Asset Management of MSE Walls: Critical from Design Through Design Life

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Early Earth Reinforcement Systems

What's an Asset?

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Modern Earth Reinforcement Systems

Asset Management is HIGHLY APPROPRIATE!

- Precast Panels, Steel Reinforcements
- Segmental Blocks, Geosynthetic Reinforcements
- Welded Wire Baskets, Steel Reinforcements
Walls: Out of Sight, Out of Mind

Driving here?
Walls: Out of Sight, Out of Mind

Can't see down here!
For Asset Management, Design Matters

- Traffic Barrier
- Roadway
- Facing Panel
- Select Granular Material
- Random Backfill
- Leveling Pad
- Reinforcements
A Typical MSE Wall Cross Section

- **PRECAST CONCRETE PANELS**

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Foundations – The First Look
Foundations – Important Wall Details

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Construction Practice – Panel Facing

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Construction Practice – Connecting Steel Reinforcements

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Construction Practice – Block Facing

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Construction Practice –
Connecting Geosynthetic Reinforcements

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Construction Practice – Connecting Geosynthetic Reinforcements

Connector with flags

No flags

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Drainage – MSE

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Drainage – Roadway

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Backfill Selection is Critical

Sheepsfoot roller.
Clay backfill = poor friction and drainage

Good friction and drainage come from granular backfill
Excellent Compaction for Long Life

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Construction Inspection – for Long-Lasting Results

• Control of materials
  – Panels, reinforcements, joint materials
  – Backfill – grain size, moisture, electrochemistry

• Control of processes
  – Wall erection – plumbness, alignment, finish details
  – Backfill placement and compaction
  – Drainage systems/runoff control
  – Barrier/coping

• Record-keeping – enables monitoring
Plan for Monitoring (instead of retrofitting)
Key Elements of The MSE Wall Asset (From Cradle On)

• **Design** Cradle - By FHWA GEC11 and AASHTO
  – Bearing Capacity, Settlement, Sliding, Overturning, Over All Stability
  – Reinforcement Strength and Connection Strength
  – Reinforcement and Facing Durability
  – Drainage and Storm Water

• **Appropriate Specifications**

• **QA/QC For Conformance to Specifications** (Construction Inspection)
Key Elements of The MSE Wall Asset (continued)

- The "On"……………… Part
- Condition Assessments (post construction inspection)
- Ability to address unforeseen circumstances or events (guidance to be developed in IBRD Study)
- IBRD Study: **Reinforced Mechanically Stabilized Earth Wall Rehabilitation Solutions and Performance Monitoring Methods**
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Key Elements: Settlement, Bearing Capacity, Overall Stability
Key MSE Wall Element – Drainage and Storm Water

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MSE Wall Design Elements with Respect to Durability

- Corrosion and Chemical Degradation Potential
- Installation Damage
- Freeze Thaw Cycles
- Ultraviolet Light
MSE Durability – Reinforcement Installation Damage
MSE Durability – Reinforcement Corrosion
MSE Durability – Facing
MSE Wall Specifications and Plans

- High quality plans and specs are needed to construct a high quality asset.
Contract Drawing

Figure 5.1.5 Typical Contract Drawing for MSE Wall Abutment
Construction Inspection

- Trained inspectors who understand MSE walls and what's Important
- Experienced
- Cooperative
- On site
MSE Wall Long-term Condition Assessments
MSE Wall Asset Preservation

Photo by: www.ncsconsultants.com
Wall Was Hit Hard

Photo by: www.ncsconsultants.com
Repaired Wall

Photo by: www.ncsconsultants.com
MSE Wall Asset Preservation
Spiral Nails
Repaired Wall
Landslide Over MSE Wall
Wall Face Damage
Wall Repaired – Slide Still Moving
Asset Management – Not Just MSE
Summary

• Many components make up an MSE wall; most are buried.
• Managing the MSE wall asset starts with the design (cradle).
• There are key MSE wall design, material, inspection, and construction elements to consider.
• The MSE wall asset lends itself to NDT monitoring, condition assessment, in-place repair.

Build it Right … Care For It Right!