Critical Projects

Critical Projects are those projects that are more complex and have a greater potential for operational issues if special attention is not applied early in the project. Ariel would like to assist in the review of critical projects and therefore has included a flag in the performance software identifying the projects that fall in this category.

Critical Projects are defined by a review of:

Application Type:

- Gas Transmission
  - Wide Range of Operating Conditions
  - Wide Range of Capacity Control Steps including Single Acting Cylinders
  - Large drivers
  - Difficult Valve Selection due to the Wide Operating Range
  - Complex Acoustic Responses
- Storage Injection and Withdrawal
  - Higher Pressures
  - Attention to Cylinder Lubrication
  - Water cooled packing cases
  - Wide Range of Operating Conditions
  - Difficult Valve Selection due to the Wide Operating Range
- PRC (Petroleum / Refinery / Chemical)
  - Industrial Gasses
  - More Stringent Specification Limitations
  - New Customer base

Equipment Type:

- Large Frames
  - KBU, KBZ, KBB and KBV
  - Some JGC, JGD and JGF
  - Large Two Throw Frames
  - Requiring Special Tools for Maintenance
- Pipeline Cylinders
  - High Flows with Large Piping
  - High Frequency Components
  - Large, Low Natural Frequency Cylinders
- VS Forged Steel Cylinders
  - High Pressure
  - Lubrication
  - Water Cooled Packings
  - Available Tailrods

Driver Type;

- Electric Motor
  - Unique Installations
  - Shaft Sizing Restrictions (see Packager's Standards)
  - Always Requiring Torsional
  - Often Requiring Torsional Detuning Devices (flywheels, detuners, special couplings...)
- VFD (Variable Frequency Drive)
  - Unique Installations
  - Shaft sizing restrictions
  - Always Requiring Torsional
  - Often Requiring Torsional Detuning Devices (flywheels, detuners, special couplings...)
  - Wide range of speeds, often with blackout ranges due to torsional response
- Large Gas Engines
  - High horsepower - high excitation forces
  - Longer drive trains
  - Often Requiring Torsional Detuning Devices (flywheels, detuners, special couplings...)
  - Some larger engines designed for power generation may require special couplings and attention to torsional results
- Gear Boxes
  - Difficult to detune torsionally
  - Most often requiring special couplings
  - Axial and Lateral Alignment Concerns including Thrust Limitations

Location:

- Offshore and FPSO
  - Limited Access
  - Limited Space for Maintenance
  - High Visibility
- International Destinations
  - Less Support Infrastructure in some Regions

Other:

- Sour Gas
  - Proper Materials
  - Purge and Vent Systems
- Pneumatic Fixed Volume Clearance Pockets
  - Supply and vent lines
  - Complex controls

Project Reviews

Many Critical Projects can be successful with a comprehensive review of the system during different phases of the project:

1. Budget and Quotation Phase
   - Regional Sales Managers and Applications Engineering can provide assistance in selection
2. Order Phase
   - Order Entry can provide assistance with scope of supply
   - Applications Engineering can provide assistance with documentation, including torsional data
   - Tech Services can provide assistance with packaging design for maintenance support and vibration avoidance
3. Installation and Start-Up Phase
   - Tech Services can provide assistance with installation review, start-up checklist review, review of vibration concerns

Torsional Providers

The success of the torsional analysis depends heavily on the modeling of the equipment and operating range of the compressor. A torsional provider must be familiar with moderate to high speed reciprocating compressors and must be provided with the full range of operation of the compressor. The operating range is to include part load cases, cases with single acting cylinders and speed variations. Familiarity with Ariel compressors is quite helpful in understanding aux end amplitudes, the availability of the torsional data (mass elastic data, torque effort data and fourier coefficient data) and availability of specific flywheels, detuners and internal flywheels.

Acoustical and Mechanical Providers

Familiarity to moderate and high speed reciprocating compressors will aid in the successful acoustical and mechanical analysis. Some larger skids and many platform mounted skids may require a skid analysis to ensure vibration levels and stress levels of skid, piping and vessels are acceptable.

Torsional and Acoustical analyses may have interfering recommendations. More complex the operating ranges have a greater chance of interference between the torsional, acoustical and mechanical systems.