North Carolina I-40 Rock Slide
2009

Challenges in Implementation of Remediation Work Plan
• Rock Fall events at night?
• Above average precipitation in August, September and October
• Highest total precipitation ever recorded in 2009
Phillips and Jordan Commence Initial Cleanup

- Jody Khune Engineering Geologist

NCDOT starts initial mapping of failure

- Scaling, blasting and rock removal
- Massive Unstable Structures
- Structure 900 feet long, 180 feet wide and up to 100 feet thick

Initial plan: Drill and Blast

Blast plan calls for over 100,000lnft of drilling for blast plan

Drilling and blasting too expensive due to the excessive amount of drilling

Rock Remediation Technician
Stabilization Plan

- An aggressive stabilization plan calls for 50,000 linear feet of 1 & 3/8 inch rock bolts.
- The average drill depth is 100 feet.
- Janod proposes utilizing cable anchors in place of 1 & 3/8 inch bars.
Unexpected Problems

- Heavy snowfall and extreme cold. Worst winter in 30 years
- Hydraulic powerpacks freezing up and maintenance problems.
- Azimuth and Inclination very little leeway
- Excessive overburden slows down production
Problems Resolved

• Utilization of helicopter
• "Tyrolean System"
• Tests on Jacks
Conclusions

- 51,680 lnft of Drilling
- 11,792 lnft of Tensioned Anchors
- 30,587 lnft of Passive Anchors
- 900 feet up the Mountain
- 10,800 Bags of Grout pumped
- 66 Working Days
- The NC Geotechnical Department, Golder and Associates and Janod as a collective team Got it Done