

HUMBLE OIL & REFINING COMPANY

POST OFFICE BOX 1512

HOUSTON, TEXAS 77001

TO BE FILED

MARINE DEPARTMENT
F. AMES SMITH
OPERATIONS MANAGER

CABLE ADDRESS
"STANSHIP HOUSTON"

January 20, 1972

03 4-5-3 P

03 70-3-2 P ✓

Harbor Island Terminal

ESSO HOUSTON Breakaway *me*

Mr. F. Ames Smith

References: (a) Letter to F. H. Stracke from Esso Research & Engineering Company (John Pollaro), dated July 19, 1971, concerning mooring winch brake settings, copy attached.

(b) Letter to R. X. Caldwell from Esso Research & Engineering Company (John Pollaro), dated June 22, 1971, concerning brake tests on mooring winches of the ESSO HOUSTON at Newport News on June 5, 1971, copy attached.

The first paragraph of reference (a) implies that a contributing factor in the breakaway of the ESSO HOUSTON at Harbor Island on April 25, 1971, was the failure of the brakes on the mooring winches to hold their rated loads. It also implies that all of the winch brakes were capable of holding only from 15% to 25% of their design capacity.

Reference (b) relates that only the No. 7 and No. 8 winches were tested at Newport News. Their performance is not necessarily indicative of how the others would perform.

After the ship left Harbor Island the crew made some tests to determine the holding power of the winch brakes. This was done by applying the brakes with full steam on the winch engines. The torque applied to the brakes by this method is much less than the rated pulling power as the engine is designed to produce a line pull of 20,000 pounds while the brakes are designed to hold against the pull of 90,000 pounds.

However, the results of this test as shown below indicate that the No. 7 and No. 8 winches were the poorest. Therefore, no one is justified in assuming from the Newport News tests that the forward winch brakes were not in proper adjustment.

- #1 Winch tighten brake one turn, holds at 400 lbs.
- #2 Winch no adjustment needed.
- #3 Winch no adjustment needed, renewed broken hydraulic hose.

Mr. F. Ames Smith
January 20, 1972
Page Two

- #4 Winch tighten brake one turn, renew broken hydraulic hose.
- #5 Winch no adjustment needed.
- #6 Winch no adjustment needed.
- #7 Winch had to tighten up brake almost to the limit, holds at 400 lbs. in pay-out position and 800 lbs. in haul-in position.
- #8 Winch had to tighten brake almost to limit. Holds in pay-out position at 400 lbs., holds at haul position at 800 lbs.
- #9 Winch manual brake holds with full head steam.
- #10 Winch manual brake holds in pay-out position, will not hold in the haul-in position.
- #11 Winch no adjustments necessary.
- #12 Winch no adjustments necessary.

Before the ship actually broke away efforts were made to heave her in against the dock but this could not be done, probably because she was in the mud on the dock side. However, there are indications that steam was left on the winches to assist the brakes.

It was not until the No. 3 breast line parted that the ship started away from the dock. The loss of this line through a greater load on the others and the No. 1 and No. 2 lines parted shortly after. The brakes on the No. 4 line was released by the braking of its hydraulic hose and this winch seems to have payed-out. Except for the No. 4 winch the brakes on the fore deck winches held enough to part the wires.

From the best picture I can form of what happened in such a few seconds, I cannot see how any slipping of the brakes on the forward winches could have initiated or contributed to the breakaway. I believe it was simply because the current forces were so very much greater than expected that the wires broke.

John B. Muir

John B. Muir

JBM:krr
Attachments
cc: 01A
03
05



ESSO RESEARCH AND ENGINEERING COMPANY

ESSO ENGINEERING
TECHNOLOGY DEPARTMENT

P. O. BOX 101
FLORHAM PARK, N. J. 07932

CIVIL AND MARINE ENG. DIVISION
P. K. NUNNMANAGER

CABLE: ENGRESSO, N. Y.

R. P. Schlenker...Section Head

54827 June 22, 1971

Tests to Determine Winch Brake Settings on the Esso Houston

Mr. R. X. Caldwell
Humble Oil & Refining Company
Marine Division
P. O. Box 1512
Houston, Texas 77001

Dear Mr. Caldwell:

On June 5, 1971 two winches (winches 7 and 8) on the Esso Houston were tested to determine the minimum hawser load which would cause the winch brakes to slip. These tests were conducted at the facilities of the Newport-News Shipbuilding and Dry Dock Company, Newport-News, Virginia, and were witnessed by Mr. John Pollaro of Esso Engineering's Marine Engineering Section.

The results of the winch brake tests are tabulated in Attachment 1 and show that brake slippage occurred at loads as low as 12 tons. This means that the brakes tested were set at only about 27% of the 45 ton design brake setting.

Based on the results from these winch brake tests, we recommend that the remaining winches on the Esso Houston be tested to determine their actual brake settings. In addition, to ensure that proper winch brake settings are maintained on Humble vessels, we recommend the following action be taken:

- All Humble-owned and chartered vessels should have their winch brakes tested once yearly to ensure they meet design capabilities.
- If the brakes tested do not meet their design capacity, they should be overhauled and then retested.
- When all brakes on a vessel meet the design requirements, a certificate so stating should be issued for that vessel.

This program should be carried out to reduce the possibility of having ships break out of berths because of improper winch brake settings. A similar program has been undertaken by Esso Petroleum Co. (EPCO) as a result of an incident in which the Esso Cambria (253,000 dwt) broke away from Milford Haven's Berth 1. Study of the Esso Cambria incident revealed that improper winch brake capacity (15% of design capacity) was the cause.

Sketch SK-7952-1 illustrates a simple, yet effective method for determining the winch brake capacity. The procedure recommended for testing is given in Attachment 2 and has the following advantages:

- No shore based equipment is required.
- Only two men are required to set up the equipment and conduct the tests.
- The tests can be done in a minimal amount of time.

We would appreciate any comments you may have regarding the recommendations given above. If you have any questions, please do not hesitate to contact us. This completes our work on the Harbor Island mooring study.

Very truly yours,



JOHN POLLARO

JP:lsr

Attach.

cc: C. E. Loeser

J. A. Ulsh

All Members of Marine Engineering Section

RESULTS OF WINCH BRAKE TESTS

ATTACHMENT 1

Winch	Load at which brake slipped (in tons)	Comments
7	12.5	Pressure at 400 psi Both 7 and 8 Disengaged
	15.5	Pressure at 500 psi Both 7 and 8 Disengaged
8	11.5	Pressure at 200 psi Both 7 and 8 Disengaged
	19.5	Pressure at 400 psi Both 7 and 8 Disengaged
	14.8	Pressure at 400 psi 7 Engaged 8 Disengaged

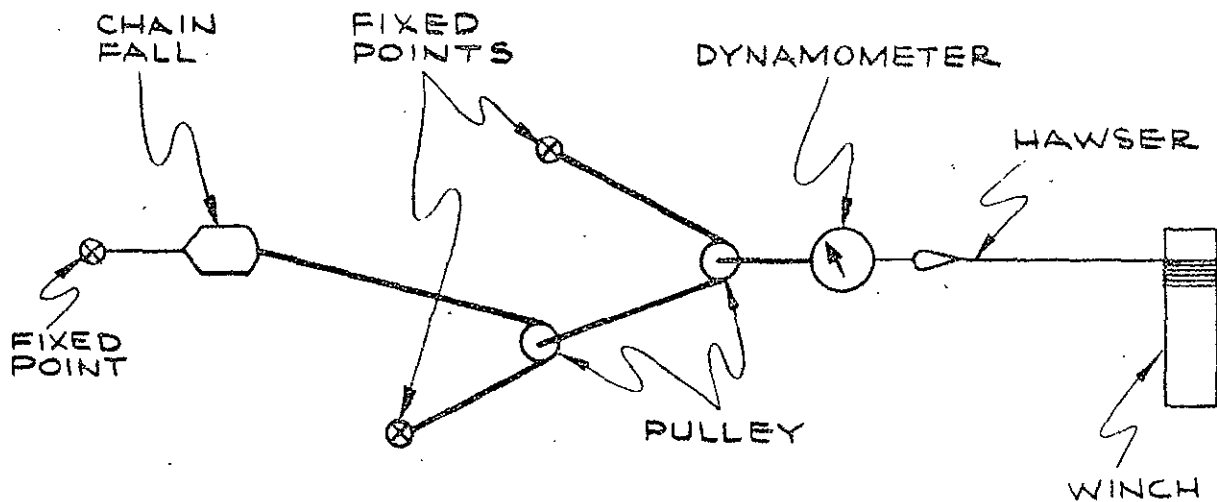
J. Pollaro:dwj
June 17, 1971

ATTACHMENT 2

PROCEDURE FOR DETERMINING WINCH BRAKE SETTINGS

1. Arrange the necessary equipment as shown in Sketch SK-7952-1. Care should be taken to ensure that the load is applied to the hawser at an angle which is as nearly perpendicular to the centerline of the winch drum as possible.
2. By using the winch, remove the slack from the test arrangement.
3. Set the winch brake.
4. By using the chain fall apply the load to the brakes.
5. Record the load at which the brake slips.
6. Repeat Steps 4 and 5 until consistent results are obtained.

EQUIPMENT ARRANGEMENT FOR DETERMINING WINCH BRAKE SETTINGS



NOTES:

- 1 FIXED POINTS CAN BE FAIRLEADS, CHOCKS, BITTS, ETC.
- 2 CHAINFALL MUST HAVE A CAPACITY GRATER THAN $\frac{1}{4}$ OF THE DESIGN BRAKE SETTING.
- 3 DYNAMOMETER MUST BE ABLE TO MEASURE LOADS UP TO THE DESIGN BRAKE SETTING.

ERE-PJG-6-1-4A

ESSO RESEARCH AND ENGINEERING CO.
ESSO ENGINEERING
P.O. Box 101 - FLORHAM PARK, N.J. - 07932

JUNE 18, 1971

ARRANGEMENT FOR

DETERMINING WINCH BRAKE

SETTINGS WITHOUT USING

SHORE BASED EQUIPMENT

JP/PAK

NO. SK-7952-1