CASE STUDY

# SIMPLE SOLUTION CURES REPEAT PUMP SHAFT BREAKAGES AT OIL REFINERY

- Cause of premature failures identified
- Solution required no modification to pump
- Improved MTBR

Refinery

## CHALLENGE

A US oil refinery was experiencing issues with a barrel pump. They asked ClydeUnion Pumps to perform an upgrade and investigate the cause of numerous shaft breakages in the location of the thrust collar.

## SOLUTION

Thrust shaft breakages can occur for a number of reasons: improper shaft design, excessive thrust loading, excessive runout of the shaft and/or thrust collar, or poor materials specification. In this instance, the intrinsic design was the root cause. The internal levelling washer had seized, forcing the thrust collar to cycle the shaft until it failed.

ClydeUnion Pumps swapped out the thrust bearing with one that has greater thrust pad flexibility, enabling the thrust collar to operate correctly. As the replacement had the same design envelope as the original, there was no need for further modification.

**Industry:** Oil & Gas – downstream

**Region:** Americas

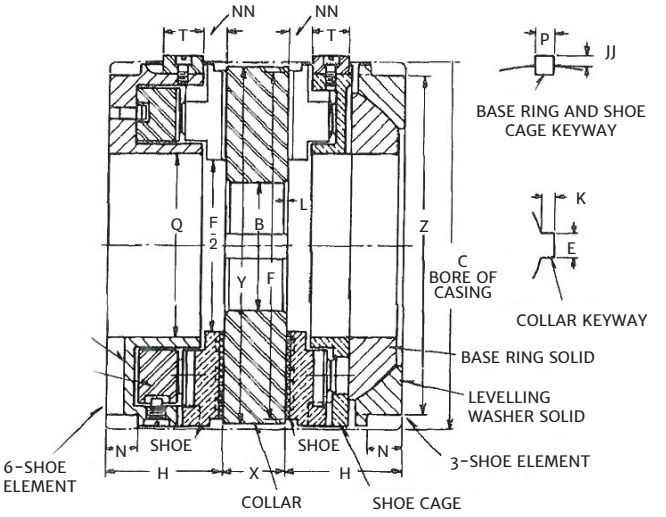
**Category:** Mechanical design upgrade

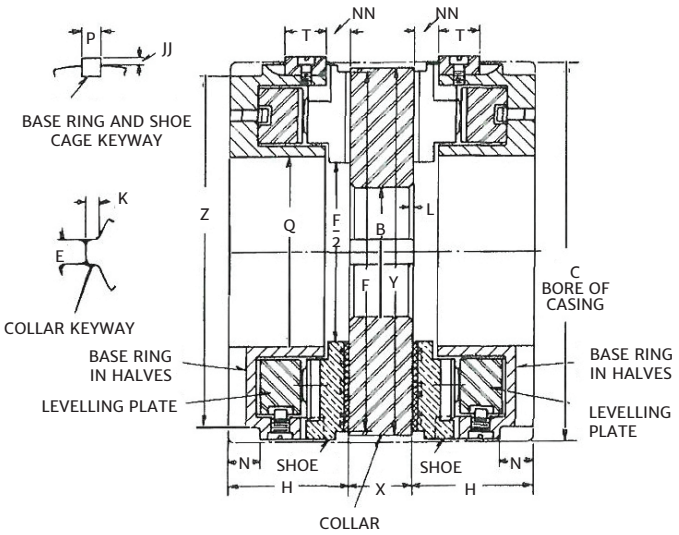
**API Type:** BB5

ClydeUnion Pumps Aftermarket Technical Services team has experience across a range of services on critical rotating and reciprocating equipment to improve operational safety, reliability and efficiency. The drop-in replacement of two original Bryron Jackson pumps for the oil and gas market is one of our success stories documented in our library of case studies. These case studies highlight the requirement from the customer, how we achieved the goal and the process we followed to deliver the improvements.

## OUTCOMES

The cause of the shaft breakages has been identified. A simple solution has been implemented that will improve Mean Time Between Repairs (MTBR) in future.




| Bearing Number | JHN-7 |
|---|---|
| 3-Shoe Element Area (Net Sq. In.) | 12.3 |
| 6-Shoe Element Area (Net Sq. In.) | 24.5 |
| JHN Bearing, complete<br>Spare Collar<br>6 Spare Shoes | 43<br>12 1/2<br>6 |
| B (Bore)*<br>C<br>E | 2.500<br>7.375<br>1/2 |
| F (Normal Size)*<br>H<br>JJ | 7<br>2 3/8<br>3/16 |
| K<br>L (Chamfer)<br>N | 1/4<br>1/16<br>3/8 |
| NN<br>P<br>Q | 7/16<br>3/8<br>3 3/4 |
| T<br>X<br>Y | 13/16<br>1 1/4<br>7 1/8 |
| Z | 6 7/8 |

| Bearing Number | JHJ-7 |
|---|---|
| Area (Net Sq. In.) | 24.5 |
| J H Bearing, complete<br>JHJ Bearing, complete<br>Spare Collar<br>6 Spare Shoes | 30<br>47<br>12 1/2<br>6 |
| B (Bore)*<br>C<br>E | 2.500<br>7.375<br>1/2 |
| F (Normal Size)*<br>H<br>JJ | 7<br>2 3/8<br>3/16 |
| K<br>L (Chamfer)<br>N | 1/4<br>1/16<br>3/8 |
| NN<br>P<br>Q | 7/16<br>3/8<br>3 3/4 |
| T<br>X<br>Y | 1 3/16<br>1 1/4<br>7 1/8 |
| Z | 6 7/8 |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