

# Maintenance

The Feedback Loop  
For  
Sound Design

# Maintenance:

“Just Like Washing the Dishes”

or

Fundamental Engineering?

# Engineering Economics

(shortcuts to concept)

“Doing for \$1.00 what any fool....”

“The glass is twice as big.....”

# Railroad Engineering Economics

## The Economic Theory on the Laying out of Railways

A. M. Wellington, 1887

“An analysis of the conditions controlling the laying out of railways to effect the most judicious expenditure of capital.”

# Maintenance and Engineering in Large Organizations

- Senior Engineers' span of knowledge
- “The Body of Knowledge”
- Spread of this knowledge

# The “Body of Knowledge”

- Design Criteria
- Standard Plans, Specifications
- Maintenance Instructions
- Applications of the BOK

# BOK Limitations

- Competitive Issues
- Liability Issues
- Backward Compatibility

# Large (any?) Organization Issues

- Factors outside the department
- Too few field/reality check trips
- G&O keep perfecting last year
- G&O personal goals impacts outside silo



# Lost Feedback Loop

- Discrete Design Efforts (happens to anybody)
- Obsolete BOK
- Isolated Maintenance Staff
- Neglected refinement of specifications

# Carry-Forward of Specs:

“Mill Scale” Grinding

Special Trackwork, Joints

Friction Modifier Devices

- Placement
- Type
- Product

# Isolated Maintenance Staff

- Best knowledge of conditions, costs
- Craft distinctions
- Staff location
- Shift timing
- “Boring, Routine, ?”

# Sample Issues

That can be avoided by utilizing robust maintenance feedback in engineering management, design, and construction

# Issues:

- Superelevation vs. speed
- Special trackwork type, placement, details
- Embedded track details
- Wheel and Rail Profiles compatible
- Profile and surface defect grinding
- Friction control devices, placement, product
- Life cycle maintenance guidance for design

# Filling the Feedback Gap

- Technical Conferences
- Professional Organizations
- Peer Reviews
- Interviews of proposers and vendors
- Design-Build, if done right

# Feedback Caution Chasing Symptoms

- Grinding
- Drainage

# Conclusion

- How maintenance feedback can/should work
- Issues with inadequate feedback
- Cautions in feedback
- Strategies to acquire feedback



# Professional Engineer

- Stay Curious
- Learn at every opportunity
- Share your knowledge/experience

# Thank You

- Questions/Comments?
- Your experiences?