

Nov 2002

TEST PILE PROGRAM
STOLTHAVEN TERMINALS, INC.
PROPOSED STORAGE TANKS
BRAITHWAITE, LOUISIANA
PURCHASE ORDER NO. 12439-1122-03
EUSTIS ENGINEERING PROJECT NO. 17799

INTRODUCTION

1. This report contains the results of a test pile program conducted for the proposed storage tanks at Stolthaven Terminals, Inc., in Braithwaite, Louisiana. A design compressive pile load capacity of 30 tons is desired for the project. The test pile program was authorized by American Tank & Vessel, Inc.'s Purchase Order No. 12439-1122-03. The test piles were installed by Gulf South Piling & Construction, Jefferson, Louisiana.

SCOPE

2. The scope of the test pile program included the logging of seven timber composite test piles and eight untreated timber reaction piles. The scope also included performance of two compression pile load tests and the issuance of this engineering report with the findings and recommendations of the test pile program.

TEST PILES AND REACTION SYSTEMS

3. Location. The test piles and reaction piles were installed on 26 and 27 November 2002 at the approximate locations shown on Figure 1. Seven timber composite piles, identified as PP-1 through PP-7, were installed at the approximate centers of

the proposed tanks. The piles were untreated ASTM D 25 timber pile lower sections, 65 feet in length, with 12-in. diameter concrete filled metal can upper sections, 20 feet in length. Eight untreated timber piles, ranging in length from 67 to 70 feet, were installed as the reaction piles for the load test reaction frames. Pile Nos. PP-4 and PP-5 were selected for load testing.

4. Installation. The installation of the test piles and reaction piles were logged by Eustis Engineering Company, Inc. The test piles were driven to firm tip embedments in the underlying sand stratum with a definite increase in driving resistance. The piles were driven 2 feet into the sand or to a refusal of 20 blows per foot. The actual tip embedments varied from 80 to 82.5 feet below the existing ground surface. The driving logs for the piles, pile characteristics, and penetration resistances are included as Appendix I.
5. Hammer. The timber composite test piles and untreated timber reaction piles were driven using a Vulcan 06 hammer developing a maximum driving energy of approximately 19,500 ft-lbs per blow. Refusal criteria was set at 20 blows per foot using this driving energy.

CONCRETE TESTING

6. Concrete for the upper pipe section of the composite timber piles was poured on 2 December 2002 and six concrete cylinders were made on this date. Each concrete truck was inspected for consistency and slump. Composite pile cans were inspected and found to be free of water and/or debris prior to concrete placement. The cylinders were picked up on 3 December 2002 by Eustis Engineering. The results of the concrete testing are shown on Figure 4.

METHOD OF LOAD TESTING

7. The load frame consisted of steel H-Beams attached to the reaction piles. A single calibrated hydraulic jack bearing against the steel cross beams was used to apply the load. Movements of the butt end of the pile were determined by periodic readings through an engineer's level (Gauge No. 1) with a scale calibrated to 0.01 inch and attached to the test pile. A backup system to monitor the pile butt movement consisted of reading a scale attached to the pile adjacent to an independently stretched piano wire (Gauge No. 2). A calibrated 100-ton jack was used to apply the load to the test piles.

LOADING SCHEDULE

8. Compression Test. Test Pile Nos. PP-4 and PP-5 were tested in compression on 5 and 6 December 2002, nine days after the test piles and reaction piles were installed. The test loads were applied to the piles in 6-ton increments up to a load of 60 tons. The load was then rebounded in four equal decrements to zero. The increments were held for one hour free of movement and the decrements held for 20 minutes each.
9. Readings were taken to the nearest 0.01 inch. The individual readings are summarized and shown in tabular form in Appendix II. The readings are also shown graphically in the form of a plot of load in tons versus pile butt deflection in inches for Test Pile Nos. PP-4 and PP-5 on Figures 2 and 3, respectively.

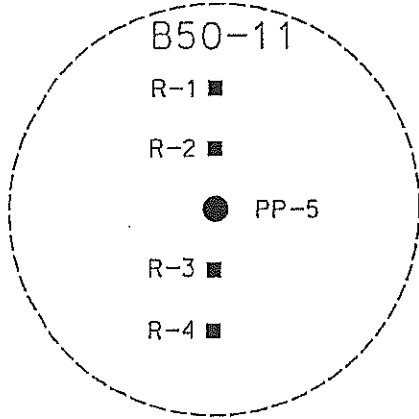
EVALUATION OF TEST RESULTS

10. Based on the results of the load versus deflection curves given on Figures 2 and 3, the test piles supported ultimate compressive loads of 60 tons without failure.

Adjusting for a factor of safety of approximately 2, it is our opinion timber composite job piles, similar to Test Pile Nos. PP-4 and PP-5, will provide an allowable design compressive capacity of 30 tons per pile against failure of the pile through the soil. All job piles should be driven 2 feet into the underlying sand stratum with a definite increase in driving resistance or to a refusal of 20 blows per foot. Based on the test piles, tip embedments may range from 80 to 83 feet below the existing ground surface.

11. The lower sections of the timber composite piles should be untreated ASTM D 25 timber piles with minimum tip diameters of 7 inches and minimum butt diameters of 12 inches. The upper sections of the timber composite piles should be minimum 12-in. diameter metal cans that extend to a depth of at least 15 to 18 feet below the existing ground surface and are filled with concrete. The metal cans should have a bottom plate limiting penetration into the timber pile lower section. The pipe upper section should be firmly embedded in the lower section and driven to grade with a mandrel. The timber composite job piles should be installed using similar methods utilized for the installation of Test Pile Nos. PP-4 and PP-5.

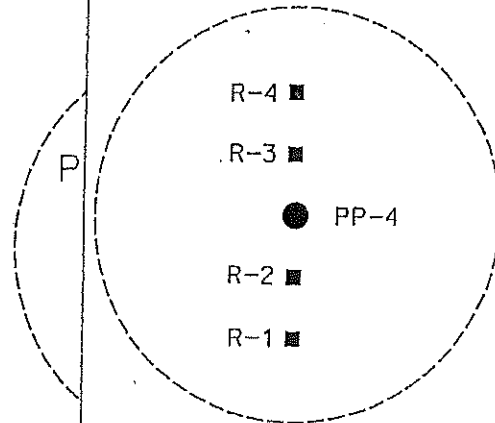
PROPOSED TANK



PROPOSED TANK
H25-1



PROPOSED TANK
H25-2



PROPOSED TANK
B50-12



NOT TO SCALE



EUSTIS ENGINEERING COMPANY, INC.

GEOTECHNICAL ENGINEERS

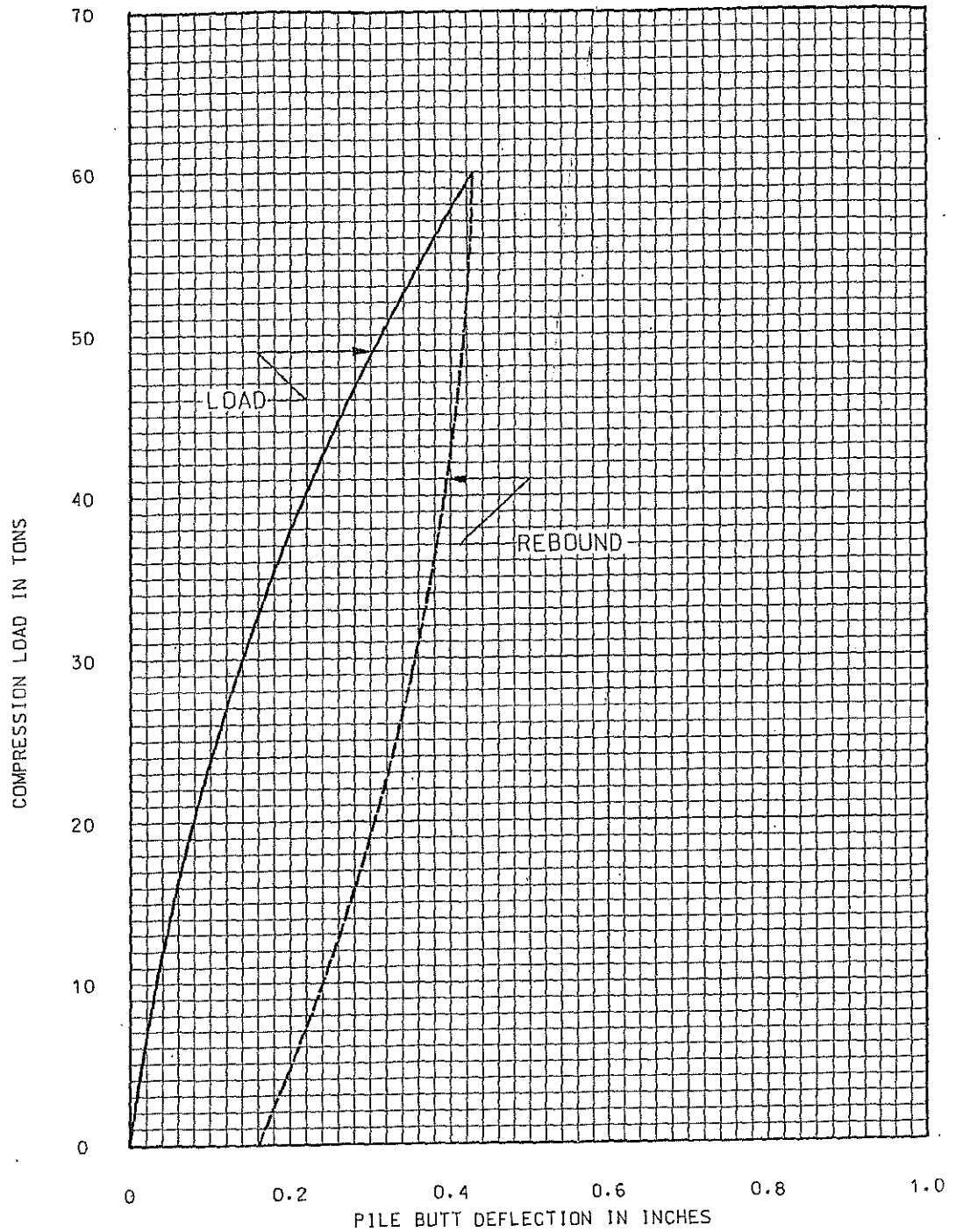
3011 28TH STREET


METAIRIE, LA

TEST PILE LOCATION PLAN

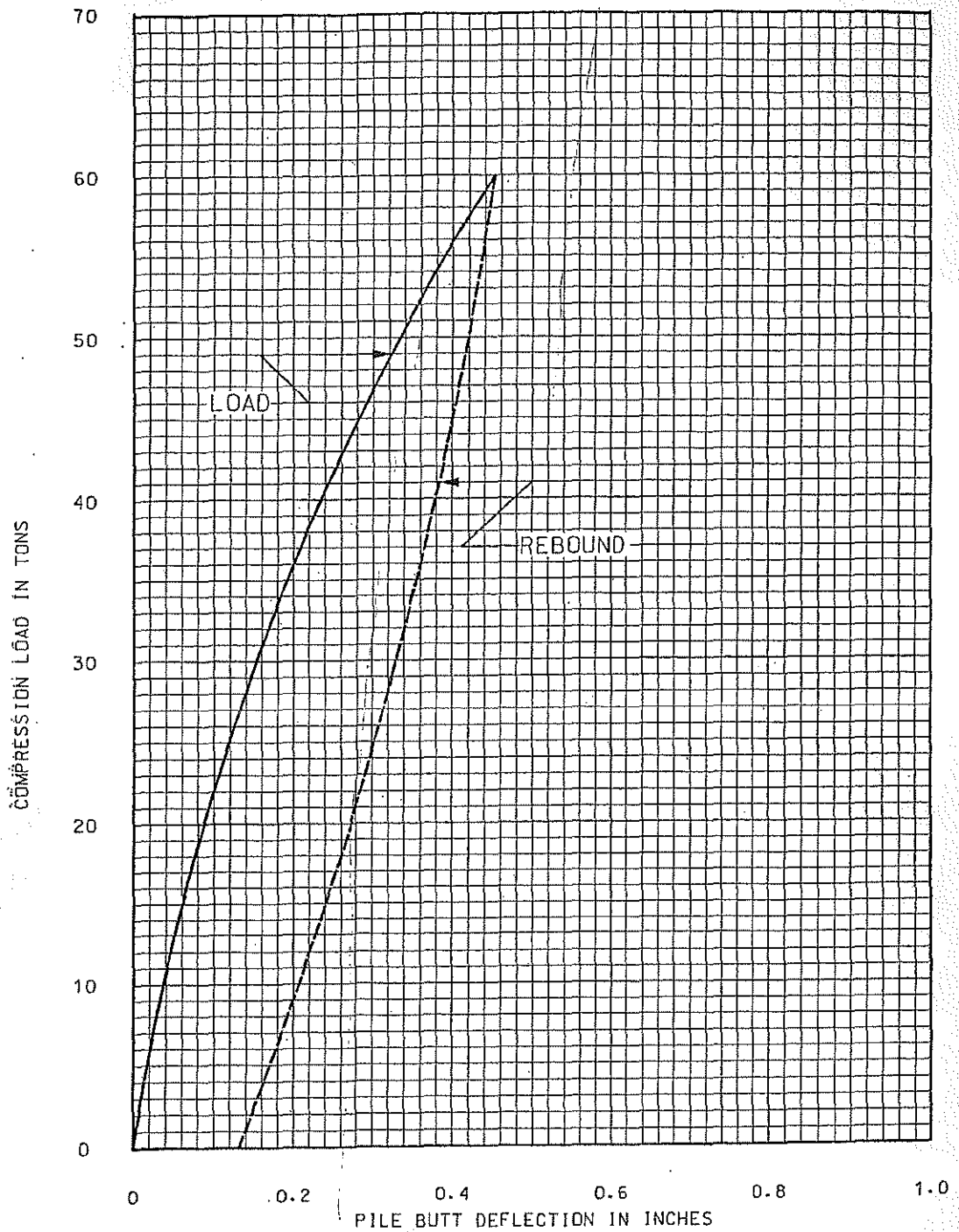
STOLTHAVEN TERMINALS, INC.
PROPOSED STORAGE TANKS
BRAITHWAITE, LOUISIANA


TEST PILE NO. PP-4
81 FT TIMBER
COMPOSITE PILE



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3011 28TH STREET METAIRIE, LA
LOAD VERSUS DEFLECTION
PILE LOAD TEST, PP-4
STOLTHAVEN TERMINALS, IN
PROPOSED STORAGE TANKS

TEST PILE NO. PP-5
81 FT TIMBER
COMPOSITE PILE



 EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LA
LOAD VERSUS DEFLECTION
PILE LOAD TEST, PP-5
STOLTHAVEN TERMINALS, INC.
PROPOSED STORAGE TANKS