Dismantling the Tallest Reinforced Fill in North America – The Observational Method Applied at the Yeager Airport

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Setting

- Rugged mountains of West Virginia
- Yeager Airport and runways on top of mountain in Charleston
- Variable sedimentary rock
- Fill, colluvium, and thin natural soil
ORIGINAL PROJECT

- FAA directed safety zone at end of runway with length of 500’
- Engineered Materials Arresting System (EMAS)
- To support the EMAS, “The tallest known geosynthetic reinforced 1H:1V slope in North America” was constructed
- Height of 240 feet
- 1H:1V outslopes with Geogrid every 3 feet vertical
- Lengths of as much as 175 feet
- Volume of >1,000,000 cy
EMAS completed in 2009
CHALLENGES

Schedule
- Mitigation plan
- Bid package
- Contractor selection
Available data limitations, unknowns

- Materials used
- In-place density and strength
- Water
- Grid limits
- Failure mechanism
Safety

- No one gets hurt
- 140 feet high vertical face below runway
- Massive, creeping debris field below vertical face
- Temporary cut slopes to be left in place
- Removal of hanging wedge/vertical face
 Balance safety factor with minimizing removal of remaining fill

 Based on perceived nature of material, used cut slopes of 1.5H:1.0V with benches approximately 50 feet vertical
REMOVAL OF HANGING WEDGE/VERTICAL FACE

- Not easily explained
- Remaining sheared grid was a benefit
- Concerns about equipment/personnel safety
- Practical limitations of equipment reach vs. oomph
OBSERVATIONAL APPROACH

- Excavate enough material to balance weight of equipment
- Monitor/restrict access in front of known cracks in remnant fill
OBSERVATIONAL APPROACH

- Survey points on outer edge of face with continuous monitoring
- Visual observations
Waste Storage Fill
Active Runway 5
Slope mitigation area
Phase 2 is complete
Phase 3 started July 5 – in progress

Permanent Repair Design and Construction in the future?