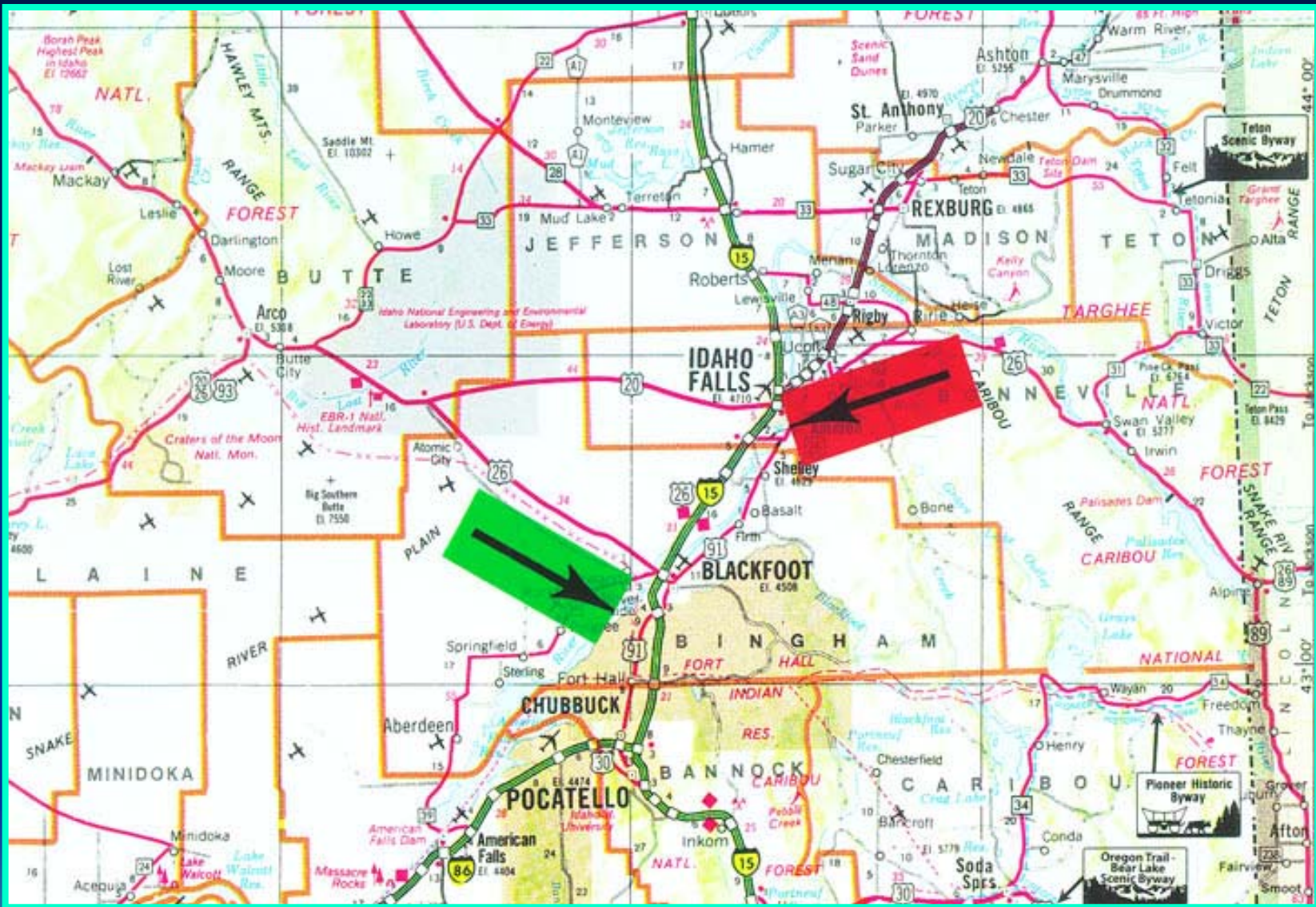


A-Jack Scour Protection on Snake River Bridges

@ Ferry Butte & Shelley Bridges



November 2002 thru January 2003
Presented by Lotwick Reese

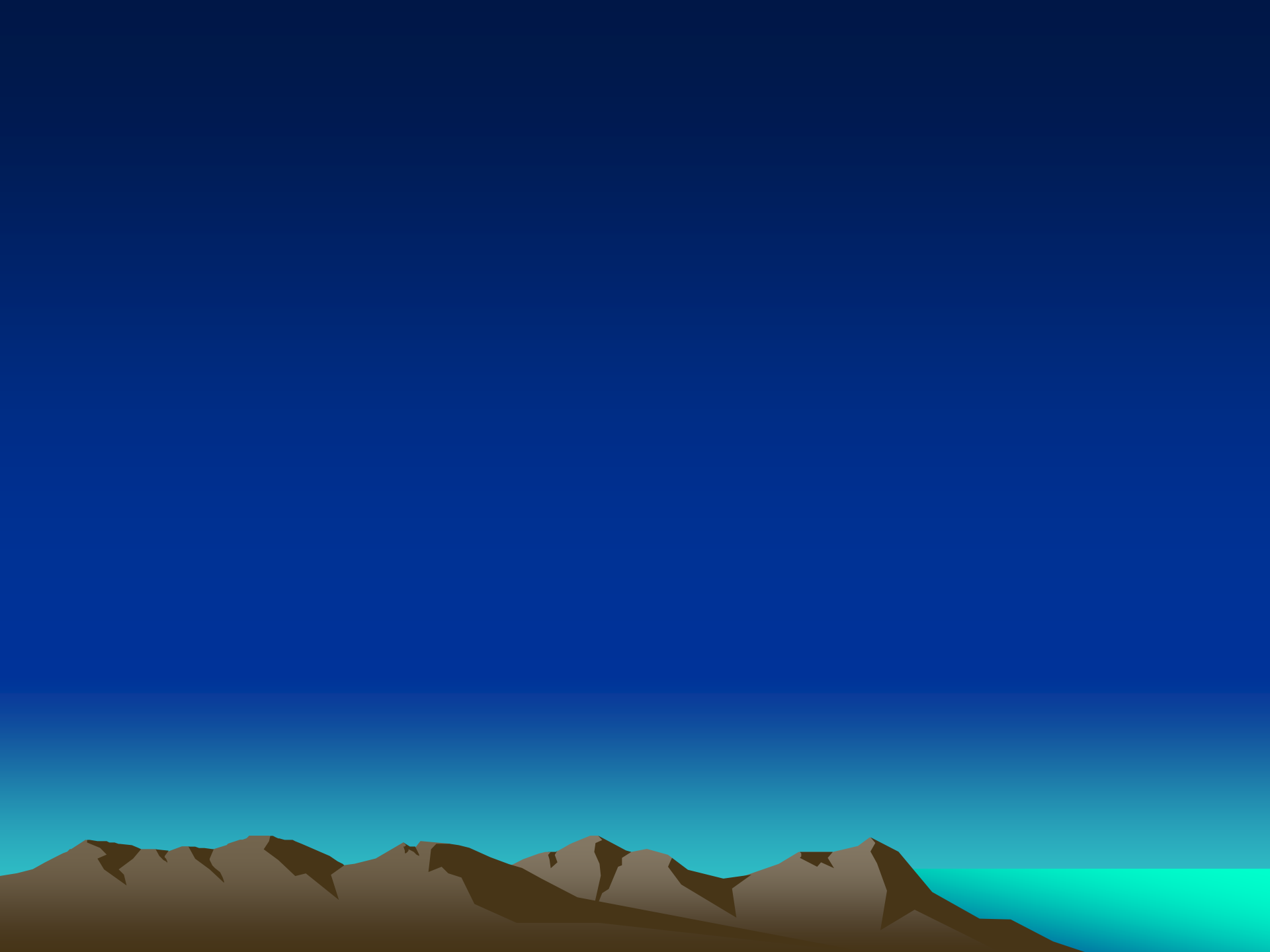












News Release

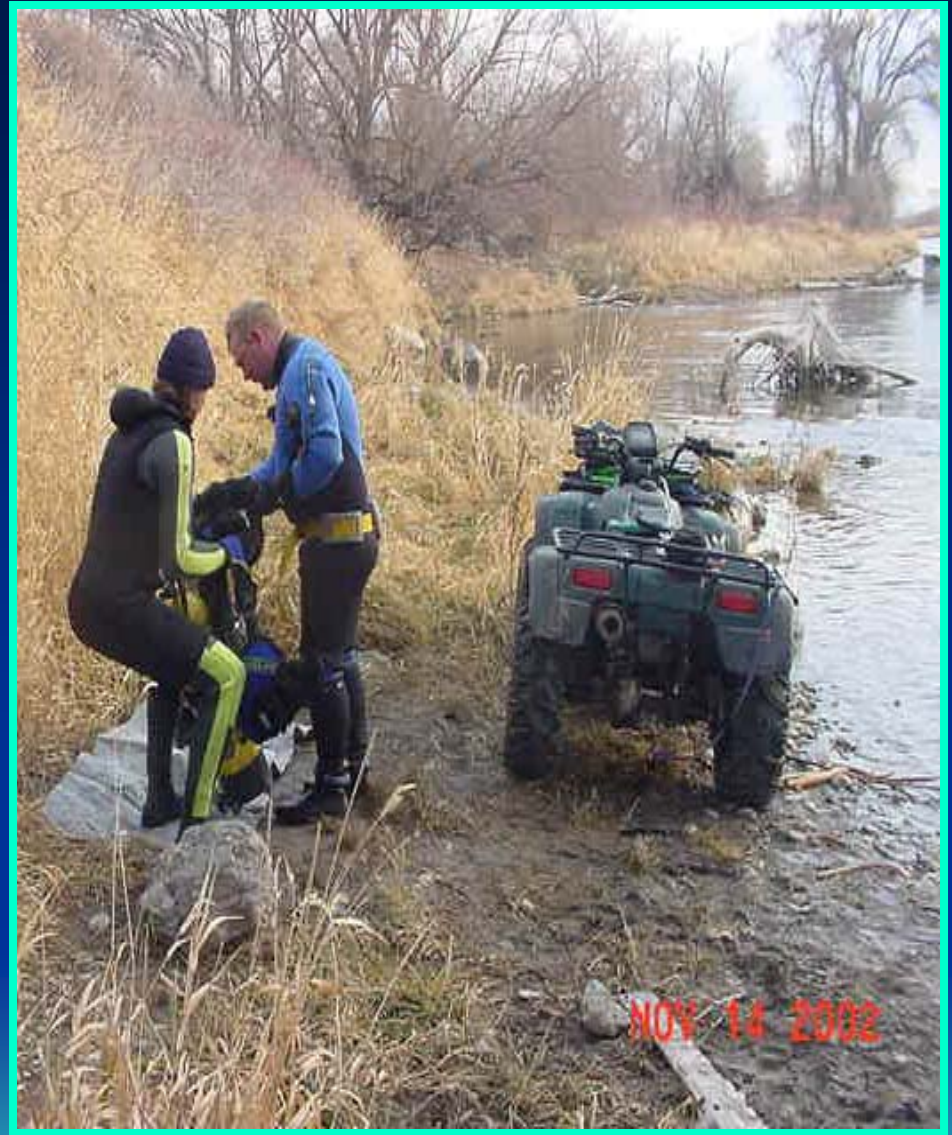
- Sept. 17, 2002
- News Release Title
- POCA TELLO – A process used to prevent erosion from the base of new bridge piers will be used for the first time in Idaho to control “scouring” on two eastern Idaho bridges that were severely scoured in the 1997 Snake River Flood.



- Eddys that form around bridge columns can carry material downriver and threaten the integrity of the piers. Concrete blocks (known as A-Jacks) shaped like the children's toy jacks will be connected and placed on all sides of the columns to prevent further erosion. The A-Jacks structures are designed to capture sediment in the river and begin refilling the eroded riverbed around the columns.



- Our first objective upon arriving on site at Ferry Butte Bridge was to investigate conditions of the river bed in the vicinity of the pier structures using divers.



Under water video camera and dive equipment. Weights belts were necessary for divers to perform duties.



- ITD specifications required that:
- woody debris be removed from scour protection zones (SPZ).
- boulders projecting 400 mm above streambed be removed from SPZ.
- scour holes be filled with clean gravel.
- all modules be connected together and secured to pier structure to prevent modules from being carried away.



Change of Specifications

- The Contractor shall use State provided underwater video camera to provide underwater inspection verification video of A-Jacks modules placement and connectivity. The underwater inspection shall include pre-placement video of all locations to receive A-Jacks and post placement video of the same locations. The recorded video shall be the Contractor's independent underwater inspection.





Assembling Modules



- Start assembling modules by laying out rows as follows:
- Set Jacks 1, 3 and 5 leaving gaps to accommodate Jacks 2, 4 and 6. This method ensures good fit-up and uniformity.



Skids were fabricated to provide for quick and easy transport of each module assembly.





NOV 14 2002



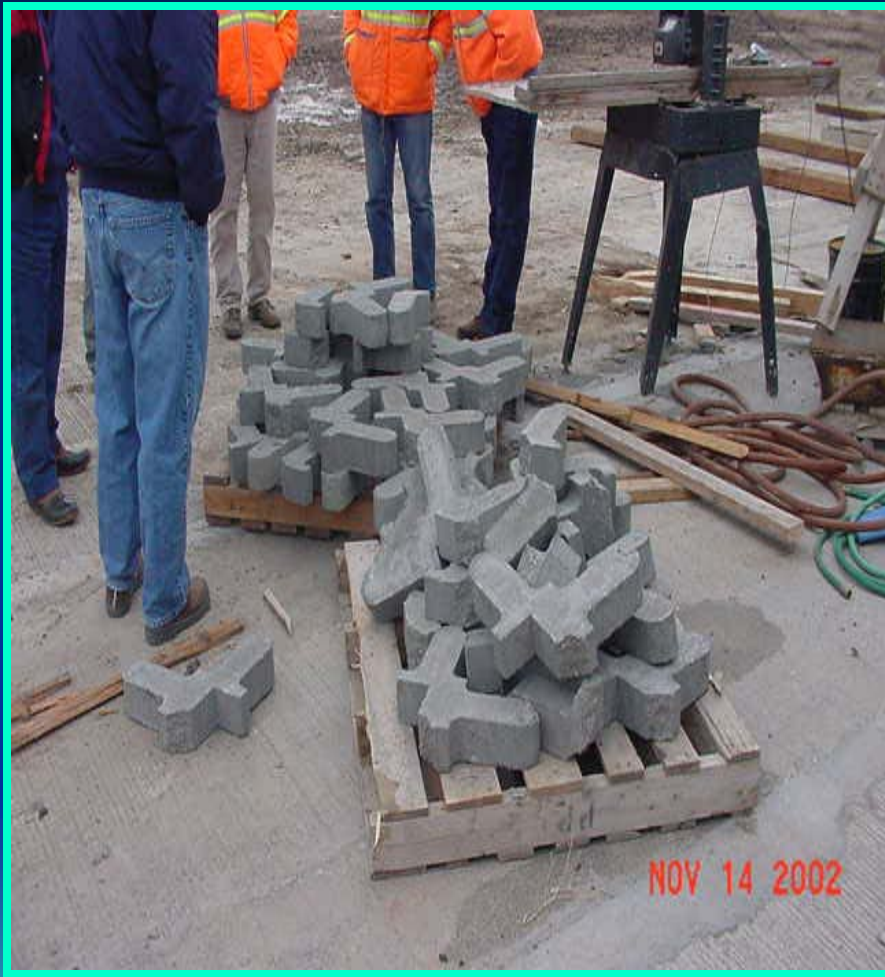
NOV 14 2002



6x6 Module



Plan for Breaks



- A-Jacks are fragile, especially in cold weather. Techs assembling modules reported a loss of around 5% of the A-Jacks due to breaks. Many more breaks were experienced during module placement on site.




Cross sectional area of Jack where breaks occurred most often.



- After assembling A-Jacks into modules they are then secured tightly using .25 inch Corrosion Resistant Steel cables and copper clamps. Modules are now ready to deliver to site.





MODULE PLACEMENT

NOV 14 2002

SCALE: 1/8"=1'-0"

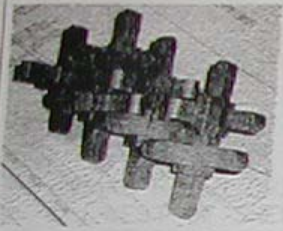
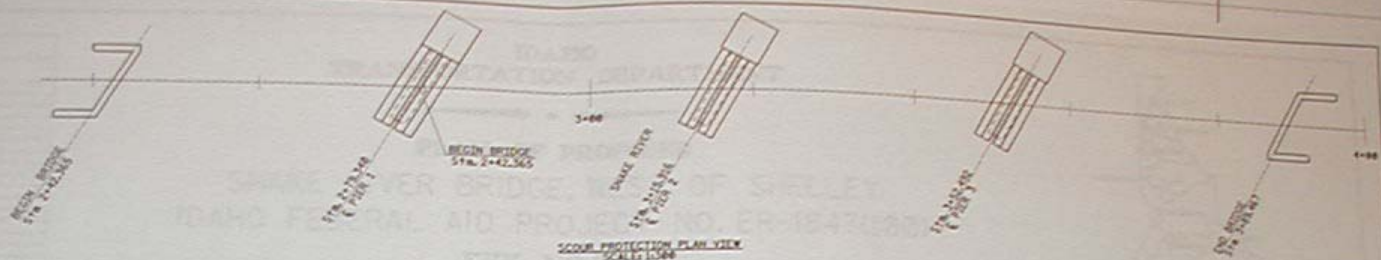
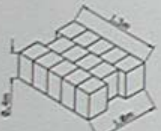


PHOTO OF 4x3 A-JACKS EXAMPLE. CONSTRUCTED FROM 36mm PLASTIC SAMPLE UNITS. EXAMPLE SHOWS A ROW OF 4 JACKS NESTED INTO 3 JACKS.

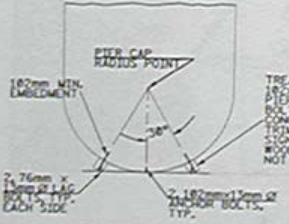


A-JACKS MOULDE DIMENSIONS. APPROXIMATE SMALL DIMENSIONS.

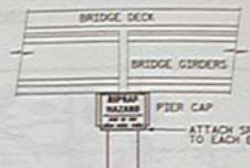
NOTES:
A-JACKS 5x4x5 REFERS TO A 14-UNIT MODULE COMPOSED OF A ROW OF 5, THEN A ROW OF 4, THEN A ROW OF 5. A-JACKS UNITS INTERLOCK AND BANGKO TOGETHER WITH A 6.4mm DIAMETER STAINLESS STEEL CABLE.



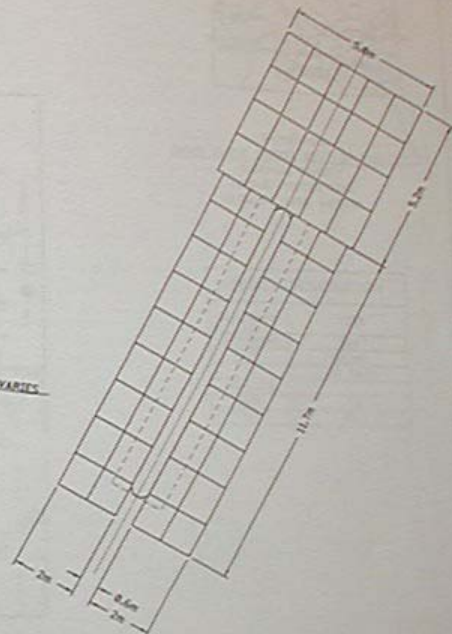
WARNING SIGN ELEVATION.



TREATED OR REDWOOD 100x100x762 S&S BOLT TO PIER # 7/8" DIA. OR ANCHOR BOLT. TYP. 180mm MIN. TYP. CONCRETE 180mm MIN. TYP. ITEM CORNER: SO THAT SIGN BEARS ON A FLAT WOOD SURFACE AND IS NOT DISTORTED WHEN ATTACHED.



SCOUR PROTECTION AT PIERS-ELEVATION VIEW N.T.S.



SCOUR PROTECTION AT PIERS-PLAN VIEW N.T.S.

REVISIONS NO. DATE BY DESCRIPTION 1 11/14/02 JWB 2 12/10/02 JWB 3 01/21/03 JWB 4 02/28/03 JWB		DESIGNER: Robert E. Butler CHECKED: Anthony Koon DETAIL: Jeremy Seaton INCH/FEET: Anthony Koon CORRECTING:	SCALES SHOWN ARE FOR 36mm x 36mm PRINTS ONLY CADD FILE NO. 733'-00-Scour.rvt DRAWING DATE: February 2002		IDAHO TRANSPORTATION DEPARTMENT BUTLER ENGINEERING & LAND SURVEYING	FEDERAL AID PROJECT NO. ER-1888(00) REGION 10 IDAHO	Scour Protection Details SNAKE RIVER BRIDGE, FERRY BUTTE ROAD BINGHAM COUNTY	BRIDGE PLANS BRIDGE INSPECTION SECTION KEY: 13148 SHEET NO. 731 BRIDGE NUMBER: 18744 SHEET: 2 of 2
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February 2003

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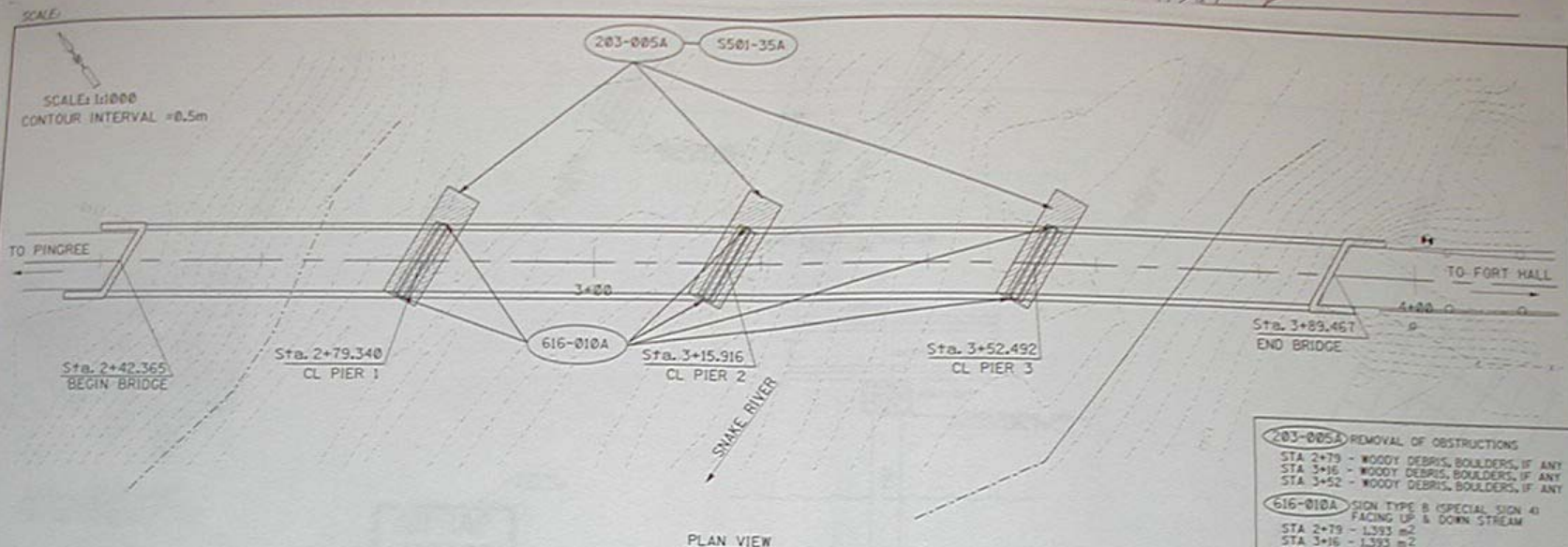
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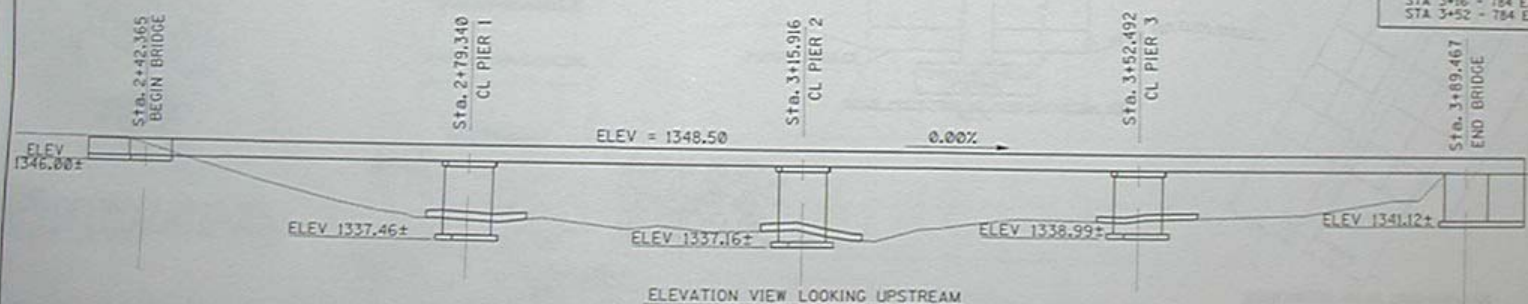
Notes

15/2/27 SGC 19



PLAN VIEW

- 203-005A** REMOVAL OF OBSTRUCTIONS
 - STA 2+79 - WOODY DEBRIS, BOULDERS, IF ANY
 - STA 3+16 - WOODY DEBRIS, BOULDERS, IF ANY
 - STA 3+52 - WOODY DEBRIS, BOULDERS, IF ANY
- 616-010A** SIGN TYPE B (SPECIAL SIGN 4) FACING UP & DOWN STREAM
 - STA 2+79 - 1,293 m²
 - STA 3+16 - 1,293 m²
 - STA 3+52 - 1,293 m²
- 5501-35A** A-JACKS SCOUR PROTECTION
 - STA 2+79 - 784 EACH
 - STA 3+16 - 784 EACH
 - STA 3+52 - 784 EACH

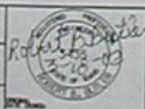


ELEVATION VIEW LOOKING UPSTREAM

ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.

NO.	DATE	DESCRIPTION

DESIGNED: Robert B. Butler
 DESIGN CHECKED: Anthony Khan
 DETAILS: Jeremy Sandberg
 TRK. CHECKED: Anthony Khan
 CORRECTIONS: February 2002



IDAHO TRANSPORTATION DEPARTMENT
 Butler Engineering & Land Surveying



metric
 FEDERAL AID PROJECT NO. ER 1888(100)
 REGION 10 IDAHO

Situation/Layout
 SNAKE RIVER BRIDGE,
 FERRY BUTTE ROAD
 BINGHAM COUNTY

BRIDGE PLANS	
BRIDGE INSPECTION WATER GUT (2014)	
ISSUED: BINGHAM	REV. NO. 73P
BRIDGE DRAWING NO. 2014A	SHEET 1 of 2

December 30,

Ken Wright
 Hancock Park
 P.O. Box 409
 Pocatello, Idaho

R.E. Chubbuck
 DM-15-21006
 Key No. 78
 Contract No.

Dear Ken:

Enclosed is a tall verification, and supplied on Scope out material plan

Sheet 6 of 16
 Cleanliness Value
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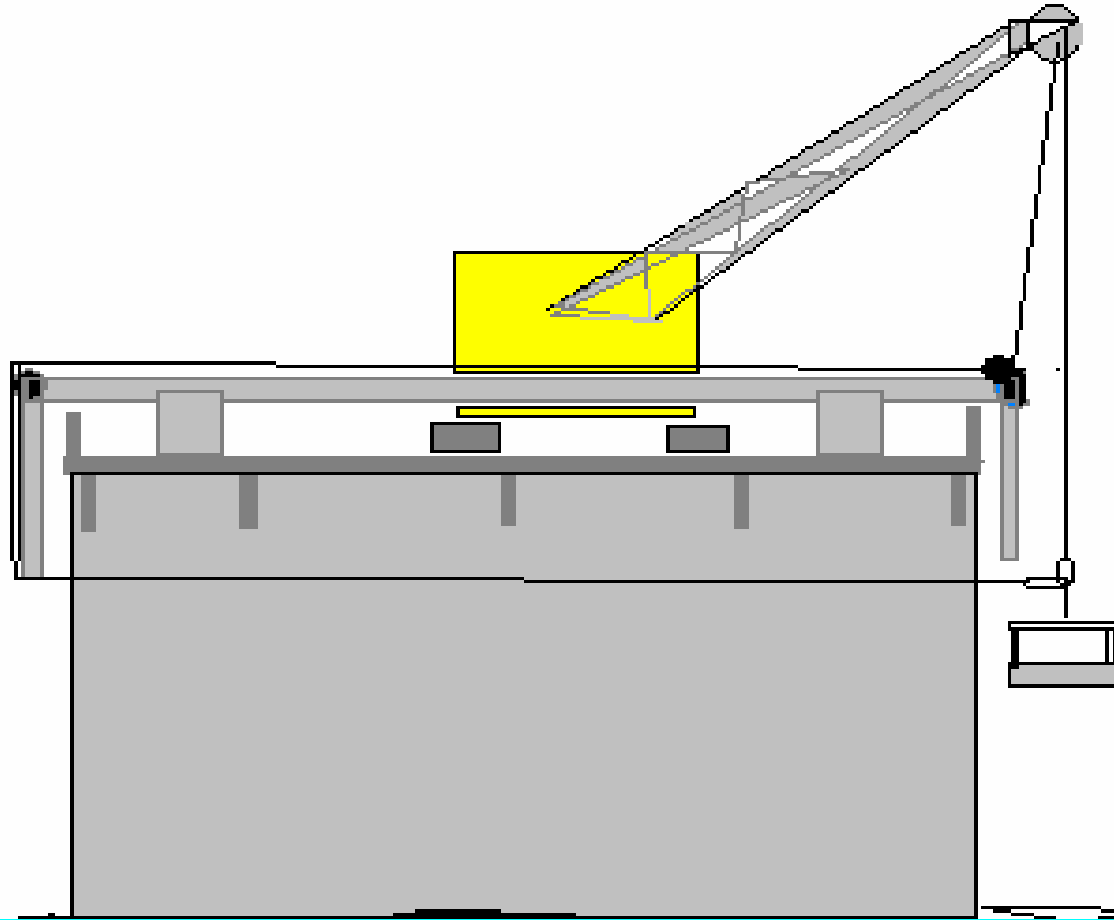
25.20
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 PAYMENT
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Started Module placement @ Ferry Butte Bridge, Pier #3



- River flow velocity was low.
- Depth of water @ Ferry Butte was 24" to about 9 feet.
- Pier #2 had severe undulated river bed and exposed pile cap.

Approved handling device designed by contractor



ITD Requirements

- Fit-up modules as close as possible between one another and to pier structure.
- Manufacturer recommended ± 6 " except that one fit-up in four placements can exceed the 6" fit-up tolerance by 3".
- Manufacturer requested that Geotextile be applied to modules prior to placement. ITD did not require Geotextile.
- Achieve A-jack coverage as per plan.



- Fill unacceptable scour holes with clean gravel (approved DEQ source with less than 2% passing no. 200 sieve).
- Contractor shall provide divers to verify fit-ups and acceptability of placed modules and report directly to ITD inspector.
- Remove any broken A-jacks from river.
- Provide connections between all modules.
- Contractor shall provide direct objective evidence to ITD for final acceptance of all A-Jacks placed.





Lifting Frame







Applying Geotextile



Started downstream and proceeded upstream to facilitate handling of modules and good fit-ups.





Pontoon boat and divers are essential to the proper and safe placing of modules.







- Diver tender and foreman manipulate module into place. Diver is in the water helping to set the module and ensure fit-up requirements are met. Take note of the whip and old man lines.



Foreman waits for diver's signal.



Diver inspecting and providing video tape evidence of module fit-ups and also the condition of A-Jacks after placement.





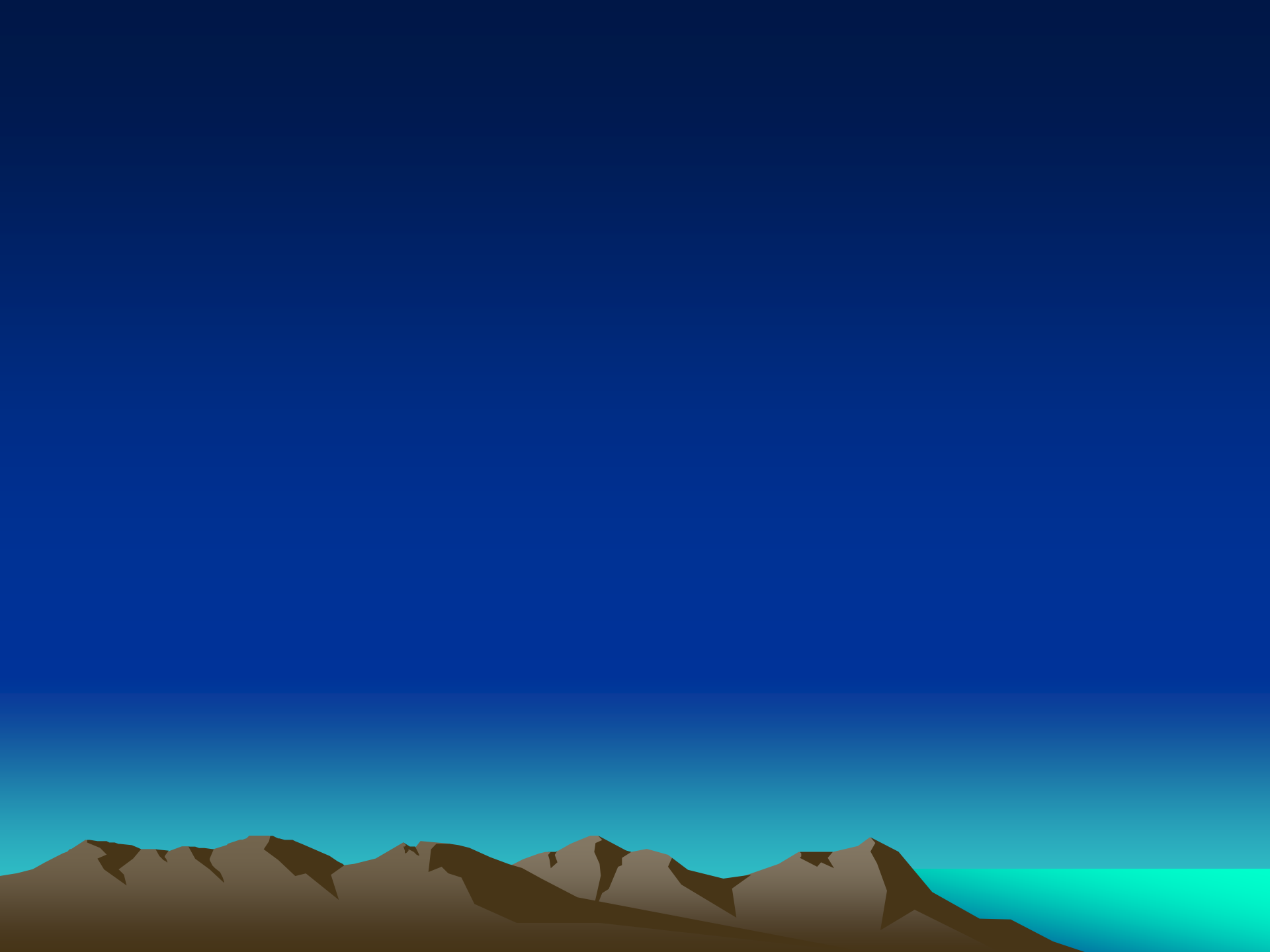






Whip line handling apparatus.





Shelley Bridge



- **Shelley Bridge:**
- River depths ± 7.5 ft. @ piers #1 & #3 to ± 15 ft @ pier #2.
- River flow velocity was much greater than Ferry Butte. Current was very strong at pier #2.
- Piers #1 & #3 were found with SPZ flat and with little debris. Pier #2 was found with large boulders protecting both ends of structure.
- Cold conditions and ice hampered diving operations.
- Deeper water and very silty river bed made placement more difficult.



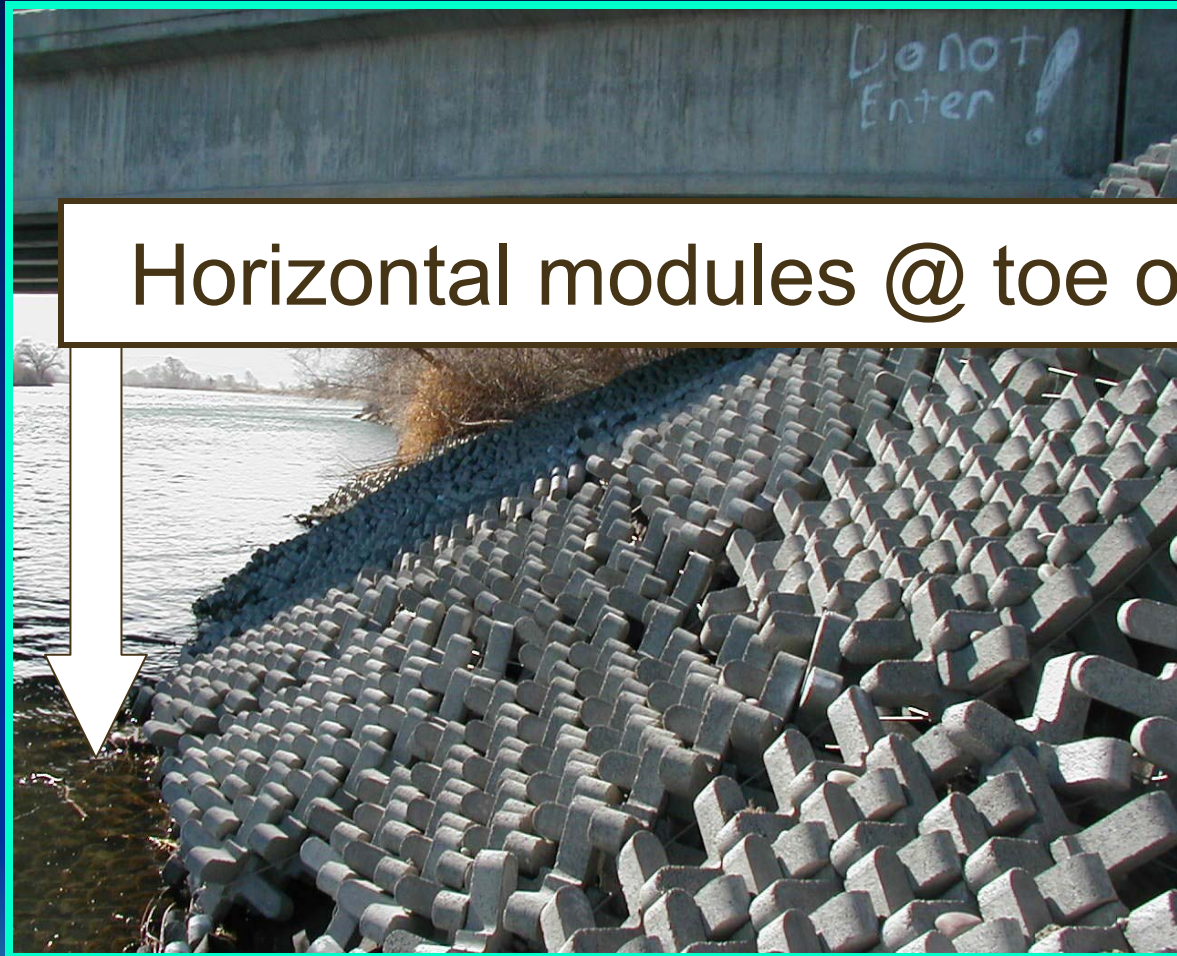
Slope Protection @ Abutment







- Modules were placed at toe of slope horizontally in the river to act as a bearing unit to support slope modules.



Horizontal modules @ toe of slope

A-Jacks were hand placed at the top of slope up to the abutment.





Viewed from east



Commentary

- (1) Use fiber or steel reinforcement to increase tensile strength of A-Jacks and reduce breaking.
- (2) Install slope protection by hand.
- (3) Can we use wasted A-Jacks in lieu of clean gravel to fill in scour holes before placing modules?
- (4) Plan your video procedure carefully in order that good comprehensive filming is achieved.
- (5) Should we use Geotextile on modules?



THE END

