

RECIPROCATING COMPRESSOR PACKAGES

SKID-TO-PLATFORM ATTACHMENT TECH TRANSFER'S COMMENTS

1. GENERAL

Tech Transfer has successfully designed and/or solved field problems for reciprocating compressor installations on well over 250 offshore platforms and FPSO decks.

Reciprocating compressors generate significant unbalanced forces and couples that can excite structural skid and deck natural frequencies. If there are deck and/or skid natural frequencies near the compressor operating speed, excessive vibration will normally be generated.

Therefore, the skid design, deck design and skid-to-deck attachment are very important.

2. SKID & DECK DESIGN

The skid should have four longitudinal runners (minimum) and all major load bearing beams should be full depth. The equipment mounting pedestals should be stiff enough to prevent side-to-side natural frequencies up to 4X the operating speed range. Each equipment pedestal should have stiffening members inline with the equipment feet and suitable energy paths to transfer the unbalanced forces into the skid beams. In turn, the skid transverse beams and skid-to-deck attachment should provide energy paths to transfer the unbalanced forces into platform deck beams.

The platform deck design should have proper energy paths to transmit the unbalanced forces into the platform framing trusses and legs. The unbalanced forces will dissipate when trying to move the large platform mass. Also, the platform deck stiffness must be rigid enough to prevent localized natural frequencies near the operating speed.

3. SKID-TO-DECK ATTACHMENT

Bolted connections are not suitable for reciprocating compressor skid attachment to offshore platform decks. Due to unbalanced forces and relaxation of bolts, the bolt-to-nut attachments will come loose in a matter of weeks and require continuous tightening. This maintenance task is not normally completed and the result is high vibration on the compressor skid.

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The skid-to-deck attachment should be made by directly welding the major skid beams to the deck beams at each intersection.

Minimum support attachment points for the skid should be at the following points:

- Perimeter - Each skid corner
- Perimeter - Ends of transverse beams under equipment feet
- Perimeter - Normally 1 or 2 between equipment feet and end of skid
- Internal - Under each equipment foot on 2 center beams
- Internal - Under 4 corner of scrubber supports
- Internal - Structural spans exceeding six feet

If the internal beam intersections are not welded, a trampoline effect with high vibration will likely occur. Normally, suitable skid-to-deck attachment will include 40 – 50 weld points. If there are no deck beams at these points, intercostal beams will have to be added to the deck.

4. SKID INSTALLATION

If gaps exist at skid-to-deck beam intersections, shims should be installed to fill the gaps prior to welding. If these gaps are not filled, weld fatigue may occur.

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