Impacts of Superfast Construction on Slope Stability

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Superfast = slope failure
• Kleinfelder’s best and largest clients
• Their risk tolerance changes as prices varies.
• Scope, schedule, and budget become SCHEDULE!!!!!

• Engineering fees are insignificant.

• The client will build it then design it, or ignore the design.
Are we loss-prevention....

• Naïve?
• Foolish?

It’s all about risk vs. reward.

www.geoprofessional.org
Four Case Studies Showing Our Adjustments

• Understanding clients’ risk tolerance and economics
• Communicating concerns
• Documenting discrepancies instead of correcting them
• Real engagement of internal experts
Is there a different “standard of care” for these projects?
Case #1.
It’s winter, so ignore the earthwork specs.
Case #1 – Site Layout
Frozen fill is placed during the winter.
Cracking continues in early spring
Cracking continues into summer – the well is now in service
Case #1 – 6 months later...
Finally Let’s Do Something
Case #1 – Lessons Learned

How can we deal with winter construction differently on the next project?

Design using geogrid reinforced frozen fills.
Is this ethical?
Case #2 - Steep Slopes and No Engineers
Case #2 - Construction
Case #2 – Steep Natural Slopes (1.5H:1V)
Case #2 - Construction

- Erosion control plans were used as grading plans.
- No fill compaction requirements
- No benching of fill subgrades on slopes
- Poor surface water control
- Dry summer construction
Case #2 - Failure

During the first heavy rain, the fill washes down hill.
Case #2 - Failure

- Erosion control measures made things worse.
- Waterbars did not get water off the slope, only concentrated it.
Case #2 – Proposed Remediation
Case #2 – Outcome

Full reconstruction of fill slopes with engineered fill
Case #2 – Lessons Learned

• Better advance planning could have reduced the impacts of construction.

• We developed “standard details” for non-designed future projects.
  • Benching slopes
  • Subsurface drains
  • Compaction and moisture control
  • Surface water control
Case #3 – Failure of Standard Details

90% of all soil problems are really water problems.
Case #3

We completed:

• Geotechnical Analyses
• Site and Grading Plans

But construction went superfast...
Case #3 – Subsurface Drainage
Sometimes the standard details are ignored.
Case #3 – There may be a problem...
The drain lines produce no water.
But there’s a lot of water below grade.
Case #3 – Solution: Reconstruction
Case #3 – Blame Game

The client wants to know who was at fault.

– Inspection Services
– Constructor
– Designer
– Owner
The **Falling** Value of Natural Gas

www.tradingeconomics.com

Clients change!
Case #4.
Landslide endangers pipelines

CAN YOU COMPLETE YOUR FORENSIC ANALYSIS BEFORE THE CONTRACTOR HAS BUILT THE REPAIR?
Mudflow endangers pipelines, buries railroad in mud.
Has the railroad complained?
Hilly, forested terrain limits access.
Exposed oil and gasoline pipelines
The client is losing $100,000 per day in pipeline revenue.

They want it fixed fast, with minimal uncertainty.
The Solution

Don’t fix the landslide!

Rebuild the pipelines under it using HDD
The Superfast Schedule

Solution chosen on Day 2
Only three days to complete subsurface exploration
Design/Build contractor mobilizing on Day 5
“Design” completed on Day 6
Geotechnical data report completed on Day 8
Risks

• Impact of the unrepaired landslide on railroad
• HDD contractor starting with little subsurface info
• Future adjacent landslides
• Documentation of discussions, risks, limitations, and oral decision making
Lessons Learned

• Understand the client’s priorities. Realign your thinking!
• Be prepared for a quickly changing scope of work.
• Sometimes landslides don’t get fixed.
• Some tasks won’t be finished.
Superfast = slope failure
Conclusions

• Projects can be successful despite the greatly increased rate of failures.

• We must understand the clients’ priorities, risk tolerance, and financial perspective.

• We must realign our thinking, loss prevention practices, and work methods and frequently confirm that we are current.
Questions?

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