

**Client:**

Iron Mountain Associates  
(IMA)

**Location:**

Park City, UT

**Services Provided:**

- Field investigations & laboratory testing
- Reliability analysis
- Yearly visual wall audit
- Statistical analysis
- Construction quality assurance
- Remedial design
- Active Risk Management™
- Expert witness

**Value Provided:**

- Identify and manage client risk
- Calculated remaining service life through realistic uncertainty quantification
- Recommended targeted remediation areas resulting in cash savings

**Background & Project Challenges**

The Colony, a 4,400 acre mountain slope ski - in and out residential community in Park City, Utah, is a phased-development project that began in 1998. The trails of The Canyons, the continent's fifth-largest ski resort, snake throughout the property.

The mountainous terrain posed significant challenges to infrastructure construction, and required an extensive system of retaining walls for side hill roadway construction, vehicle bridges and ski cross-overs, comprising over 50 individual structures. Mechanically stabilized earth (MSE) retaining walls were used and consist of welded wire for face elements and primary reinforcement. Unfortunately, intrusion of deicing salts placed on the roads in the winter has led to accelerated corrosion of the metallic grid reinforcement in most of the walls. As a result of the accelerated corrosion, it was recognized that the service life of the walls would be lower than that for which they had been designed. However, the actual decrease in service life that could be expected was unknown.



**Geocomp Role & Accomplishments**

In late 2005, Geocomp was retained by IMA to determine the extent and impact of corrosion of the steel reinforcements on the service life of the MSE structures. A detailed Protocol was established for the determination of "projected service life". This included a series of field and laboratory investigations (including forensic deconstruction of a number of structures) that were conducted over a 5 year period. An extensive data set of reinforcement thickness/area measurements and electrochemical properties of the reinforced fill soils was developed. A regression analysis of the data set and other statistical techniques were used to establish a loss rate model. This provided the basis on which to perform reliability analyses and predict remaining service life of all structures. Predicted corrosion degradation rates were confirmed through use of monitoring methods, including sample retrievals and non-destructive testing (i.e., linear polarization measurements), that were conducted over a 7 year period.

Technically viable rehabilitation solutions and costs were developed. A phased program for the required near term and future rehabilitation was prepared to assist the Client in developing present value remediation costs. Geocomp provided design support and construction quality assurance services for initial wall remediation that began in 2011.