

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT  
GULF OF MEXICO REGION

ACCIDENT INVESTIGATION REPORT

For Public Release

1. OCCURRED

DATE: 25-APR-2018 TIME: 1700 HOURS

2. OPERATOR: Castex Offshore, Inc.

REPRESENTATIVE:  
TELEPHONE:

CONTRACTOR:  
REPRESENTATIVE:  
TELEPHONE:

- STRUCTURAL DAMAGE
- CRANE
- OTHER LIFTING
- DAMAGED/DISABLED SAFETY SYS.
- INCIDENT >\$25K
- H2S/15MIN./20PPM
- REQUIRED MUSTER
- SHUTDOWN FROM GAS RELEASE
- OTHER

3. OPERATOR/CONTRACTOR REPRESENTATIVE/SUPERVISOR ON SITE AT TIME OF INCIDENT: 8. OPERATION:

4. LEASE: G05431

AREA: VR LATITUDE:  
BLOCK: 252 LONGITUDE:

5. PLATFORM: A  
RIG NAME:

- PRODUCTION
- DRILLING
- WORKOVER
- COMPLETION
- HELICOPTER
- MOTOR VESSEL
- PIPELINE SEGMENT NO.
- OTHER

6. ACTIVITY:  EXPLORATION(POE)  
 DEVELOPMENT/PRODUCTION  
(DOCD/POD)

7. TYPE:

- HISTORIC INJURY
  - REQUIRED EVACUATION
  - LTA (1-3 days)
  - LTA (>3 days)
  - RW/JT (1-3 days)
  - RW/JT (>3 days)
  - Other Injury

- FATALITY
- POLLUTION
- FIRE
- EXPLOSION

- LWC  HISTORIC BLOWOUT
- UNDERGROUND
  - SURFACE
  - DEVERTER
  - SURFACE EQUIPMENT FAILURE OR PROCEDURES

COLLISION  HISTORIC  >\$25K  <=\$25K

9. CAUSE:

- EQUIPMENT FAILURE
- HUMAN ERROR
- EXTERNAL DAMAGE
- SLIP/TRIP/FALL
- WEATHER RELATED
- LEAK
- UPSET H2O TREATING
- OVERBOARD DRILLING FLUID
- OTHER \_\_\_\_\_

10. WATER DEPTH: 150 FT.
11. DISTANCE FROM SHORE: 67 MI.
12. WIND DIRECTION: SE  
SPEED: 7 M.P.H.
13. CURRENT DIRECTION:  
SPEED: M.P.H.
14. SEA STATE: 4 FT.

A hydraulic box boom crane located at Castex Offshore's Vermilion 252-A facility experienced repeated hydraulic boom cylinder (HBC) failures. Specifically, the cylinder rod separated from the cylinder rod eye on two consecutive occasions. The crane is equipped with dual, parallel HBCs that are designed to work together to raise and lower the box boom. The first HBC failure occurred on a refurbished unit they had installed only two days prior to the failure (original was replaced due to a leaking wiper seal). Subsequently, they replaced the failed refurbished unit and it had a repeat, like failure twenty-four days later. In both cases, the crane had little or no hook load and the failures did not result in any other damage to the crane or injury to personnel.

Both of the failed HBCs had inferior quality welds that went undetected during a nondestructive test (Dye Penetrant) after refurbishment. Metallurgical tests conducted post incident showed the first failed HBC to have "a poor weld with multiple voids and a lack of penetration" and the second failed HBC to have a poor weld, which "was never fully machined away from the parent material before the eye was welded to the new rod." The vendor stated, "the weld on these cylinders is not meant to resist tension, just compression." Not convinced that the root cause of the two failures was solely due to inferior quality welds, Castex commissioned a hydraulic specialty shop to perform an in-depth evaluation of the cylinders including the undamaged one. The subsequent study identified that both failed HBCs had a working stroke roughly one inch different from the originals. As stated by a Hydraulic/Cylinder Specialist, "the combination of the under welded rod eye and difference in working stroke would result in applied tension (torque) instead of compression and cause rod eye failure."

Based on the BSEE and third party investigation findings, all agreed to rebuild both cylinders with matching measurements per original equipment manufacturer specifications prior to installation and returning the crane to service. Additionally, each sudden unexpected failure of the HBCs resulted in an increased risk to personnel; therefore, operators should consider changing both HBCs when repairs to one are necessary to ensure a matched pair. An alternative to changing both would include verifying a matched set, which requires confirming the same pin-to-pin centerline (both while collapsed/while extended) and equal working stroke measurements of each HBC; "it could be as little as 1/4" in length to cause a pull and give it torque."

## 18. LIST THE PROBABLE CAUSE(S) OF ACCIDENT:

- Mismatched hydraulic boom cylinders designed to work together (roughly one inch difference in working stroke) which created torque and led to material failure

## 19. LIST THE CONTRIBUTING CAUSE(S) OF ACCIDENT:

- Faulty weld on refurbished hydraulic boom cylinders
- Failure to recognize the importance of ensuring the same pin-to-pin centerline (both while collapsed/while extended) and equal working stroke measurements of each HBC

## 20. LIST THE ADDITIONAL INFORMATION:

## 21. PROPERTY DAMAGED:

- Crane hydraulic boom cylinder
- Small section of handrail adjacent to the crane pedestal

## NATURE OF DAMAGE:

- Broken weld resulting in separation of the cylinder rod from the cylinder rod eye
- Broken top-rail

ESTIMATED AMOUNT (TOTAL):

**\$40,000**

**For Public Release**

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

**The Lake Charles District recommends a Safety Alert for the Agency shared with the Oil and Gas Operators and Crane maintenance and repair companies in efforts to heighten the awareness to prevent a reoccurrence.**

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: **NO**

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

25. DATE OF ONSITE INVESTIGATION:

28. ACCIDENT INVESTIGATION  
PANEL FORMED: **NO**

OCS REPORT:

26. INVESTIGATION TEAM MEMBERS:

**Darron Miller /**

29. DISTRICT SUPERVISOR:

**Mark Osterman**

APPROVED

DATE: **16-JUL-2018**