

EXECUTIVE SUMMARY

The Federal Lands Highway (FLH) of the Federal Highway Administration (FHWA) recently investigated the application of polyurethane resin (PUR) injection as a rapidly deployed, cost-effective ground structure stabilization method. Application objectives included the preservation of historic, cultural and other environmentally sensitive natural and man-made features, while maintaining the original visual characteristics and aesthetic appeal.

Most recently, in cooperation with the Colorado Department of Transportation (CDOT), FLH completed full-scale PUR demonstration projects at a historic tunnel located along highway SH 14 in the scenic Poudre Canyon west of Ft. Collins, CO, and at a dry-stack stone masonry retaining wall supporting highway SH 149 along the Rio Grande River northwest of South Fork, CO.

The Poudre Canyon demonstration involved PUR injection and stabilization of a previously bolted section of the western tunnel portal, where annual freeze/thaw cycles and rock mass creep toward the adjacent Cache La Poudre River were contributing to rock mass instability. The South Fork demonstration involved PUR injection within a culturally-sensitive dry-stack stone masonry wall that was progressively failing.

In addition to the FLH sites, CDOT also contributed PUR injection data from a recent rock slope stabilization project along highway US 6 in Clear Creek Canyon just west of Golden, CO.

Based on the “lessons learned” from these investigations, application guidance has been developed for the selection of polyurethane resin products and injection methods to (1) stabilize failing rock-masses (e.g., rock slopes, unique rock promontories, escarpments), and (2) preserve aging and/or deteriorating man-made structures (e.g., historic retaining walls, archeological structures).

