

Diamond Bearings in Chemical Mixers

Handling abrasive fluids, toxic materials, and corrosive chemicals.



PROJECT OVERVIEW

CUSTOMER: Publicly-Traded Energy Company
CATEGORY: Agriculture, Chemical Mixer, Clarifier & Agitator, Power Generation, and Water Treatment
APPLICATION: High Temperature Chemical Mixer
LOCATION: Fawley, TX -- Baton Rouge, LA
YEAR BUILT: 2003

The real challenge for industrial mixing companies is bearing failure caused by harsh, corrosive, and abrasive operating conditions. These failures are the root cause of expensive downtime and costly equipment failure.

9 years

WITHOUT BEARING FAILURE

“The chemical industry highly prefers industrial mixers that can handle a broad range of products, such as high viscosity fluids, abrasives, toxic materials, and corrosives”

-- Technavio; Industrial Mixers Market by End-user and Geography; Forecast and Analysis 2020-2024.

That's why we've developed an innovative diamond bearing solution that is specifically designed to handle abrasive fluids, toxic materials and corrosive chemicals. Our innovative diamond bearings take advantage of the hardest material known to man to make the world's longest lasting, most abrasion-resistant bearings on the market.

Diamond bearings from US Synthetic have been used in the oil and gas industry for more than 15 years. Recently, these dynamic bearings were adopted by companies in the chemical mixing and wastewater industry.

CHALLENGE

Chemical mixing plants often deal with premature bearing failure. In this project example, our customer was running a traditional bushing foot bearing in a large, industrial mixer. The open bushing was operating in an abrasive-laden fluid and was failing every 3 1/2 months (100 to 120 days) because of axial wear and misalignment caused by excessive vibration. As part of this failure, the entire mixing tank had to be drained and cleaned before a maintenance technician could climb down into the tank to replace the failed bushing.

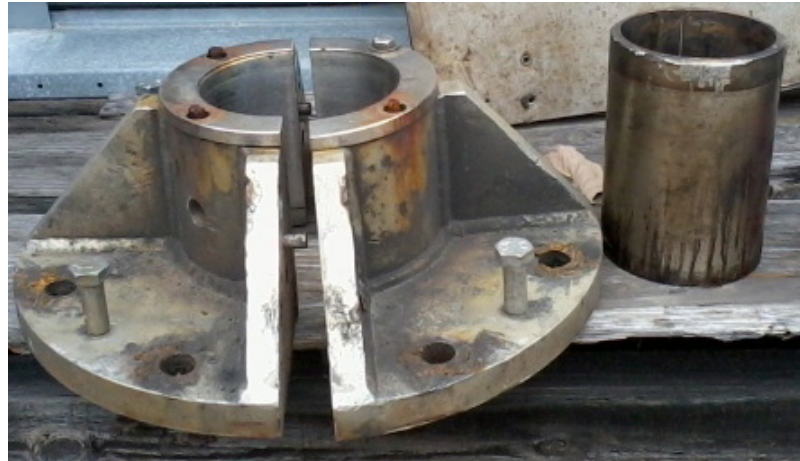
In general, this maintenance process would take the mixer out of production for at least 2 days. Production flow would completely stop during this time. To avoid any safety risk of exposure, the maintenance technician was then required to use approved Personal Protective Equipment (PPE) to even enter the tank. Overall, the bearing replacement process was not only costly, but was a maintenance nightmare as well.

SOLUTION

Working with our customer engineering team, we replaced the existing Super Duplex steady bearing with our abrasion-resistant diamond bearing. The new bearing was custom-designed with polycrystalline diamond technology as a drop-in replacement for the failed bushing. With the new diamond solution in place, the mixing application was brought back online. After 3 1/2 months, the chemical mixer was still running well.

Ironically, after the first year of operation, the engineering team actually took the mixing tank application off-line to inspect the bearings. They were shocked to find that our

120-day Run in Abrasive-laden Fluid



Failed Bushing Foot Bearing

abrasion-resistant diamond bearing showed "no measurable wear." As the engineering team calculated the overall cost of replacement bearings and the maintenance risks of past solutions, it was clear that the adoption of our new bearing technology was delivering measurable cost savings and significant safety benefits. To date, our diamond bearing has been running without failure for 9 years.

OUR PROMISE

"Our promise is that diamond bearings will: 1) easily operate in viscous and corrosive process fluids, 2) deliver longer bearing life and lower overall maintenance costs, and 3) eliminate the need for fragile seals and contaminating lubricants."

-- Jair Gonzalez, General Manager, US Synthetic Bearings

CONCLUSION

US Synthetic diamond bearings are a **perfect fit** for:

- **Large-scale chemical mixers that experience extensive axial vibration;**
- **Sludge mixers and vertical pumps that handle dirty fluids and rainwater; and**
- **Electrical Submersible Pumps (ESPs) used in water treatment plants.**