FGI Webinar: Geosynthetic Covers to Reduce Leachate Generation and Cost

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Host:
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Introduction

Leachate management remains a major challenge in landfill operations, where rainwater infiltration significantly increases treatment costs and environmental risks. In this webinar, hosted by the **Flexible Geomembrane Institute** (FGI), experts **Dan Rohe** and **Pat Elliott** discuss innovative geosynthetic solutions—specifically rain shed and floating covers—that effectively minimize leachate generation. The session covers fundamental design principles, practical applications, and long-term benefits, illustrated by impactful case studies highlighting substantial operational savings.

Key Discussion Points

1. Geosynthetic Rain Shed Covers (Dan Rohe)

These covers serve as protective “umbrellas” that divert rainwater away from landfill cells, preventing infiltration into waste material and thereby reducing leachate volume.

- **Applications:**
    - **Short-term (approx. 5 years):** Used as interim covers on active landfill cells to manage rainwater during ongoing waste placement and operations.
    - **Long-term (20+ years):** Installed on final closures or dormant landfill sites to provide low-maintenance protection over the lifespan of the site.

- **Benefits:**
    - **Cost Savings:** A notable case in Michigan saw leachate hauling decrease from 100 truckloads per month to just one, with the investment paying off in roughly 1.5 years.
    - **Slope Protection:** Beyond water diversion, the covers also help control erosion on landfill slopes during construction phases.
    - **Efficient Installation:** Prefabricated panels, some up to 50,000 square feet, enable rapid deployment and reduce onsite labor, speeding project schedules.
- **Challenges:**
    - **Wind Uplift:** Large panel surfaces can be vulnerable to wind forces, which are mitigated using ballast systems such as sandbags or proprietary products like Wind Defender to keep covers securely in place.

2. Floating Covers for Leachate Ponds (Pat Elliott)

Floating covers provide a flexible barrier that sits atop leachate ponds, reducing rainwater entry and limiting evaporation losses while preventing exposure to wildlife and UV degradation.

- **Case Study:** A 52,000 square-foot floating cover installed in Washington in 2008 reduced leachate volumes by 1.6 million gallons annually, saving approximately $200,000 per year in treatment costs.
- **Design Innovations:**
    - **Tensioned Systems:** Encapsulated floats paired with weighted troughs effectively manage water runoff and maintain cover tension.
    - **Venting Mechanisms:** Essential venting systems prevent dangerous gas buildup beneath the cover, ensuring safety and functionality.
- **Operational Insights:**

- **Prefabrication Benefits:** Offsite fabrication significantly cuts down field installation labor and time.

- **Durability:** Materials are selected for UV and wildlife resistance, allowing service lifespans exceeding 17 years with minimal degradation.

Conclusion

Geosynthetic covers represent proven, scalable technologies that deliver rapid payback and significant environmental benefits by drastically reducing leachate generation. Key takeaways include:

1. **Rain shed covers** excel at protecting landfill cells from rainwater infiltration, while **floating covers** optimize containment for liquid leachate ponds.

2. Thoughtful design incorporating ballast, venting, and durable materials ensures long-term performance and safety.

3. Real-world case studies demonstrate leachate cost reductions of 90–99%, translating to major operational savings.

These solutions align economic efficiency with sustainability goals across landfills, tailings storage, and reservoir applications. The Flexible Geomembrane Institute (FGI) offers extensive resources, including webinars and professional development credits, to guide successful implementation.

Next Webinar: *Geomembranes for Produced Water and Brine Containment* (March 13, 2025)
Access: Recordings and slides available at thefgi.org