

GSI W-9 Webinar Entitled:

“Behavior and Analysis of Twenty Solid Waste Landfill Failures”

Webinar Overview

In comparison to the number of worldwide solid waste landfills that exist, the incidence of failure is quite small. Nevertheless, when they do fail the mass of waste involved can be enormous. Six of the twenty failures described in this webinar involved over 1,000,000 m³ of waste and three involved deaths. The analysis of each failure using the computer program ReSSA (3.0) identified the most sensitive unknown variable, while individual reports identified the “triggering mechanism” which brought the already low FS-value into an incipient failure state. Some of the salient findings are as follows:

1. 7 of 11 unlined cases were rotational failures
2. 8 of 9 lined cases were translational failures
3. Service lifetimes were from 1 week to decades
4. Duration of failures was from 1 min. to a few hours
5. Average height of waste mass was 26 m
6. Height-to-length of failed waste was approximately 0.42
7. Average density of waste was 12.1 kN/m³
8. Average waste shear strength was 26° and 13 kPa
9. Geomembrane shear strength varied from 5.1 to 16.2° (none were textured)
10. Waste and/or liner shear strength was generally the greatest uncertainty
11. Liquids were involved in all 20 cases; i.e., in the waste, liner system or foundation soil and was invariably the “trigger” causing failure

This webinar should convince all involved and interested landfill technology of the serious implications of failure and of the necessity for proper design, filling, cover and maintenance practices.

Learning Objectives

Participants will become familiar with the methods and idiosyncrasies of solid waste landfill failures. Different trajectories of failures (rotational or translational) will be identified and described where they occurred. The computer analyses will clearly show the importance of having accurate shear strengths; both of the solid waste and liner system. Additionally, the negative implications of liquid in the waste, liner, or foundation will be highlighted. This webinar will hopefully lead to mitigating such failures in the future.

Webinar Benefits

1. Understand the idiosyncrasies of solid waste failures
2. Learn about the circumstances leading to the failures
3. Learn the significance of representative shear strengths to the FS-values
4. Learn about the negative impacts of liquids to the FS-values
5. Understand the negative implications that such failures have on the credibility of landfilling practice and everyone involved in it

Intended Audiences

Public and private owners/operators of landfills, heap leach mining operations, combustion coal residuals and related solid waste facilities; consultants and designers in the private sector; regulators and agency personnel at the federal, state and local levels; geosynthetic manufacturers and their representatives; geotechnical and geosynthetic testing organization personnel; contractors and installers of liner and cover systems; academic and research groups; and others desiring technically related information on this important aspect of our constructed infrastructure.

Specific Topics Covered

- 1.0 Background of Webinar
- 2.0 Overview of Analysis Method
- 3.0 Unlined (or Soil Lined) Cases
- 4.0 Geosynthetic Lined Cases
- 5.0 Summary and Conclusions
- 6.0 Recommendations

Webinar Instructor

Dr. Robert M. Koerner's (Professor Emeritus of Civil Engineering at Drexel University and Director Emeritus of the Geosynthetic Institute) interest in geosynthetics spans over thirty years of teaching, research, writing and advising. He holds his Ph.D. in Geotechnical Engineering from Duke University. He is a registered Professional Engineer in Pennsylvania, a Distinguished Member of ASCE, a Diplomate of the GeoInstitute and a member of the National Academy of Engineering. Bob has authored and co-authored about 650 papers on geosynthetics and geotechnical topics in journals and at national and international conferences. His most widely used publication is the sixth edition of the textbook entitled "*Designing with Geosynthetics*". He is the founding director of the Geosynthetic Institute which is a nonprofit research and development organization dedicated to the proper use of geosynthetics in its myriad applications. The institute also provides laboratory accreditation and inspection certification programs.