STATUS REPORT OF RESEARCH PROJECT

ON

IMPROVING DESIGN OF A HOPPER DREDGE PUMP

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Prepared for
U.S. Army Engineering District, Philadelphia
Corps of Engineers
Philadelphia 29, Pennsylvania
May 1961
Bethlehem, Pennsylvania
I. INTRODUCTION


II. EXPERIMENTAL STUDIES

A. General Comments

The experimental tests were performed with two impellers: (a) Impeller No. TD-7 and (b) Impeller No. TD-8. It will be recalled that the Impeller No. TD-7 has a 22-1/2° exit angle and a 45° entrance angle, while Impeller No. TD-8 has a 35° exit angle and a 45° entrance angle. Both impellers have an involute vane shape.

* Numbers in parentheses indicate References
Data were obtained for the following pump speeds: 1150, 1300, 1440, 1550, 1650, and in the case of impeller No. TD-7, for 1750 rpm. The complete data are now available for two concentrations: of about 1320 grams per liter and 1380 grams per liter. Only negligible wear was observed on both impellers, and it should not have any effect on test results.

B. Characteristic Curves

The data are being processed, and complete characteristic curves for the pump with Impellers No. TD-7 and TD-8 are being prepared. The complete information will be presented in the project report covering this phase of the study.

III. EXPERIMENTAL RESULTS

A summary of pump efficiency obtained with various impellers is presented in Table I. The summary covers all impellers tested: No. 1 (the "Essayons" impeller), TD-5, TD-6, TD-7, and TD-8, for two silt-clay-water mixture concentrations of 1320 and 1380 grams per liter, and speed range of 1150 to 1750 rpm.

In addition, the comparison is made for tests of Impeller No. 1 between earlier tests with damaged impeller and the rebuilt impeller. As it was expected, the correct values of efficiency were lower than originally reported.
The results are quite significant, Impeller No. TD-7 seems to have highest values of efficiency, followed by Impellers TD-5, TD-6, TD-8, and No. 1. It is not immediately apparent why the efficiencies for Impeller No. 1 are higher for the heavier concentration.

IV. FUTURE STUDIES

A. General Comments

Negotiations have been under way for contract extension to incorporate the Phase IV of the originally planned program.

B. Additional Tests

It is planned to complete testing with silt-clay-water mixture concentrations early in June for the two impellers: TD-7 and TD-8. Additional tests will include obtaining of data for Impellers TD-5, TD-6, TD-7, and TD-8, for pumping water.
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<table>
<thead>
<tr>
<th>Speed RPM</th>
<th>Flow Rate GPM</th>
<th>1320 grams/liter</th>
<th>1380 grams/liter</th>
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<td></td>
<td></td>
<td>Impeller No. 1</td>
<td>Impeller TD-5</td>
</tr>
<tr>
<td>1150</td>
<td>800</td>
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<td>76.7</td>
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<tr>
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<td>All Speeds</td>
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* Test with damaged impeller