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TITLE: Rock Blasting and Slope Design for Highway and Railroad  
Construction in Alaska - A Case Study

### ABSTRACT

Design methods in rock engineering have evolved slowly, largely by trial and error since the physical and mechanical laws governing the behavior of rock masses are difficult to define. In Alaska, a high percentage of construction for highways and railroads have required rock removal and stabilization and therefore, have presented unique concerns to the design engineer and geologist.

Golder Associates has recently completed two projects in Alaska which have involved significant blasting and slope stabilization requirements.

The Tongass Highway in Ketchikan is currently planned for expansion with an alternate route in addition to widening of the current highway. Golder Associates has evaluated blast designs and stabilization methods for 100' high slopes adjacent to the Tongass Highway, Ward Cove Cannery and Cannery Dam. Controlled blasting techniques were employed and were designed to minimize blast damage to adjacent structures.

The Alaska Railroad had a major tunnel collapse in the spring of 1984 which resulted in temporary closure of the southbound mainline. Golder Associates performed a structural analysis of the tunnel stability and designed and managed the removal of the tunnel and replacement with a  $\frac{1}{2}$ :1 cut slope. Tunnel removal was accomplished utilizing sophisticated modified cushion blasting which was designed to protect the roadbed and a short span bridge structure, located approximately 50 yards south of the tunnel. Over 20,000 pounds of explosives were detonated sequentially to control the direction of explosive energy.

