STATUS REPORT OF RESEARCH PROJECT

ON

CHECKING DESIGN OF A DREDGE PUMP

Prepared by

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Prepared for

NATIONAL BULK CARRIERS, INC.

New York 17, New York

May 1961

Bethlehem, Pennsylvania
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REFERENCES
I. INTRODUCTION

The following report summarizes the studies performed during the period December 1, 1960 to April 30, 1961, at the Hydraulics Division of Fritz Engineering Laboratory for the Marine Design Division of the National Bulk Carriers, Inc. The studies prior to December 1, 1960, were described in Memorandum No. M-18(1)*.

II. EXPERIMENTAL STUDIES

A. General Comments

As indicated in the Memorandum No. M-18, after completion of the preliminary tests, it was discovered that noticeable wear was evident on the volute casing, particularly around the circumference of the flanges adjacent to the shrouds of the impeller. The volute casing was repaired and a series of check tests was conducted, as described below.

* These numerals refer to the List of References
B. Experimental Tests

Two model speeds were initially selected for test checks: 1440 revolutions per minute (rpm) and 1840 rpm. The speed of 1840 rpm in the model corresponds to a prototype speed of 230 rpm. The tests were performed with silt-clay-water mixture concentration of 1170 grams per liter, and sufficient data obtained to calculate the head flow, brake horsepower-flow, and efficiency-flow curves for the two impeller speeds.

The original (preliminary) data and the check data were tabulated and are presented in Table I. In addition, the characteristic curves of head, brake horsepower, and efficiency as a function of flow, were plotted in Fig. A-1 for model speed of 1440 rpm, and in Fig. A-2 for model speed of 1840 rpm.

Perusal of the data indicates that the effect of increased clearances between volute and impeller on pump efficiency was a minor one.

C. Future Tests

It is planned to study the effect of ribs located on both shrouds of impeller on pump efficiency in the near future.
III. EXPERIMENTAL RESULTS

A. General Comments

We have been authorized by the U.S. Army Engineers, Philadelphia District, to conduct studies on the effect of exit angle of impeller on pump efficiency. These studies, which involve tests with various silt-clay mixture concentrations, are under way now.

B. Final Report

The preparation of the final report will be delayed until all tests are completed.
TABLE 1 - ADDITIONAL TESTS FOR

Two Speeds: $N_m = 1440 \text{ rpm}$ and $N_m = 1840 \text{ rpm}$

Concentration: 1170 grams/liter

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<th>Flow</th>
<th>H Original</th>
<th>H Check</th>
<th>EFF Original</th>
<th>EFF Check</th>
<th>BHP Original</th>
<th>BHP Check</th>
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</table>
FIG. A-1 \hspace{1cm} N_m = 1440 \text{ rpm}

- Original Data
- Check Data
Herbich, John B.  STATUS REPORT OF RESEARCH PROJECT ON CHECKING DESIGN OF A DREDGE PUMP
Fritz Eng. Lab. Report
No. 283-M-18