



**Discoverer's Report
on
Heritage Time Capsule (HTC) Contribution
Technical Committee (TC) 307: Sustainability
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U.S. National Society for ISSMGE**

31 December 2025

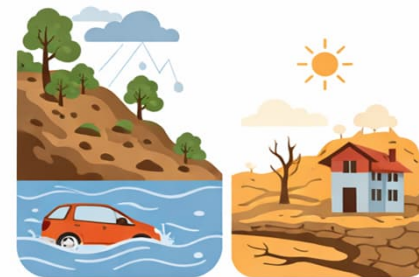
Motivation for Interest in TC 307: Sustainability for HTC



- **Sustainability interests** for young engineers → **shift in priorities** from **conventional geotechnical design**.
- **Change in climatic conditions** → **longer duration** of seasonal periods, **increased consequences** of extreme weather events (**flooding and droughts**), and **heightened severity** of **geohazards**, all affecting **infrastructures globally**.
- TC 307-Technical committee works towards **implementing sustainability** into practice of **geotechnical design**.
- Our **motivation** for selecting this technical committee is our interest in the use of **environmentally friendly** and **recyclable materials** for **ground improvement methods**.



Sustainability Interests
and Implementation



Change in Climatic
Conditions

Objectives of TC 307: Sustainability



- **Objective 1: Dissemination** – Geotechnical engineering has a role in being **crucial** in **early phases of construction projects** and the **consequences of natural disasters**, the development of **sustainability** practices is necessary to enhance **infrastructure life** and **geohazard mitigation**.
- **Objective 2: Guidelines and Recommendations** –
 - 1) **Innovative, environmentally friendly geotechnical techniques** for all phases of geotechnical design (site investigation, construction, monitoring, ground improvement).
 - 2) **Sustainable use of energy** (geothermal, wind, solar, storage, carbon dioxide) and renewable materials through geotechnical systems.
 - 3) **Development, assessment, and practice of sustainability** indicators through **socio-economic** activities with **geoethics** and **geodiversity**.



Recycled lime sludge
as **chemical stabilizer**
(ground improvement)

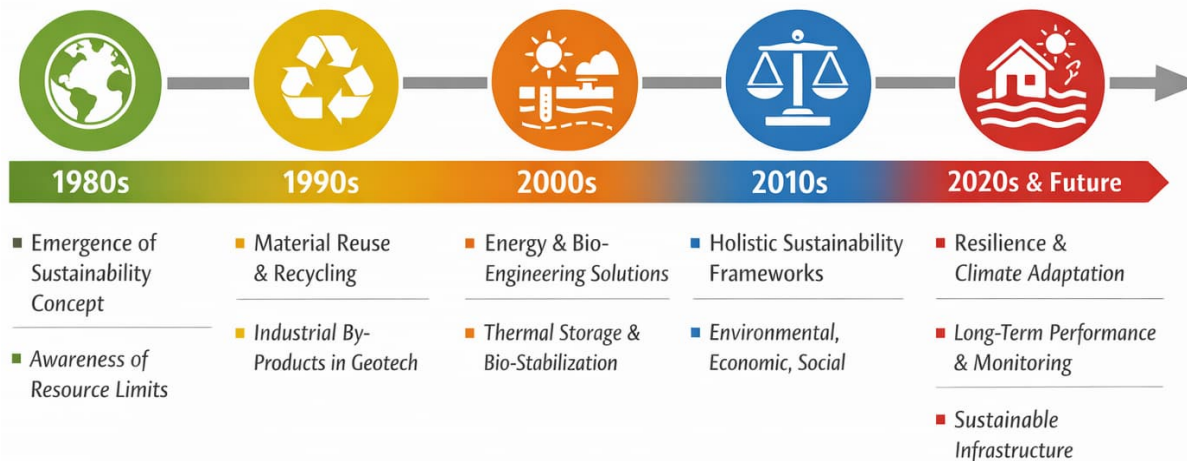
Objective 3: Conference Assistance – To disseminate information on sustainability related issues in geotechnical engineering.

HTC Summary of TC 307 Contributions: History



- Documented the **evolution** from **1980s sustainability definition** through **integrated framework**.
- Provided the **compiled contributions** from **TC307: Underground Thermal Energy Storage (UTES), bio-engineering, green remediation**.
- Identified **10 global leaders of sustainability** in geotechnical engineering and **landmark case studies demonstrating practical implementation**.

Evolution of Sustainability in Geotechnical Engineering



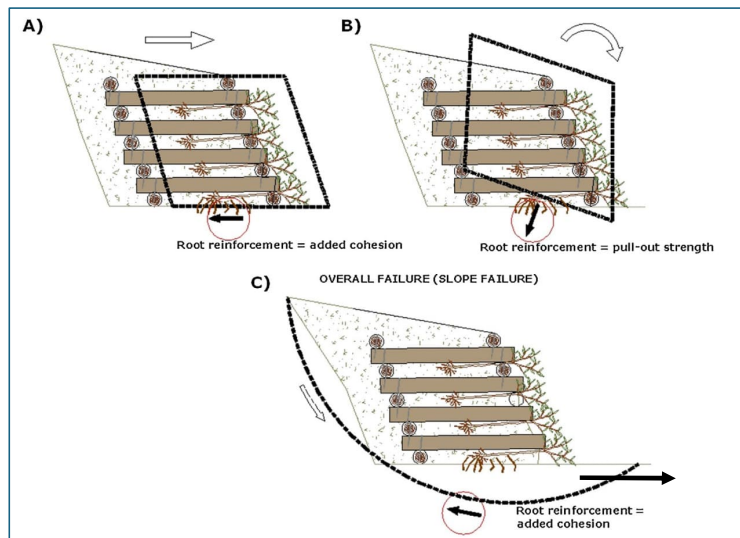
HTC Summary of TC 307 Contributions: Case Studies



▪ Landmark Case Studies in Sustainable Geotechnical Practice

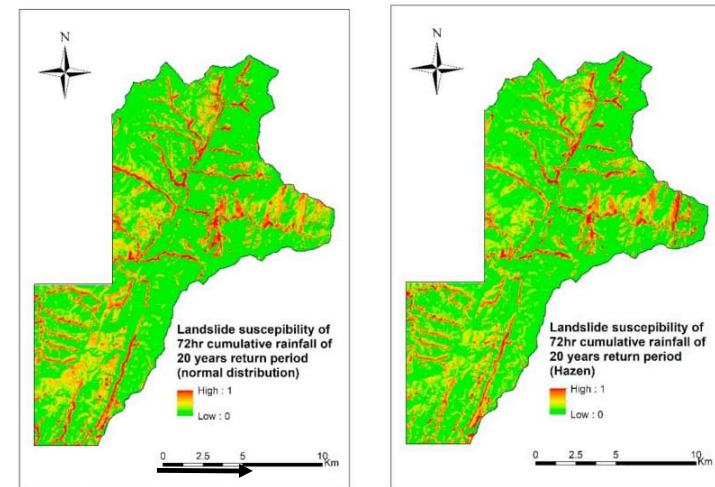
Several case studies represent milestones in achieving sustainable development objectives, including but not limited to:

- Introduction of **eco-engineering and nature-based solutions** in slope stability.



“Implementation of eco-engineering design into existing slope stability design practices” (Tardio and Mickovski, 2016)

- Assessment of **climate-driven extreme rainfall impacts** on landslide susceptibility.



“Evaluation of the extreme rainfall predictions and their impact on landslide susceptibility in a sub-catchment scale” (Shou and Lin, 2020)

Questions to the Authors



- **What lessons from past sustainability efforts should future geotechnical engineers be careful not to overlook?**

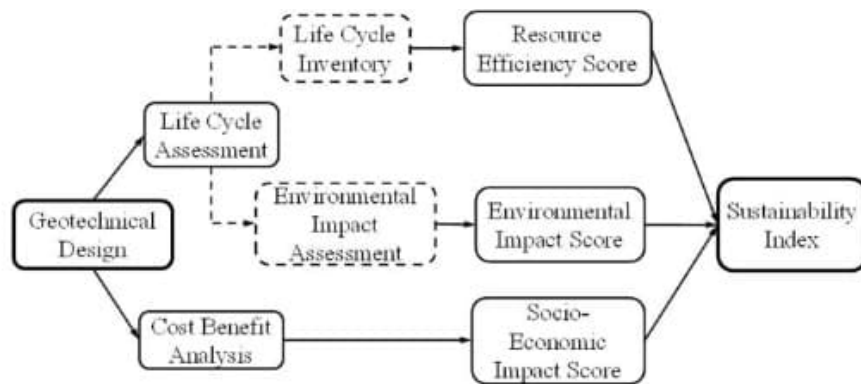
- **What are the biggest anticipated future barriers to implementing sustainable materials and construction methods geotechnical infrastructure?**

- **How can Technical Committees such as TC307 continue to implement sustainability into practice while responding to rapidly changing societal and climatic demands?**

HTC Summary of TC 307 Contributions: Most Interesting

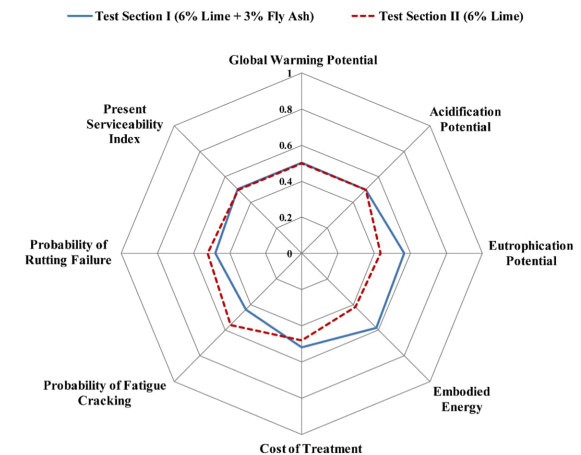


- **Interesting Contribution 1** – Most times, students, recent graduates, and some practitioners are unaware of **sustainability** practices in geotechnical engineering.
- This paper from Dr. Dipanjan Basu lays out **sustainability** very nicely, stripping it back to the **conventional means** of **sustainability** is and how it can be **applied to geotechnical engineering**.
- This is a great resource for a **primary understanding** of **sustainability** practices for **geotechnical engineers!**



“Sustainability and geotechnical engineering: perspectives and review” (Basu et. al, 2015)

- **Interesting Contribution 2** – This contribution caught our attention because it is relevant to our area of **transportation geotechnics!**
- **Sustainability** and **resilience** was used as a crucial tools to compile a **unified assessment** for assess tradeoffs between various chemical stabilizers with **resource consumption, environmental and socio-economic impacts** as metrics.



“Sustainability and resilience in pavement infrastructure: a unified assessment framework” (Das et al., 2019)

Expectations from the Future Geotechnical Community



- We expect **sustainability** to become a **core principle of geotechnical engineering** and be maintained across its full lifecycle in the future.
- We believe the profession will increasingly **prioritize resilience and adaptability**, responding to **climate-driven** challenges worldwide.
- We expect TC 307 and professional societies to play a critical role in the **geotechnical practice** with **implementation** of **sustainability methods** and adopting future generations through evolving **societal and environmental demands**.

Balanced Practice in Future

