What Were They Thinking?

The Design of Temporary Erosion Control BMPs
What Were They Thinking?

- Williston Hwy 2/85 bypass
- Temporary erosion control design
- Challenges
  - Rolling sometimes steep topography
  - New roadway through undeveloped land
  - Natural channels, wetlands
  - Sand Creek, Camp Creek
  - Goal: Keep soil in place to protect waters of the state
What Were They Thinking?
### What Were They Thinking?

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What Were They Thinking?

• Is this overkill?
• Is there a method to the madness?

Answer: Yes!
What Were They Thinking?

• **Purpose:**
  Provide insights into what it takes to design temporary erosion control.

• **Rule of thumb/general guidelines/standards**
  Ex. 3:1 slopes, culvert outlets, bioroll spacing

• **Design**
  Ex. concentrated flow, channel lining

What Were They Thinking?

Soil management:
- Soil erosion
- Sediment management

Primary Goal: Keep soil in place

How to keep it in place...
- Concept: Shear-stress
- Application: Bare soil just after final grading
Shear:
- Hydrodynamic force of water flowing in a channel.
  - Effective shear
  - Permissible shear

Simple Equation:

\[ \tau = \gamma d S_0 \]

\( \gamma \) = weight of water
\( d \) = flow depth
\( S_0 \) = slope
What Were They Thinking?

**Shear vs Flow Depth**
(Slope constant, flow varied)
What Were They Thinking?

Shear vs Slope
(constant flow)

Shear

Channel Slope

0.00% 1.00% 2.00% 3.00% 4.00% 5.00% 6.00%

0.00 0.1 0.2 0.3 0.4 0.5 0.6

Shear
What Were They Thinking?

Shear vs. Vegetation Height

- Permissible Shear
- Channel Bottom Shear

Vegetation Height (ft)

Shear

Permissible Shear
Channel Bottom Shear

STORM WATER EROSION AND SEDIMENT CONTROL WORKSHOP
What Were They Thinking?

Shear vs. Slope
(no vegetation establishment yet)

Seed/mulch ok

Additional stabilization needed

STORM WATER EROSION AND SEDIMENT CONTROL WORKSHOP
What Were They Thinking?

[Diagram of a construction site with labels such as "Limits of Construction," "Proposed R/W," and "Fiber Rolls 12 IN." A photo of a construction site is also included.]
That’s What They Were Thinking!

Sometimes it’s a challenge...
That’s What They Were Thinking!

But usually its pure magic ...
That’s What They Were Thinking!

Thank you!

Questions?