STATUS REPORT ON RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP

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STATUS REPORT OF RESEARCH PROJECT
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I. INTRODUCTION

The following report summarizes the studies performed during the month of September 1960, at the Hydraulics Division of Fritz Engineering Laboratory, under terms of Contract No. DA-36-109-CIVENG-59-112. Earlier work was described in Status Reports dated: December 1958(1)*, February 1959(2), April 1959(3), June 1959(4), December 1959(6), March 1960(9), April 1960(10), May 1960(11), June 1960(12), July 1960 (13), August 1960(15), September 1960(16), and a Project Report dated September 1959(5).

II. EXPERIMENTAL STUDIES

A. General Comments

After completion of experimental tests on impeller of Trial Design No. 6, the volute casing was removed from the test stand for inspection. Only very slight wear of the pump impeller was observed, but noticeable wear was found on the volute casing, particularly around the circumference of the flanges adjacent to the shrouds of the impeller.

* Numbers in parenthesis are listed in REFERENCES
It was decided to send the volute casing for repairs, and the casing will be bored out to receive a steel wearing ring, which will be fabricated and brazed into the bore of the volute casing. This will restore the original dimensions and clearances. It is hoped to have the pump in operation again by November 15, 1960.

B. Characteristic Curves

Some of the characteristic curves for the pump with impellers No. 5 and 6 have been prepared and are presented in the Appendix.

Figures A-1, A-2, and A-3, present the summary Brake Horse Power and Head curves as a function of Flow for Impeller TD-5 and the following concentrations: 1240, 1320, and 1380 grams/liter.

Figures A-4, A-5, and A-6 are the summary curves for Impeller TD-6 and concentrations of 1240, 1320, and 1380 grams/liter.

Figures A-7 to A-11 present the characteristic curves for two impellers: TD-5 and TD-6 for various pump speeds:

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<td>A-10</td>
<td>1550</td>
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Additional characteristic curves are being prepared and will be submitted in the next Memorandum.
REFERENCES

(1) Herbich, J. B. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-1 Lehigh University, December 1958

(2) Herbich, J. B. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-2 Lehigh University, February 1959

(3) Herbich, J. B. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-3 Lehigh University, April 1959

(4) Herbich, J. B. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-4 Lehigh University, June 1959

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(6) Herbich, J. B. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-5 Lehigh University, December 1959

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(13) Herbich, J. B.  Long, J. L.  STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-13 Lehigh University, July 1960

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(15) Herbich, J. B. Long, J. L. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-14 Lehigh University, August 1960

(16) Herbich, J. B. STATUS REPORT OF RESEARCH PROJECT ON IMPROVING DESIGN OF A HOPPER DREDGE PUMP. Fritz Engineering Laboratory Memorandum No. M-15 Lehigh University, September 1960
APPENDIX

Figures A-1 - A-11
Fig. A-1 - MODEL DREDGE PUMP CHARACTERISTICS
Impeller TD-5
Concentration: 1240 grams/liter
Fig. A-2 - MODEL DREDGE PUMP CHARACTERISTICS
Impeller TD-5
Concentration: 1320 grams/liter
Fig. A-3 - MODEL DREDGE PUMP CHARACTERISTICS

Impeller TD-5
Concentration: 1380 grams/liter
Fig. A-4 - MODEL DREDGE PUMP CHARACTERISTICS
Impeller TD-6
Concentration: 1240 grams/liter
Fig. A-5 - MODEL DREDGE PUMP CHARACTERISTICS
Impeller TD-6
Concentration: 1320 grams/liter
Fig. A-6 - MODEL DREDGE PUMP CHARACTERISTICS
Impeller TD-6
Concentration: 1380 grams/liter
Fig. A-7 - MODEL DREDGE PUMP CHARACTERISTICS
Impellers TD-5 and TD-6
Concentration: 1374 grams/liter
Speed: 1150 rpm
Fig. A-8 - MODEL DREDGE PUMP CHARACTERISTICS
Impellers TD-5 and TD-6
Concentration: 1374 grams/liter
Speed: 1300 rpm
Fig. A-9 - MODEL DREDGE PUMP CHARACTERISTICS
Impellers TD-5 and TD-6
Concentration: 1374 grams/liter
Speed: 1440 rpm
Fig. A-10 - MODEL DREDGE PUMP CHARACTERISTICS
Impellers TD-5 and TD-6
Concentration: 1374 grams/liter
Speed: 1550 rpm
Fig. A-11 - MODEL DREDGE PUMP CHARACTERISTICS
Impellers TD-5 and TD-6
Concentration: 1374 grams/liter
Speed: 1650 rpm