

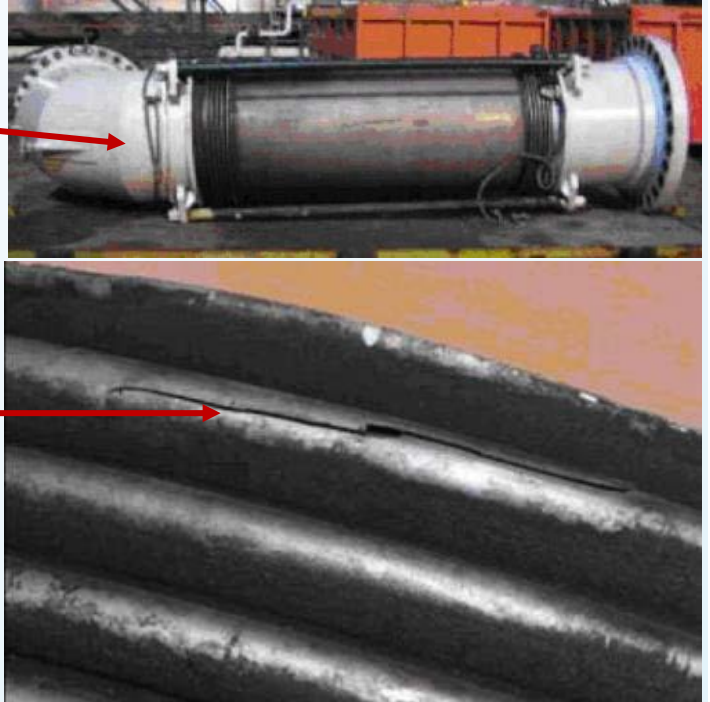
Leaking Bellow

EPSC Learning Sheet May 2024



What Happened:

A 30-inch expansion joint installed on a recycle gas compressor of a steam-cracking plant failed during start-up. The 36-year-old bellow operated at 3.2 bars and 32°C and showed a 10 cm long crack.



Aspects:

- Bellows allow for thermal expansion and are generally less strong than fixed pipe. They are more sensitive to leakage due to vibration, fatigue, wrong alignment and mechanical impact.
- The stainless steel 321 bellow was in use for 36 years.
- Compressors (during start-up) can have deviating temperature and pressure. The bellow must be designed for that.
- Critical bellows should be part of an inspection program as fatigue and crack formation is typically a slow process. This crack should have been found before the leakage. See specification for bellow: [ASTM F1120-87](#).

Assure the integrity of bellows