Design Guidelines for Engineered Placement of Wood

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EPW – Design Guidelines

Why?
- Performance
- No established standard of practice
- Liability (infrastructure/public safety)

What?
- Process
- reference list
- checklist
- Identify appropriate technical and stakeholder involvement
EPW – Design Guidelines

Project Definition
- Habitat Assessment
- Reach Analysis
- Geomorphic Analysis
- Identify Hazards

Goals/Objectives
- Constraints
- Concept(s)

Design Development
- Risk-based
- PS&E

Implementation
- Construction
- Monitoring
- Adaptive Management

Liability Management
- Environmental
- Public Safety
- Infrastructure
EPW – Design Guidelines

- Project Definition
- Analysis
  - Hazard & Risk Assessment
  - Alternatives Feasibility
  - Preferred Alternative
  - Basis of Design
  - PS&E
- Implementation
- Liability Management
EPW – Design Guidelines

• What is Risk?

To expose to a chance of loss or damage; hazard

Hazard is the potential to cause harm; risk on the other hand is the likelihood of harm

Risk = Likelihood x Consequence

• Hazard & Risk Assessment
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Hazard & Risk Assessment

Identifying sources of potential harm, assessing the likelihood that harm will occur, and the consequences if harm does occur.
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Analysis

Alternatives

Feasibility

Hazard & Risk Assessment

1

2

3

Geomorphology

Hydrology

Hydraulics

Cost / Benefit

Habitat / Ecology

Constructability

Project Stakeholder Input

Permitting

Safety Workgroup

Structural / Stability Analysis

Preferred Alternative

Final Design
1) Analysis

- Sediment Input
- Transport Capacity (sediment and wood)
- Hydrologic
- Hydraulic
- Erosion / Scour
- Structural Stability
- Life cycle / Decay
- Ice or wood loading
- Costing
2) Alternative Analysis

- Establish Criteria
  - Goals/objectives
  - Risks
  - Cost/Benefit
- Selection of concept
- Avoid optimism bias
3) Hazard & Risk Assessment

- **Hazard**
  - Flooding
  - Erosion
  - Avulsion
  - Public Safety
  - Habitat
- **Risk**
  - Loss of Property
  - Loss of Life
  - Ecological Loss or Lost Opportunities
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Design

• Calculations
  - Scour
  - Static Force Balance
  - Impact & Fatigue
  - Aggradation

• Level of Design
  - Factor of Safety
  - Sensitivity Analysis
  - Redundancy

• Ice / Wood loading
• Individual log strength
• Life cycle / Decay
Conclusion:

- Risk-based process
- Reference tool
- Checklist(s)
- Keys on input from a broad range of disciplines
- Introducing wood is important, it’s evolving rapidly, it’s time.