

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?