

The REMR Bulletin

News from the Repair, Evaluation, Maintenance, and Rehabilitation Research Program

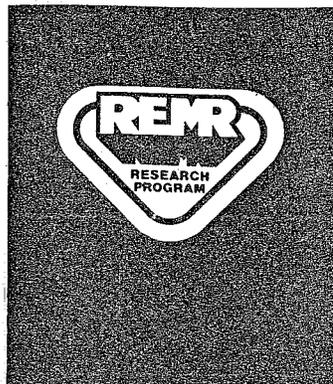
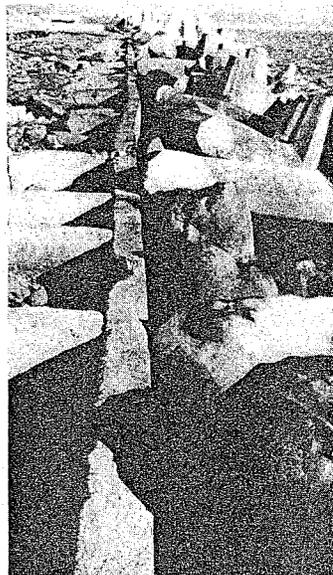
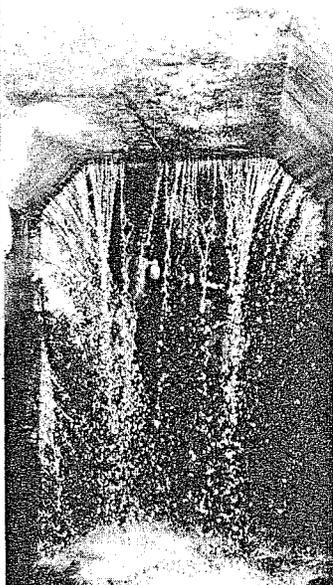
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INFORMATION EXCHANGE BULLETIN

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REPLY TO
ATTENTION OF:

This is the first issue of The REMR Bulletin. It is one of the methods adopted for technology transfer for the Repair, Evaluation, Maintenance, and Rehabilitation (REMR) Research Program. The objective of this program is to identify and develop effective and affordable techniques to preserve and extend the service life of existing civil works projects.

Many Corps civil works structures are approaching or have reached their design service life. The potential for extremely large replacement costs exists if these structures cannot be preserved. Enhanced REMR activities have become critically important to the continued efficient and cost effective operation of our structures.

The REMR Bulletin will keep you informed of developments in the REMR Research Program. It also will provide a means for readers to pass on to others their experiences in REMR activities. Therefore, we strongly encourage those of you with experience in these subject areas to submit draft articles to the REMR Program Manager's Office at the Waterways Experiment Station. Your sharing of information will substantially add to the success of this new program.


John F. Wall
Major General, USA
Director of Civil Works


Ames S. Albro, Jr.
Major General, USA
Director of Engineering and
Construction

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The REMR Research Program

The Repair, Evaluation, Maintenance, and Rehabilitation (REMR) Research Program is a comprehensive effort by the Corps of Engineers to address problems that have arisen over recent decades in the operation of civil works projects. Over the next six years, all of the Corps R&D Laboratories will join in a \$35-million program to develop means of assisting Division and District technical staffs better manage their Operation and Maintenance (O&M) activities. The REMR Research Program is broad in scope, touching virtually every aspect of civil works project operation and management, yet targets specific problems encountered repeatedly by field personnel in their operation of projects.

OBJECTIVE

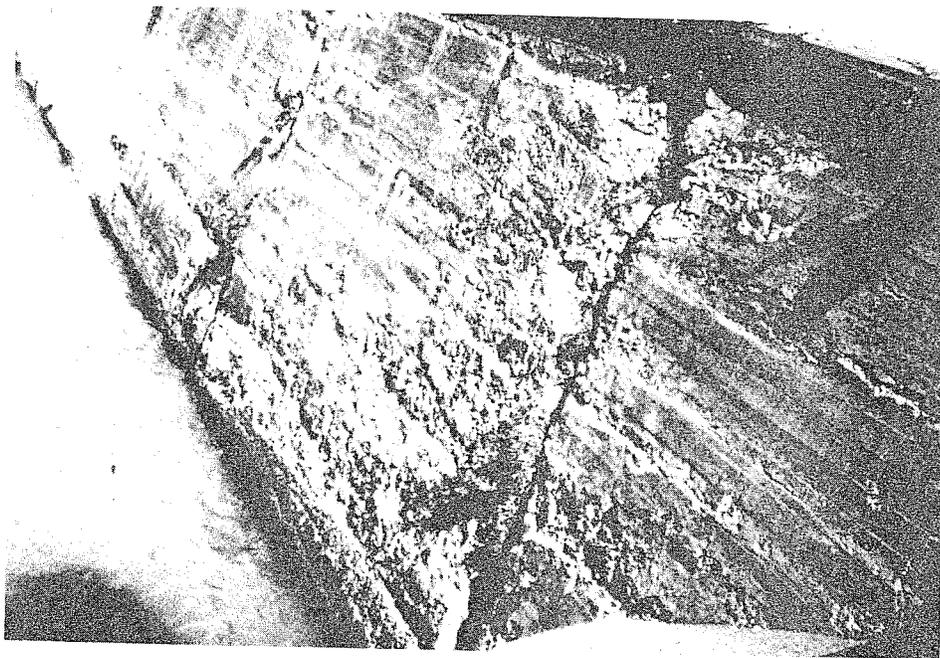
The overall objective of the program is to identify, develop, and apply effective and affordable technology for maintaining and, where possible, extending the service life of existing civil works projects. It is recognized that many of the solutions to REMR problems needed to accomplish this objective may well already be in use either within the Corps or by other government agencies and private industry.

Thus, as part of an extensive technology transfer effort, emphasis is being placed early in the program on gathering information on REMR activities from as many sources as possible.

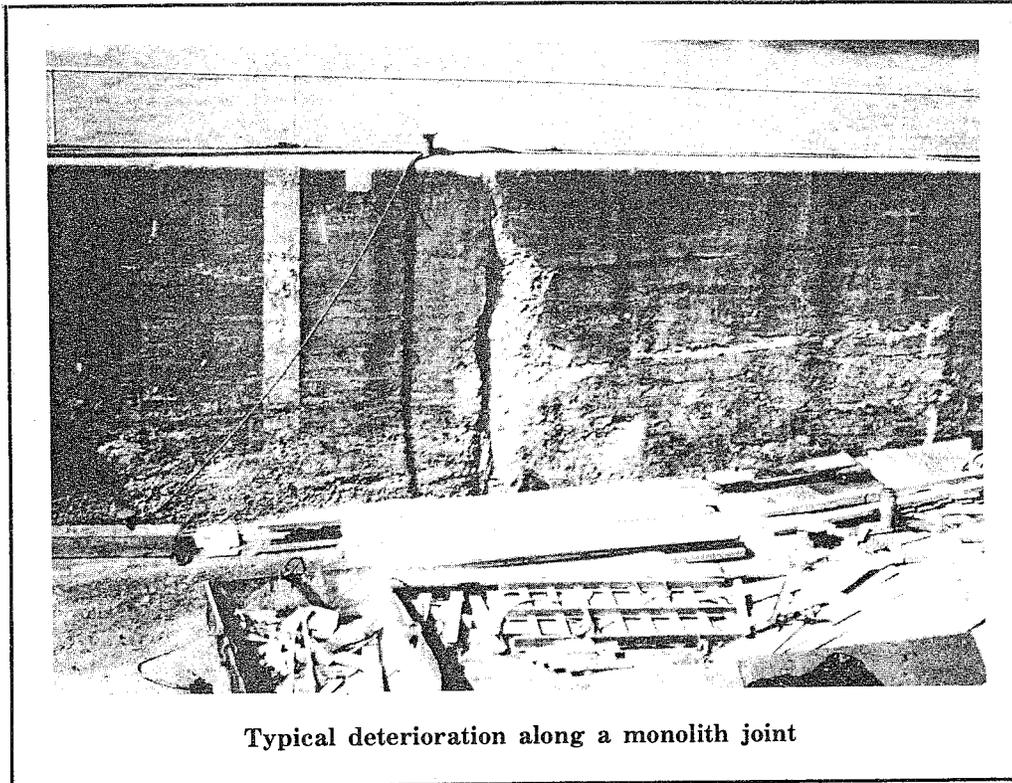
ORGANIZATION

Seven problem areas have been established to accomplish the tasks necessary to achieve the overall program objective. These are: Concrete and Steel Structures, Geotechnical, Hydraulics, Coastal, Electrical and Mechanical, Environmental Impacts, and Operations Management. Research in each problem area will address issues of critical concern to the Division and District offices and will thus require considerable interaction between the researchers and their counterparts in the field. To insure this field involvement, a Field Review Group comprised of members from every Corps Division having civil works responsibilities has been established. The Field Review Group performs broad technical review of REMR problems, provides continuous field input, recommends research priorities, and assists in technology transfer.

Program oversight is provided by Technical Monitors at Headquarters, U.S. Army Corps of



Typical deterioration of a navigation lock wall



Typical deterioration along a monolith joint

Engineers (HQUSACE), who insure that research requirements are met and are consistent with the overall program objective and Corps command goals. Program management is provided by the Structures Laboratory of the Waterways Experiment Station (WES). From there, the REMR Program Manager oversees the day-to-day activities in the seven problem areas. A list of key personnel for the program is included on the insert to this bulletin.

ORIENTATION

The focus of the REMR Research Program is on field personnel of the Corps who operate the nearly 600 civil works projects in the Corps' inventory. Researchers from the Corps Laboratories have already begun visiting and otherwise communicating with the technical staffs in the Divisions and Districts to identify REMR problems as well as to establish working contacts. Further visits, seminars, and demonstration projects are planned to insure that the orientation of the program remains with those responsible for project operation.

ORIGINS

The REMR Research Program was authorized in response to changing emphasis in the Corps' Civil

Works Program and the attendant need for new and improved technology to address the Corps' growing REMR responsibilities. This changing emphasis is best evidenced by civil works appropriation trends since the mid-1960s, a period coinciding with the Corps' initial efforts at defining the scope of its REMR problems.

In August 1965, Engineer Regulation 1110-2-100, "Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures," was issued. Since then, in-depth evaluations have been made of the condition of existing Corps structures which have revealed an absolute need for improved methods, materials, and equipment for use in repair, evaluation, and maintenance. In some instances, the need for complete rehabilitation of these structures has been indicated as well.

Consequently, O&M funding for existing Corps projects as a percentage of the total civil works appropriation has been increasing for more than a decade. In FY 84, the O&M budget exceeds the construction budget for the first time in recent years.

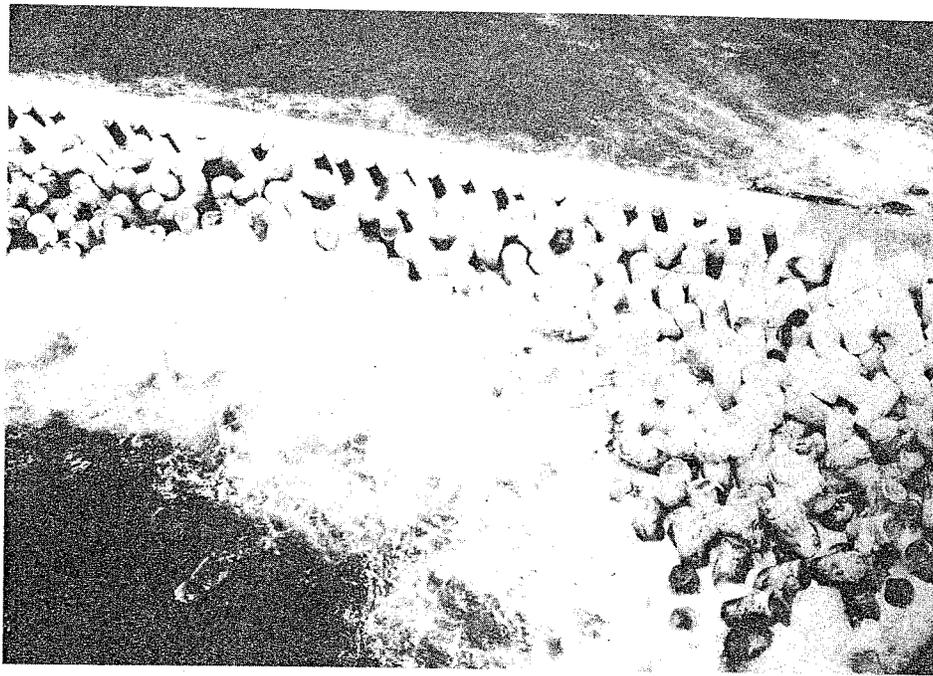
Experience gained in implementing ER 1110-2-100 has shown that REMR efforts require various types of expertise, some of which differ considerably from those associated with the Corps' traditional design and construction responsibilities. The Corps has long prided itself on its ability to plan,

REMR RESEARCH PROGRAM

RESEARCH CONTACTS FOR DIRECT USER ASSISTANCE

For assistance with your repair, evaluation, maintenance, and rehabilitation problems, call the following Corps research contacts:

<u>Contact</u>	<u>Problem Area</u>	<u>Commercial No.</u>	<u>FTS No.</u>
Jim McDonald	Concrete and Steel Structures	601-634-3230	542-3230
Britt Mitchell	Geotechnical (Soils)	601-634-2640	542-2640
Jerry Huie	Geotechnical (Rock)	601-634-2613	542-2613
John Grace	Hydraulics	601-634-3346	542-3346
D. D. Davidson	Coastal	601-634-2722	542-2722
Paul Howdysshell	Electrical and Mechanical; or Operations Management	217-373-7244	958-7244
Jerry Mahloch	Environmental Impacts	601-634-3635	542-3635



Upslope damage due to instability of rubble-mound structure toe

design, construct, and operate civil works projects. However, until recently, when a project reached the point of requiring complete rehabilitation to keep it functioning, it was generally also time to replace it with a larger project, often with multiple purposes. Thus, the Corps has only limited experience in addressing REMR problems on older projects.

Furthermore, projects constructed more recently normally have the capacity to function as required for the foreseeable future, though with increased age and use they too will require effective maintenance to continue functioning efficiently. To address the problems raised by these changing responsibilities, HQUSACE recognized that existing technology applicable to REMR activities must be identified, made readily available, and applied and, where necessary, new and improved technology must be developed.

At stake in this effort is a significant portion of what is popularly referred to as America's infrastructure—the system of public facilities, both publicly and privately funded, which provide for the delivery of essential services and a sustained standard of living. Corps civil works projects are an essential part of this base upon which our society rests. They contribute substantially to the Nation's economic growth, transportation, hydropower, water supply, and flood control requirements. Given their importance, the massive investments of

public resources that these projects represent must be protected.

The immense value of these projects can best be appreciated in light of recent economic conditions. Inflationary trends in our economy during the 1970s have resulted in prohibitively high replacement costs for most of these projects and in strict limitations on new construction, regardless of its merit. The Nation cannot afford to allow existing Corps projects to deteriorate or be abandoned so long as their functions are necessary and they are economically competitive with other systems capable of performing the same functions.

OUTLOOK

In this the first year of the REMR Research Program, \$910,000 has been budgeted for research in five of the problem areas. The work will focus variously on REMR problems of critical concern to the field (e.g., rehabilitation of navigation locks and emergency spillway scour), on data collection efforts necessary to evaluate the severity of other problems already identified and thereby guide future research (e.g., evaluation of existing maintenance materials and methods), and on development of a management budgeting system for REMR activities. An expanded effort is anticipated

(Continued)

The REMR Research Program

(Concluded)

next fiscal year as the program gains full stride.

Technology transfer efforts will include, in addition to publication of this bulletin, compilation of the first editions of the *REMR Notebooks*. These will be looseleaf binders containing fact sheets that summarize methods and materials for use in REMR activities. A system for direct user assistance is being established to provide Division and District technical staff members easy access to research personnel who can advise them on possible solutions to REMR problems. Seminars are tentatively scheduled on underwater survey techniques, controlling levee underseepage, and liquefaction problems with foundation soils. As the program progresses over the next six years, a continuing effort will be made to insure timely transmittal of research results to the field, and of field experiences to the researchers and other field offices.

CONCRETE STRUCTURES BULLETIN DISCONTINUED

The August 1983 issue of the *CONCRETE STRUCTURES; Repair and Rehabilitation* information exchange bulletin (Vol C-83-1) is the last that will be published in that series. From its initiation in March 1980, this bulletin provided the kind of forum for information exchange on repair and rehabilitation of concrete structures that *The REMR Bulletin* will provide in the wider area of REMR measures for civil works projects. Articles on repair and rehabilitation of concrete structures will of course appear in *The REMR Bulletin*, but they will now be accompanied by articles on other aspects of civil works projects. Recipients of the discontinued bulletin have been placed on the distribution list for *The REMR Bulletin*.

FIELD REVIEW GROUP MEETINGS

The 2nd meeting of the Field Review Group (FRG) for the REMR Research Program was held at WES on October 11 and 12. The 2-day session was devoted to a review of FY 84 and 85 work plans. Presentations were made by each problem area leader as well as by a number of other researchers assigned to individual work units. Discussion centered on technology transfer efforts and on developing plans to improve field awareness of and participation in the program.

Attending were the 12 members of the FRG, 10 representatives from HQUSACE including the 3

technical monitors, and 36 members of the staffs of the five laboratories at WES and of the Construction Engineering Research Laboratory.

The FRG held its 1st meeting on May 6, 1983, in Washington in conjunction with the FY 84 program review.

The 3rd meeting of the FRG will be in the spring and will review FY 85 work plans. Consideration is being given to holding the meeting at the Mobile District office and to scheduling a session to include other government agencies. Watch for details in later issues of *The REMR Bulletin*.

COPIES OF DEVELOPMENT REPORT STILL AVAILABLE

Copies of the "REMR Research Program Development Report" (also referred to as "the orange book") are still available for distribution. This report, published in February 1983, documents the background of the program and development of the research problem areas, summarizes the program objectives and initially recommended funding, and details the identification and assessment of problems and the recommended research to address them.

Requests for copies should include the report title and should be made to: Commander and Director, U.S. Army Engineer Waterways Experiment Station, ATTN: WESTP-R, PO Box 631, Vicksburg, MS 39180.

DISTRIBUTION LIST

Since this is the first issue of *The REMR Bulletin*, we may well have made some mistakes in preparing address labels. Please take a moment to check your label for correct name, office symbol, address, zip code, etc., and send us any changes that should be made. You can help speed this process by including your address label with your corrections.

Also, if you are not already on our distribution list but wish to be, send us a request to be added.

Send your address label corrections or your request for addition to our distribution list to: Commander and Director, U.S. Army Engineer Waterways Experiment Station, ATTN: WESSC, PO Box 631, Vicksburg, MS 39180.

REQUEST FOR ARTICLES, ETC.

- Attention: Readers with experience in REMR activities
- Subject: Request for articles, reports, photographs, news, and notices about your REMR activities
- What you do: Send us a draft of your article
Furnish any illustrations you have (original glossy photographs and line drawings)
- What we'll do: Publish your article under your byline
Provide you with editorial assistance if needed
- Topics of future issues: REMR Bibliography; Concrete and Steel Structures; Geotechnical Problems
- Call or write to us: By writing—Commander and Director, U.S. Army Engineer Waterways Experiment Station, ATTN: WESSC, PO Box 631, Vicksburg, MS 39180
By calling—Tim Ables, AC 601-634-2587; FTS 542-2587

DIRECT USER ASSISTANCE

ATTENTION: Field personnel engaged in REMR activities.

Have a question about what material or technique to use in a given application? Unsure about the possible environmental impact of a repair procedure? Need other kinds of help?

REMR researchers are available to help you address these problems. They are monitoring REMR activities throughout the Corps and may be able to relate approaches and solutions others in the field have already used successfully. And if they do not have a solution for your problem, they will document your inquiry for consideration in future research efforts.

A list of research contacts for each problem area is included on the insert to this bulletin. Save it and call us when you need help.

The contents of this bulletin are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products.

The REMR Bulletin is published in accordance with AR 310-2 as one of the information exchange functions of the Corps of Engineers. It is primarily intended to be a forum whereby information on repair, evaluation, maintenance, and rehabilitation work done or managed by Corps field offices can be rapidly and widely disseminated to other Corps offices, other U.S. Government agencies, and the engineering community in general. Contributions of articles, news, reviews, notices, and other pertinent types of information are solicited from all sources and will be considered for publication so long as they are relevant to REMR activities. Special consideration will be given to reports of Corps field experience in repair and maintenance of Civil Works projects. In considering the application of technology described herein, the reader should note that the purpose of *The REMR Bulletin* is information exchange and not the promulgation of Corps policy; thus, guidance on recommended practice in any given area should be sought through appropriate channels or in other documents. *The REMR Bulletin* will be issued on an irregular basis as dictated by the quantity and importance of information available for dissemination. Communications are welcomed and should be made by writing the Commander and Director, U.S. Army Engineer Waterways Experiment Station, ATTN: T. D. Ables (WESSC), PO Box 631, Vicksburg, MS 39180, or calling 601-634-2587 (FTS 542-2587).



TILFORD C. CREEL
Colonel, Corps of Engineers
Commander and Director
Waterways Experiment Station

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