Challenging Transmission Structure Designs: Case Studies

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Your assignment, should you decide to accept.....
“Flying is hours and hours of boredom sprinkled with a few seconds of sheer terror.”

Gregory “Pappy” Boyington
Why Challenging?

- Landowners
- ROW
- Design Constraints
- Conflicting Facilities
- Regulators

Why they pay us the ‘big bucks’
Impacts

Cost
Schedule
Headaches (literally)
Constructability
Aesthetics

Decisions have consequences
Case #1 - Scenario

• Politically-charged project
• 115 kV wood H-frame
• Franchised for 161 kV
• Upgrade to double circuit 161 kV
Case #1 - Challenges

Phase-to-Phase > 15.5 ft.

Same pole locations
Same pole spacing
Case #1 - Challenges

Flange joints

Pole bearing
(OMG moments!)
Case #1 - Challenges

Initial or later?
Fatigue?
Insulator constraint
Coating bleed?

Vendor Involvement!
Case #2 - Scenario

• 345kV Dead End Crossing Structure
• Highly Congested Area
• Single Circuit Structure, from Triple Circuit
• Significant Sideslope
• Grading Required
Case #2
Case #2

Future 345kV Line

Existing 345kV Line

345kV Circuit

69kV Circuits
Case #3 - Scenario

- Mix of existing and new circuits
- 69 kV
- Public ROW
- Minimum guying
Case #3

Existing Circuit #1

Existing Circuit #2

Underbuild (of course)

New Circuit
Case #3

Geometry
Clearances
Guying
Loading
Tree
Case #4 - Scenario

- 138kV DC T-line
- 2nd Circuit for future Wind Farm
- Narrow ROW
- Distribution
- Landowner Requests
- Circuit-Circuit clearances
Case #4
Case #4
Case #5 - Scenario

- Politically-charged project
- Greenfield route
- Minimal footprint

BANANAS to NIMBY
Case #5

Quad bundle T2
Narrow profile
Landowner Accommodations
Case #5

Hardware
Deadends
Constructability
Conclusion

• **Challenging Designs**
• Creativity
• Collaboration
• Flexibility
• Maximize what you can **cram** into your ROW

**Many Ways to Skin a Cat**
Questions
Thank You!

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