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U HOLD-GRO EROSION CONTROL SYSTEM 4

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Final Report
October 1978

Prepared in cooperation with
U. S. Department of Transportation
Federal Highway Administration

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views of the Colorado Department of Highways or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

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16. Abstract Three 1/4 acre test installations of an erosion control fabric produced by Gulf States Paper Corporation, Tuscaloosa, Ala., were installed on steep, high altitude cut and fill slopes in Colorado. The test sites were adjacent to areas covered with jute mesh normally used. Hold-Gro consists of paper strips interwoven with plastic yarn. It was determined that growth of vegetation through the Hold-Gro product was equal to, or slightly better than, growth through the familiar jute mesh. Hold-Gro weighs only about 1/4 as much as jute per square yard thereby providing a significant advantage in shipping and installation.			
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HOLD-GRO EROSION CONTROL SYSTEM ON VAIL PASS
PROJECT I 70-2(51)193

This report covers research performed in compliance with the work plan submitted to the Federal Highway Administration by a letter dated October 26, 1976. The related Contract Modification Order Number 3156 was approved by FHWA staff December 16, 1976. No increased contract cost was involved and monitoring and reporting of the experimental feature has been at State expense.

HOLD-GRO is an erosion control fabric manufactured by Gulf States Paper Corporation, Tuscaloosa, Alabama, 35401. It consists of paper strips interwoven with plastic yarn. Suggested specifications and installation instructions furnished by the manufacturer are attached.

A combination of weather and availability of materials resulted in the placement of three test installations rather than the four originally planned and approved. The sites where the HOLD-GRO was installed were 9,432 square feet at Station 614+50 left, a steep moist cut slope; 10,800 square feet at Station 645+50 left, a steep fill slope; and approximately 10,000 square feet at Station 654+50, a rocky knoll and adjacent medium fill slope. The first two sites were completed during the 1976 construction season and, coincidentally were both involved in some slide damage the following spring. Sufficient undamaged portions remained to observe results, however. The third site, at Station 654+50 on Project I 70-2(45)194 was installed August 15, 1977 and subsequent time and precipitation had been insufficient to completely degrade the woven paper portion of the HOLD-GRO.

Based on observations of all three sites, and as supported by attached photographic evidence, it has been determined that growth of vegetation through the HOLD-GRO product is, after a full season, equal to or slightly better than, the growth through standard jute.

Early growth through jute appears to be faster and stronger but tends to form "tufts" or "bunches" through the grid pattern of the jute (see Photo No. 5). When the paper portion of HOLD-GRO dissolves, the growth through it soon equals the growth through standard jute in height and exceeds it in fullness and consistency of cover, (see Photo No. 8). Erosion of soil beneath both the HOLD-GRO and the standard jute was not a problem. Both products performed equally well in this respect.

The landscaping contractor's foreman in charge of installation of both types of erosion control material was strongly in favor of the HOLD-GRO over the standard jute because of the 1:4 weight advantage. He indicated this was a particular advantage on the 614+50 site which, due to the 10,100 foot altitude and steepness of slope was "the most difficult (slope) his crew has ever worked."

In the summer of 1976 a small installation (approximately 3600 square feet) of HOLD-GRO was placed on a medium cut slope near the foot of Berthoud Pass west of the village of Empire on Project RF 040-3(5). Again performance of the HOLD-GRO was at least equal to adjacent untreated and plastic mulch net covered areas. Photos Number 9 and 10 show this installation.

The weight advantage of HOLD-GRO over jute, both in installation and in shipping, is significant. Satisfactory prevention of erosion and promotion of growth was provided by both types of material, HOLD-GRO and jute, used in this test.

A minor disadvantage of the HOLD-GRO was its light almost white color which did not blend into the landscape. The local product representative advises that a nonfading green color is now available.

This report will be discussed at a meeting of the CDOH Research Implementation Committee to determine appropriate implementation action.



Photo No. 1 Taken 10/14/76
Vail Pass Hold-Gro Sta. 614+50
Installation Date - 10/12/76
(White rectangle upper center)



Photo No. 2 Taken 6/27/78
Same site as Photo No. 1
Shows rock and mud slide from
above partially covering test
site

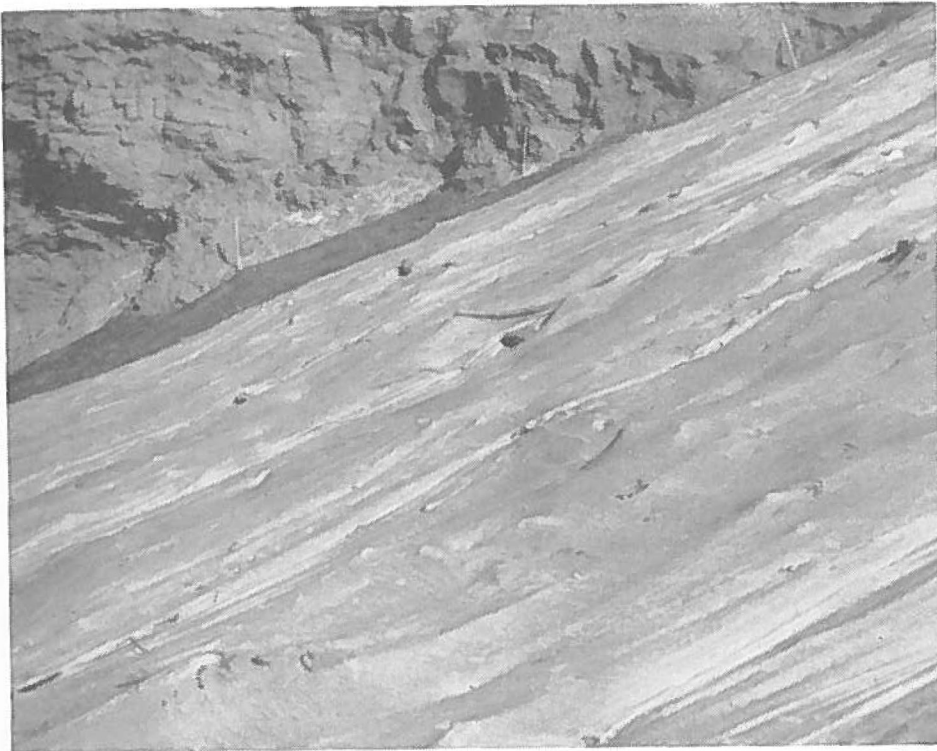


Photo No. 3 Taken 10/14/76
Same site as Photo No. 1
close up. Dark strip in
background is standard jute.



Photo No. 4 Taken 6/27/78
Same site as Photo No. 1.
Rock and mud slide deposit is
visible on right side. Hold-
Gro paper has disappeared
completely.



Photo No. 5 Taken 7/24/78
Vail Pass Hold-Gro, Sta. 645+50
Installation Date: 10/15/76.
Hold-Gro is on left and
standard jute on right.

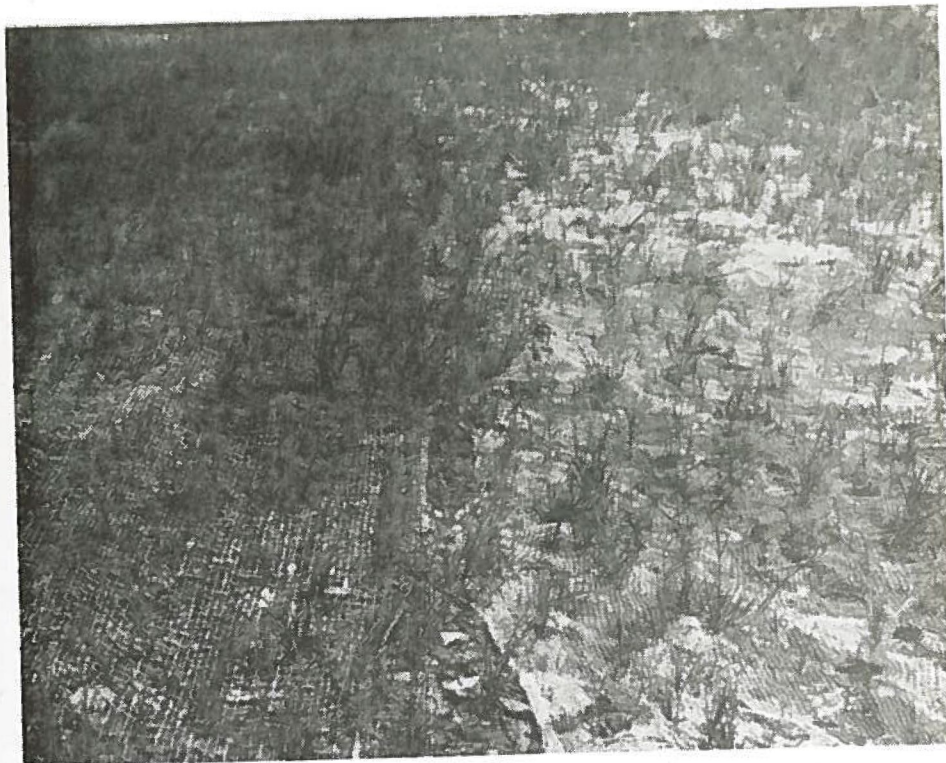


Photo No. 6 Taken 9/12/78
Vail Pass Hold-Gro, Sta. 654+1
Installation Date: 8/25/77
Standard jute on left, Hold-G
on right.



Photo No. 7 Taken 9/12/78
Vail Pass Hold-Gro, Sta. 654+50
Installation Date: 8/25/77
Hold-Gro on left, standard
jute on right. Rocky knoll at
top of medium fill slope.



Photo No. 8. Taken 7/24/78
Vail Pass Hold-Gro, Sta. 645+50
Installation Date: 10/15/76
Hold-Gro on left, standard
jute on right, junction just
left of center of photo.

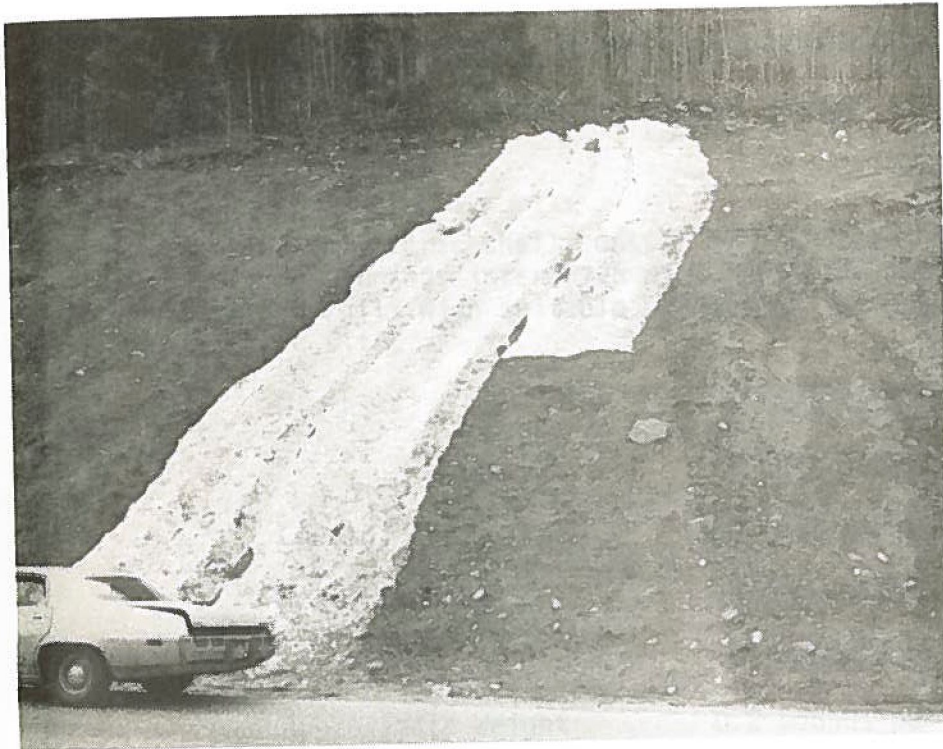


Photo No. 9 Taken 4/1977
Installation Date: Summer 1976
Near Berthoud, Colorado



Photo No. 10 Taken 11/1978
Same location as 9 above.

SUGGESTED MATERIAL SPECIFICATIONS

EROSION CONTROL FABRIC

Erosion Control Fabric shall consist of a knitted construction of yarn with uniform openings interwoven with strips of biodegradeable paper, furnished in rolls with suitable protection for outdoor storage at a construction site.

Widths	5 feet minimum and 10 feet minimum
Length	360 feet average
Roll Sizes	5 foot width - 200 square yards 10 foot width - 400 square yards
Approximate Weight	0.2 pounds per square yard
Packaging	4 - 6 mil opaque polyethylene bag
Staples	11 gauge wire, "U" shaped with a 1 inch crown and legs 6 inches in length

INSTALLATION

Best results will be achieved from close ground contact; therefore, during installation material should be draped loosely over ground surface, not stretched tightly and smoothly. The area to be covered shall be prepared as a fine seed bed, fertilized, limed, and seeded prior to installation of erosion control fabric. If the slope is greater than 3:1, fabric shall be applied vertically with paper strips oriented parallel to the slope.

Dig a 4 inch deep check slot 1 foot back from the slope crown; fold, place, and staple fabric every 9 inches in the check slot and cover with soil. Repeat check slot at the bottom of the slope. When 2 or more lengths of fabric are required to be installed side-by-side to cover an area, they shall overlap 4 inches (minimum). Fabric lengths installed end-to-end shall overlap 4 inches (minimum) with the upgrade section on top of the lower grade section.

Each length of fabric shall be stapled in 3 rows; each edge and the center with staples placed on 3 foot centers (maximum). Overlap ends shall be stapled on 9 inch centers across the fabric overlap.

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- 66-3 Interim Report on the Clifton-Highline Canal Experimental
Project I 70-1(14)33 #1
- 66-4 Final Report on Statistical Research Project - Quality Control
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- 66-5 Final Report on the Automatic "Icy Road" Sign Study
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- 78-1 The Use of Clear Concrete Sealer in Colorado
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 78-4 Rate of Progressive Deterioration on Colorado Highways
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 78-7 Evaluation of the Outflow Meter in Colorado
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