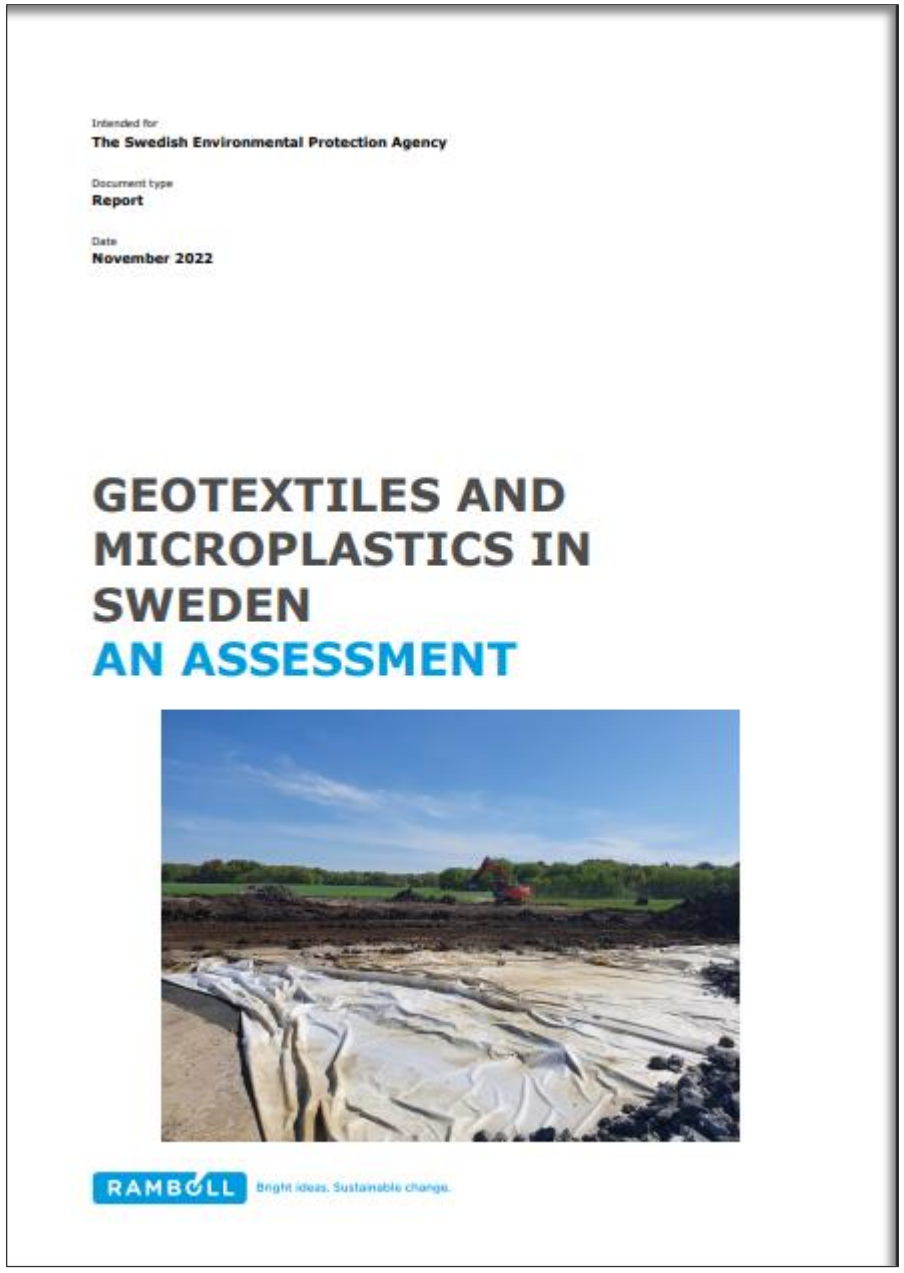

BACKGROUND AND AIM

- Geotextiles potential source of unintentional microplastic emissions
- Under investigation by the Commission, geotextiles questions included in open public consultation
- Study to obtain information on geotextile composition, quantities, waste, use, alternatives, risks and microplastics emissions
- Literature study and interviews used to collect information

Geotextile; planar, permeable, polymeric (synthetic or natural) textile material, which may be nonwoven, knitted, or woven, used in contact with soil and/or other materials in geotechnical and civil engineering applications

(ISO 10318-2015)

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Foto: Västmark Entreprenad AB

RESULTS – MATERIAL, QUANTITIES AND USE

Polymer	% of use
Polypropylene (PP)	92-99
Polyethylene terephthalate (PET)	5
polyethylene (PE)	2
Polyamide (PA)	1
Natural or biodegradable	2

- Ca 14900 ton geotextiles in 2021 (Sweden)
- Approximately 164-193 ktons in Europe/year
- Other geosynthetics 6% of total
- 99,6% nonvowen
- global geotextile market size 6.72 billion US dollars 2021
- an expected annual compound growth rate of 6.5%

- Separation and filtration most common applications (91%)
- Hydraulic applications represent approximately 7% of the total EU market for geosynthetics
- Consumer use estimated to ~10%
- Increased use in 1980s and 1990s

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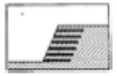
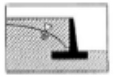
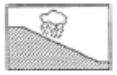
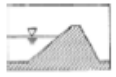
RESULTS – TESTING, WASTE, RECYCLED CONTENT

- Geotextiles are construction products under (EU) No 305/2011 (CPR)
- Harmonised standards require testing, i.e., weathering and oxidation testing
- 25, 50 or 100 years service life
- No requirements related to microplastics

Standard	Pictogram	Scope
EN 13249:2016		Geotextiles and geotextile-related products - Characteristics required for use in the construction of roads and other trafficked areas (excluding railways and asphalt inclusion).
EN 13250:2016		Geotextiles and geotextile-related products — Characteristics required for use in the construction of railways.
EN 13251:2016		Geotextiles and geotextile-related products — Characteristics required for use in earthworks, foundations and retaining structures.
EN 13252:2016		Geotextiles and geotextile-related products — Characteristics required for use in drainage systems.
EN 13253:2016		Geotextiles and geotextile-related products — Characteristics required for use in erosion control works (coastal protection, bank revetments).
EN 13254:2016		Geotextiles and geotextile-related products — Characteristics required for the use in the construction of reservoirs and dams.
EN 13255:2016		Geotextiles and geotextile-related products — Characteristics required for use in the construction of canals.
EN 13256:2016		Geotextiles and geotextile-related products — Characteristics required for use in the construction of tunnels and underground structures.
EN 13257:2016		Geotextiles and geotextile-related products — Characteristics required for use in solid waste disposal.
EN 13265:2016		Geotextiles and geotextile-related products — Characteristics required for use in liquid waste containment projects.
EN 15381:2008	No pictogram	Geotextiles and geotextile-related products - Characteristics required for use in pavements and asphalt overlays.

- Most geotextile still in use – not much waste
- Incineration or landfill most likely fate for exhumed geotextiles
- Possible to recycle in theory but still in early devlopment
- PCM/PIM only allowed in non-reinforcement applications with 5 year service life

DEGRADATION AND RISK FACTORS

- Degradation factors synergistic and weaken the geotextile.
- UV-exposure most important but also abrasion, chemical degradation, hydrolysis, biological degradation
- Not covering geotextiles according to instructions and hydraulic applications identified as risk uses.
- Relationship between degradation factors and microplastic formation not clear
- Fragments of geotextile have been identified on beaches in the Baltic Sea

Photo: VästMark Entreprenad AB

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ESTMIMATION OF MICROPLASTIC RELEASE

Assumptions

Maximum scenario:
Incorrect handling in construction uses (20%) and by consumers (50%). Expected lifetime halved (UV).

Hydrualic applications -> 20% mass loss due to abrasion (0.2%/year)

Lower scenario:
Incorrect handling in construction uses (1%) and by consumers (10%). Expected lifetime shortened (UV) from 100 - > 80 years

Hydrualic applications -> 1% mass loss due to abrasion (0.02%/year)

Results

Year	Lower (tonnes)	Max (tonnes)
2022	2	32
2030	3	55
2050	42	800
2080	280	4710
2121	15500	20900

These results assume disintegration into MP after service life is reached

CONCLUSIONS

- Geotextiles do not appear to currently be a large source of microplastics but may become in the future
- Not enough is known about the relationship between degradation, strength loss and microplastics formation
- There is also a lack of studies investigating geotextile release of fibres/particles
- There seems to be a need to develop methods to measure microplastics in soil samples

PHOTO: VÄSTMARK ENTREPRENAD AB

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