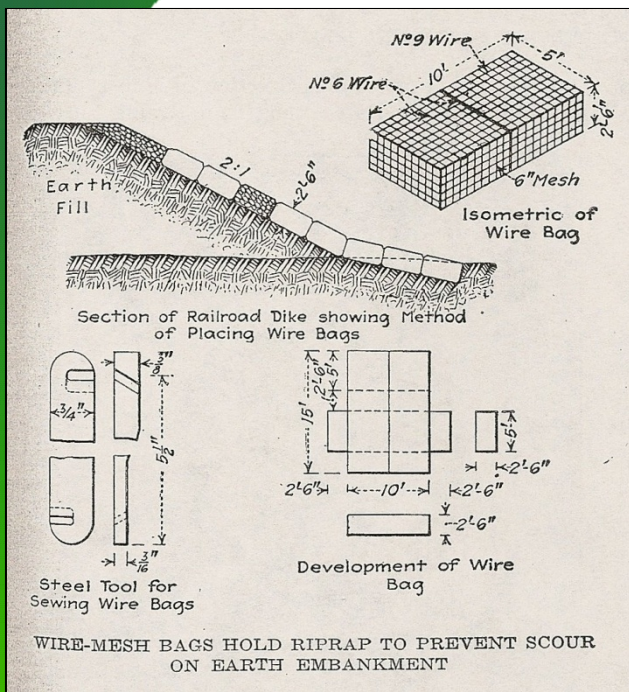


Part 3

GABION STRUCTURES

Welded Wire Erosion Mattresses

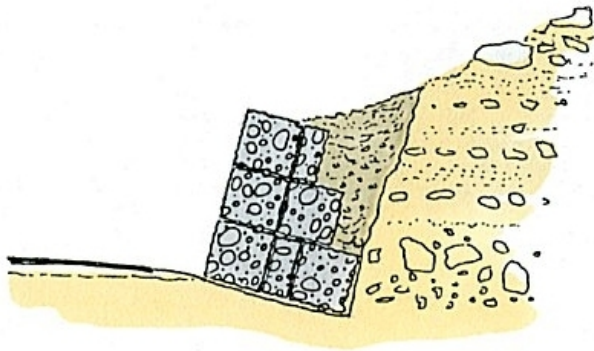


Wire mattresses were first used by the US Reclamation Service in 1918 for channel bank protection on the Carlsbad Project in New Mexico

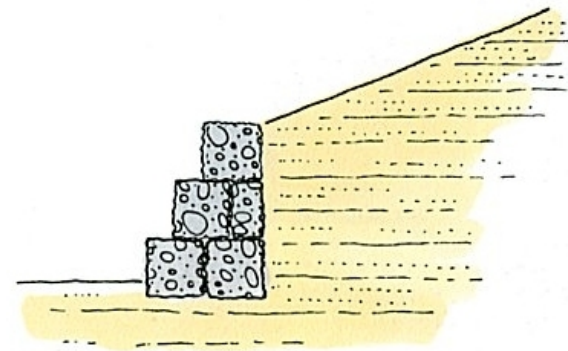


Rock-filled welded wire or twisted wire mattresses can be an effective mitigation to mitigate wave and velocity-induced erosion. These led to the development of rock-filled gabion baskets.





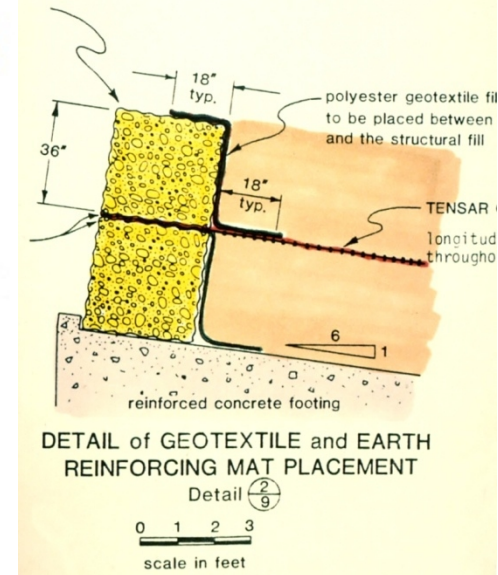
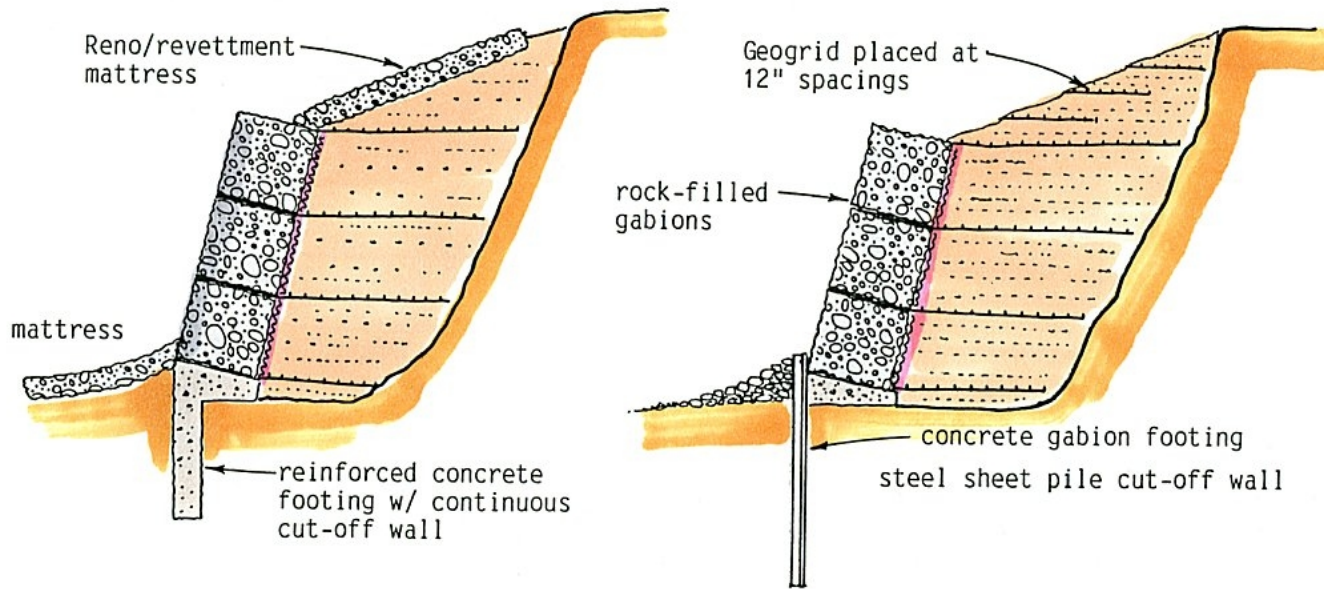
Typ gabion retention structure against glacial till material
Back batter of 1:4



Horizontally-stacked gabion baskets and half basket; placed in a stream channel against recent terrace deposits

Rock-filled gabions are gravity structures designed using the same methodology as those employed for crib walls. Gabions are very flexible structures, able to withstand significant movements from undercutting or landslipping. They can be constructed on a batter (left) or level (right).





Gabions work well in *unimproved channels* because they provide surface roughness more in harmony with natural channels. Gabions can also absorb significant deflections when undercut by the stream.



- **Gabion baskets are “soft,” flexible support systems, which can be backfilled with native rock to ‘blend’ into their background, and thereby, become more aesthetically pleasing. This wall is long the westbound shoulder of Interstate 70 coming into Glenwood Springs, Colorado.**

Gabion Walls and Mesh to stabilize talus cut slope

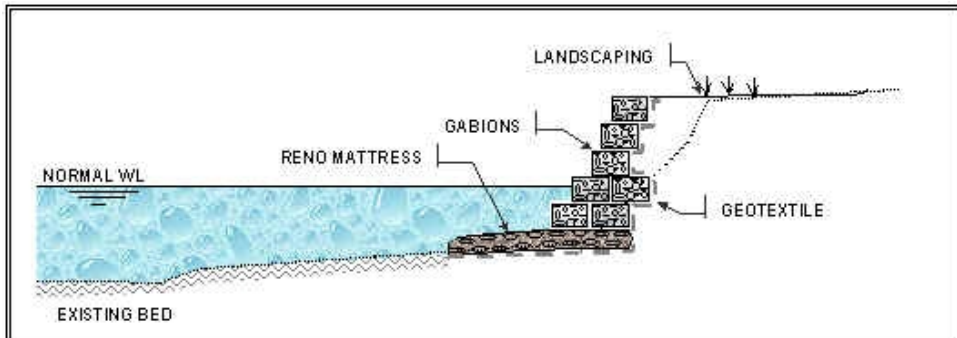
Westbound Interstate 70 near Glenwood Springs, Colorado, showing attempted stabilization of a highway cut in talus

This scheme was not altogether successful, as shown at lower left





- Crushed rock-filled gabion retaining wall supporting an ancient sinkhole feature along the eastbound lanes of Interstate 44, just east of Vichy Road in Rolla. Note rockfill surcharge on crest of wall
- The **toe wall** provides passive toe restraint so the wall did not have to be excavated as deeply against the existing road shoulder, when the highway was widened in 2005.



This shows a typical gabion wall and *revetment, or Reno Mattress*, which protects the wall from being scoured or undercut during high flow.

Gabions possess *high skin friction* and provide *channel aeration* during high flow, which makes them very desirable for limited repair of unimproved channels