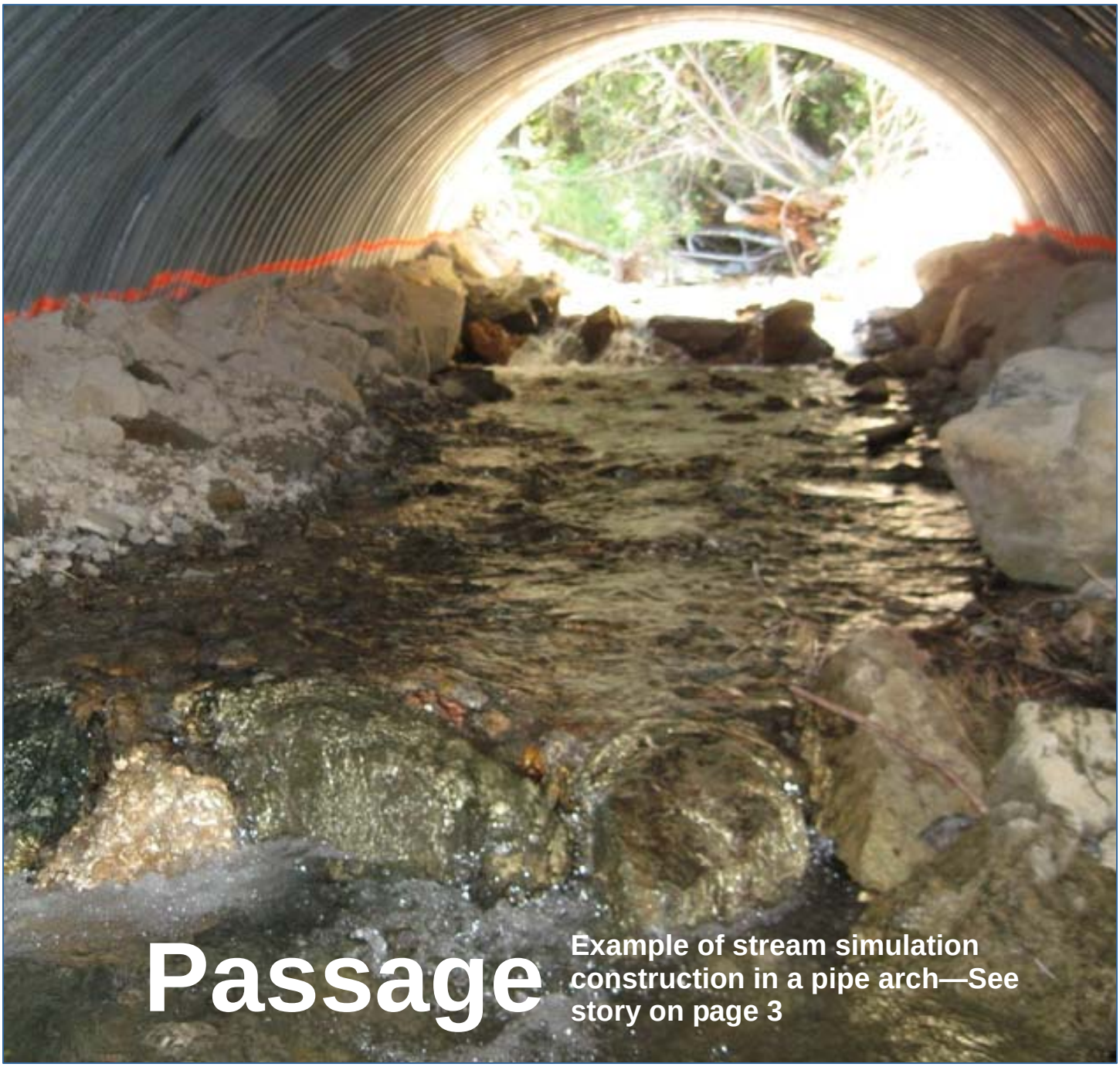
ACE RESOURCES

A Newsletter for the Association of Conservation Engineers

MARCH 2008

Enhancing Our Natural Resources



Passage

Example of stream simulation construction in a pipe arch—See story on page 3

also inside...

Something for everyone at annual conference

President's Message

Included in this issue is a variety of information that will ultimately lead to a successful Fall Conference. I'm sure all of us have taken part in the development of a successful project in the past year. The awards competition provides all members the opportunity to showcase their achievements and be suitably recognized and applauded by their peers. I urge everyone to seriously consider participating in the competition.

The heart of any successful conference is the presentation of papers highlighting the good work of all of our members. The quality of presentations at past conferences has been outstanding. Everyone should accept the challenge of submitting papers that maintains this high standard.

Finally, the Conference provides an opportunity to recognize the Conservation Engineers of the future. I'm sure that there are many engineering students in need of financial support. We need to increase our effort to bring more students into the competition. These students may be our future members.

Eugene Comoss
President

Send in news of your projects!

Editor's Note

A huge thank you to Traci Sylte for submitting the article on Passage. Our newsletter needs more articles like this one. Please make a note to send in news, articles, photos, and graphics for publication in the June newsletter—deadline for submittals will be June 1, 2008! If you don't consider yourself an author, send me your notes and I'll write it up into an article.

Lynda Cliburn
Editor

Association of Conservation Engineers

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For use of award chairperson only

*PROJECT REG. NO.*_____

*Received*_____

ACE 2008 DESIGN AWARDS DATA SHEET #1

PROJECT NAME:_____

1. Agency / Firm Making Submittal: _____

2. Address:_____

3. Contact Name:_____ Contact Phone No: _____

   Fax No: _____

   E-mail:_____

4. Project Location: _____

5. Project Category: _____

6. Outside Consultant(s): _____

7. If a winning entry, please give exact name(s) or title(s) as they should appear on the plaque or certificate:

   _____

   _____

   _____

Note: The information from the submitting entry must be confined to this sheet only.

To maintain anonymity during the judging, this data sheet, and the declaration of intent copy will be removed from the submitted material. All other submitted material will be signed or marked with the project registration number copy.

Passage

Photo on Left: Culvert failure resulting from water piping. Photo on right: Example of stream simulation construction in bridge

(Continued from page 3)

easily exceed average stream velocities when culverts constrict the active channel width. If roughness differences between the stream and culvert bottoms are considered, velocities during runoff conditions may exceed 4-5 ft/sec even for culvert gradients as low as 1-2 percent, even if the active channel width is not constricted. One does not need sophisticated knowledge of culvert hydraulics or models to look at a culvert and assess the likelihood of organism passage difficulties.

Stream and Culvert Interaction

Culverts commonly constrict the active (e.g., bankfull) stream channel width. The stream has developed this width in response to the sediment, debris, and water produced in the watershed. When culverts constrict this width, a series of stream adjustments frequently occurs and culvert failure risk increases. Culverts more commonly fail due to capacity reductions associated with debris or bedload blockage upstream of the inlet. Having the culvert span the active channel width can prevent the majority of these failures. If the culvert is wider than the channel width, most debris will pass through the culvert.

Spanning the active channel width can also minimize aggradation due to bedload deposition upstream of the inlet. As flow begins to pond above the culvert inlet, velocity decreases and bedload is deposited. Stream flow correspondingly erodes the stream banks causing stream widening upstream of the inlet.

These backwater conditions increase inlet headwater depths and velocities within the culvert, eroding the culvert outlet (photo on page 3). This scour can lower local stream base levels and result in undercutting of adjacent slopes.

Backwater conditions can also saturate the road fill, which can cause culvert piping and/or road overtopping conditions (photo above on left). Debris torrents from one failed crossing can cause failure of the next lower crossing, setting in motion a series of domino-effect failures.

Fish Needs and Capabilities

Culverts commonly impede fish movement by one of the following mechanisms:

- Excessive velocities,
- Excessive outlet perch heights,
- Inadequate depths for fish migrating during lower flow conditions, or
- Debris blockage at the inlet.

Fish move for a variety of reasons, including feeding, avoidance of unfavorable conditions, optimization of reproductive success, and optimization of colonization. Due to differences in evolution, fish commonly move to access desirable spawning areas at different times of the year. Considering multiple species and spawning times with the need for fish to avoid undesirable conditions leads to the conclusion that fish need to migrate during all times of the year. Consequently, culverts should provide passage whenever fish are present.

The swimming capabilities of fish differ greatly by species and between life-stages. Generally, weaker swimming fish are the limiting factor in passage considerations. Depending on the site conditions, fish commonly must use a combination of darting and/or sustained swimming speeds to negotiate through a culvert. Both consume a large quantity of energy and can only be maintained for short distances.

Conclusions

Properly designed culverts do not produce water velocities that exceed fish swimming abilities. Properly designed culverts also accommodate stream structure and function, which in most cases means at least spanning the active channel width. Installing adequately-sized structures such as bottomless box culverts or arches (photo on cover), countersunk culverts,

(Continued on page 5)

For use of award chairperson only

*PROJECT REG. NO.*_____

DECLARATION OF INTENT TO SUBMIT
FOR
ACE CONSERVATION PROJECT ENGINEERING AWARDS

(This page is due by fax, Internet or mail postmarked on or before May 5, 2008)

Date submitted:_____

Note: Please furnish all information requested below for each entry. If additional forms are required, copy this format.

I intend to submit an entry to the Association of Conservation Engineers Design Awards Program in the following category and division designated.

Category (Check One)

A. Studies/Research Program _____

B. Conservation/Environmental _____

C. Special Projects _____

Budget Cost of Project: _____ Scheduled Completion: _____

Actual Cost of Project: _____ Actual Completion: _____

Name of Submitting Entity: _____

Address: _____

Contact Name: _____ Phone No: (___) _____

Fax No: (___) _____

E-mail: _____

Name of Project: _____

Location: _____

Owner's Name: _____

***Note:** Remember to get Owner's approval for use of project award nomination*

Name of Consultant(s): _____

(if applicable) *May be the same as submitting entity*

Address: _____

Note: The submitting entity or the owner of the project must be a member of the ACE organization or must have made application for membership at the time the Declaration of Intent is filed.

PURPOSE

The purpose of this design awards competition is to give recognition to those members and/or their departments whose work, as judged by their peers and associates, best exhibits the goals and objectives of The Association of Conservation Engineers. These goals and objectives are presented on the Association of Conservation Engineers Web site at *www.conservationengineers.org*.

CATEGORIES

PROJECT CATEGORY A

STUDIES / RESEARCH PROGRAMS

Non-design services including, but not limited to:

Pilot/experimental projects

Bioengineering

Electrical heating

New products and materials

Basic research on new technology

Fuels and water

Properties and uses of fuels

Research in natural resources

Hazardous waste studies

Resource recovery

Environmental impact studies

Soils and other subsurface geotechnical investigation and evaluation

Damage correction

Computer services

Technical papers.

All of the entries in Category A are involved with non-construction document design services.

PROJECT CATEGORY B

CONSERVATION / ENVIRONMENTAL

Energy generation, transmission, distribution, conversion, conservation and storage-mitigation

Dams (water supply, irrigation, flood control, recreational, fisheries management)

Drainage systems

Incineration

Mine Reclamation

Parks and Wildlife facilities

Resource recovery

Waste treatment facilities

Water resources and supply

Wetlands treatment

PROJECT CATEGORY C

SPECIAL PROJECTS

Any project that does not fit into other categories including, but not limited to:

Erosion protection and control

Recreational-theme parks, zoos, marinas, aquariums

Site development

Structures including bridges

Historical restoration

Construction projects resulting from unique studies or research of the type in Category A.

ELIGIBILITY

ENTRANT:

Any governmental agency or department, or its selected consultant, engaged in the fields of recreation, wildlife preservation, tourism, and/or conservation of the natural and historical environment, who is a member of or has made application for membership in the ACE, is eligible for participation in this awards program.

PROJECT:

The project entered must be the completed work of the agency or owner making the submission.

Up to two project entries may be submitted by each participant.

The project must have been completed and in its intended use within the 36 months preceding its submittal.