

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523
BIBLIOGRAPHIC INPUT SHEET

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Batch 52

1. SUBJECT CLASSIFICATION	A. PRIMARY	TEMPORARY
	B. SECONDARY	

2. TITLE AND SUBTITLE
Field research and testing of a water hand pump for use in developing countries, progress report, July-Sept. 1972

3. AUTHOR(S)
Fannon, R.D.; Frink, D.W.

4. DOCUMENT DATE 1972	5. NUMBER OF PAGES 11p.	6. ARC NUMBER ARC
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7. REFERENCE ORGANIZATION NAME AND ADDRESS
Battelle

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)

9. ABSTRACT
(SCIENCE AND TECHNOLOGY--Engineering--Hydraulics R & D)

10. CONTROL NUMBER PN-AAD-312	11. PRICE OF DOCUMENT
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12. DESCRIPTORS	13. PROJECT NUMBER
	14. CONTRACT NUMBER CSD-3305 Res.
	15. TYPE OF DOCUMENT

CSD-3305012
PN-AAD-312



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November 17, 1972

CSD/3305

Mr. A. Dale Swisher, P.E.
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Agency for International Development
Washington, D. C. 20523

Dear Mr. Swisher:

Fifth Quarterly Progress Report on Phase III
"Field Research and Testing of a Water Hand
Pump for Use in Developing Countries"
AID/csd-3305
July 1 through September 30, 1972

During the fifth quarter of this program, progress has not been as great in our two test areas (Thailand and Nigeria) as we would like, but significant gains have been made. In addition to this program, the United Nations Children's Fund (UNICEF) has a program in Bangladesh which will require 140,000 improved AID design pumps. Data resulting from the UNICEF Program will be a significant input to this project. However, the effort required to set up the UNICEF Program resulted in a delay in this report, for which permission was granted in your letter of September 25, 1972. We do plan to get back on schedule with our next quarterly report.

Field Evaluation in Thailand

At the present time only 2 complete pumps have been cast and machined in Kohn Kaen and 100 plastic cylinders made. However, out of this years fiscal budget, 10 more pumps have been ordered and it is expected that the Sanitary Engineering Department (SED) and the Mineral Resources Department (MRD) will each receive a pump from the Accelerated Rural Development (ARD) Program for their own experimentation. It is anticipated that more pumps will be ordered from the 1973 fiscal year budget which begins November, 1972.

A short visit was made to Kohn Kaen (October 18 and 19) during the return trip from Dacca for UNICEF. Two pumps were in operation, the original demonstration pump and one of the pumps made in Kohn Kaen. As reported in Khun Sa-ard's letter of September 13, 1972, the upper guide rod failed at the rod end and eventually caused failure of the pump rod, at the same connection point. It was hoped that the guide rod could be made from 7/16 inch diameter pump rod, but it is now recognized that at least 5/8-inch diameter rod should be used for guide rod. This substitution has been made in Kohn Kaen and additional records will be kept on this matter. The Nigerian Foundries in Lagos have been advised of the change in the guide rod size.

Wear patterns are becoming evident at the pinned joints and the guide rod bushings. The amount of wear will be recorded and reported to Battelle before the end of this year. It is believed at this time that restriction of pin rotation and modifications in the design of the pump cap or rod guide for the deep well type pump will decrease the wear rate.

Field Evaluation in Nigeria

Mr. Erik Fraser, Water Systems Engineer with Care in Lagos, reported in his letter of September 18, 1972, that eighty-four deep well type pumps will be completed in November and that the Nigerian Foundries are receiving purchased parts from the United States and other countries for an additional 200 pumps. These pumps will be set in wells located in rural or semi-urban communities for public use. The pump cylinders and end caps will be fabricated from PVC (polyvinyl chloride) plastic. It is also planned that plastic drop pipe will be used. Because of the extreme high machining costs and low efficiency, one piece pumps which require less machining will be made. They have, however, shortened the total height of the one piece cast pump approximately 2-inches in order to make it fit in their largest core box. We believe that Nigerian Foundries and Care have shown enthusiasm and ingenuity in modifying the AID design to meet the conditions in Nigeria.

The UNICEF Program in Bangladesh

As the result of the favorable results in our work for you on the AID pump Battelle was recommended by Dr. Charles Spangler of World Bank and Erick Fraser of CARE, to provide UNICEF with technical assistance in connection with a large scale drinking water project based on hand pumps operating on tube wells. It is currently anticipated that 140,000 pumps of the best design possible will be required for the program. It is anticipated that these pumps will be of the AID design with such modifications as seem needed for the circumstances in Bangladesh, and that these pumps will be made in foundries in and around Dacca. Much experience will be gained through this project and this will be included in future reports.

Flexibility of Design

It is important to recognize the flexibility of the Aid design. The present modular design can be cast in a one piece body-base arrangement for deep well use as they are doing in Nigeria to save machining costs; or the body and cylinder can be cast as one piece with a bolt-on-base to facilitate plastic linings for shallow well use as will be the arrangement for Bangladesh. All of the arrangement afford interchangeability of parts, easy replacement and repair, and long life. The Nigerian version is least interchangeable, but it is not now needed as it is in North East Thailand. The Nigerian Foundries are working with plastic drop pipe and all plastic cylinders and hopefully UNICEF in Bangladesh will be able to do likewise. If these experiments prove to be successful, better rural water systems will be constructed for less money.

Material Suppliers

Suppliers of materials can become critical, particularly if the materials must be imported into the country making the pumps. The following addresses were given to Thailand and Nigerian Officials concerned with making the pumps for purchase of flapper valve material.

E. I. Dupont Co.
Tokyo, Japan

E. I. Dupont Co.
Mr. George F. Putnam
Room B-1243
F&F Export Sales
Wilmington, Delaware 19898

B. F. Goodrich Co.
Mr. Gordon Callfas
P.O. Box 48
Shiba, Tokyo, Japan
Telephone: 431-1076
(Goodrich Diaphragm Sheet)

Drake Thompson & Chaney
720 St. George Street
New Orleans, Louisiana
Mr. Don Maggio
(Goodrich Diaphragm Sheet)

Mueller Belting & Supply Co.
150 N. Midland Avenue
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Mr. Don Strober
(Goodrich Diaphragm Sheet)

Southwestern Rubber & Packing Co.
2511 Broad Street
Houston, Texas 77012
(Goodrich Diaphragm Sheet)

For small quantities of materials it may be easier to order from a dealer than the manufacturer. There seems to be no problem in obtaining cups or cup material in any of the countries, however, purchasing arrangements have not been completed in Bangladesh.

Patent Application

As you requested in your letter of September 25, 1972, Mr. Philip Dunson of Battelle's Legal and Patent Department is preparing a letter concerning patent application of the AID pump for Mr. Catcchio.

Pump Costs

No pump costs have been established at this time, as Dempster, because of their work load did not want to quote prices. However, it is expected that within a few months costs can be obtained from the Nigerian Foundries in Lagos; Kohn Kaen, Thailand; and perhaps soon after costs from Bangladesh. These figures will be more realistic and can be compared with the known material and labor charges. It is anticipated that by the end of the program quite an interesting comparison can be made between workmanship, performance, local design modifications, and costs.

Information Dissemination

This area of the program is perhaps one of the more important aspects and certainly one of the most costly. To date 41 separate inquiries have been received, but only 23 replies have been made. The number of replies has been limited partly because of time, but primarily because no money has been allocated in the program for this kind of effort. Some guidance in this area is needed from AID. If Battelle is to continue this increasing correspondence, an increase in appropriation will be required. Otherwise the requests will be sent to Washington. Appendix A lists the requests answered by the project staff. In addition, inquiries generated by the program, but not retaining directly to the pump design have been taken care of by our Public Services Group.

November 17, 1972

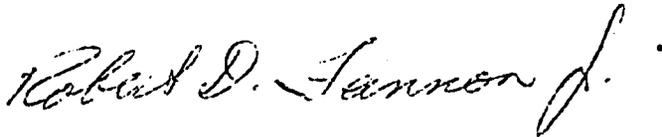
Future Work

During the remainder of sixth quarter of work, any data that comes in from the field will be analyzed. Letters will also be written to the field sites encouraging further work and suggesting that all pins at rotating joints be increased to 5/8 inch diameter, as well as the guide rod. Work will continue on the UNICEF Program and this information will be reported on as it is done.

At this point in the program we are extremely pleased to see the results of the AID pump program appearing on a large scale. This application of the pump demonstrates the foresight of AID in pursuing this program over the past several years.

If you have any questions concerning this report please call us.

Sincerely,



Robert D. Fannon, Jr.
Research Engineer
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D. W. Frink
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RDF/DWF:lds

Enclosures (25)

cc: Mr. V. C. Perelli
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APPENDIX A

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APPENDIX A

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