COUNTERMEASURE DESIGN GUIDELINES

LESSON 7
LEARNING OUTCOMES

• Discuss the five countermeasure design guidelines for which a workshop is not available
DESIGN GUIDELINE 1
Bendway Weirs / Stream Barbs

• Sources
  – Colorado DOT
  – Washington State DOT
  – NRCS
  – U.S. Army Corps of Engineers

• Application
  – Bankline protection and flow alignment in meandering channel bends
DESIGN GUIDELINE 2
Soil Cement

• Sources
  – Portland Cement Association
  – Pima County DOT
  – Maricopa County, Arizona

• Application
  – Revetment for banklines and sloping abutments, drop structures and bed armor
DESIGN GUIDELINE 3
Wire Enclosed Riprap Mattress

• Sources
  – New Mexico State Highway and Transportation Department

• Application
  – Revetment for banklines, guidebanks, and sloping abutments
DESIGN GUIDELINE 4
Articulated Concrete Block System

• Sources
  – Hydro Review, Hydraulic Engineering ‘93
  – Maine DOT
  – Minnesota DOT

• Application 1
  – Bankline and abutment revetment, bed armor

• Application 2
  – Pier scour protection
DESIGN GUIDELINE 5
Articulating Grout Filled Mattress

• Sources
  – Oregon DOT
  – Arizona DOT

• Application
  – Bankline and abutment revetment and bed armor
DESIGN GUIDELINE 6
Concrete Armor Units

• Sources
  – Pennsylvania DOT and tested at Colorado State University
  – A-Jacks Testing Manual (CSU) and Design Manual (Ayres Associates)

• Application
  – Pier scour and abutment scour protection
DESIGN GUIDELINE 7
Grout / Cement Filled Bags

• Sources
  – Maryland State Highway Administration
  – Maine DOT

• Application
  – Protection of undermined areas at piers and abutments and bed armor
DESIGN GUIDELINE 8
Rock Riprap at Piers and Abutments

• Sources
  – HEC-18 Scour at Bridges (Third Edition)

• Application
  – Pier and Abutment Scour Protection
DESIGN GUIDELINE 9
Spurs

• Sources
  – HEC-20 Stream Stability at Highway Structures (Second Edition)

• Application
  – Bankline stabilization and flow alignment
DESIGN GUIDELINE 10
Guide Banks

• Sources
  – HEC-20 Stream Stability at Highway Structures (Second Edition)

• Application
  – Abutment protection
GUIDE BANK

Flow

Scour Hole

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DESIGN GUIDELINE 11
Check Dams/Drop Structures

• Sources
  – HEC-20 Stream Stability at Highway Structures (Second Edition)
  – HEC-14 Hydraulic Design of Energy Dissipaters for Culverts and Channels

• Application
  – Correcting or preventing channel degradation
DESIGN GUIDELINE 12
Revetments

• Sources
  – HEC-11 Design of Riprap Revetment

• Application
  – Bankline/abutment protection and riprap component of many other countermeasures
DUMPED RIPRAP
LEARNING OUTCOMES

• Discuss the five countermeasure design guidelines for which a workshop is not available