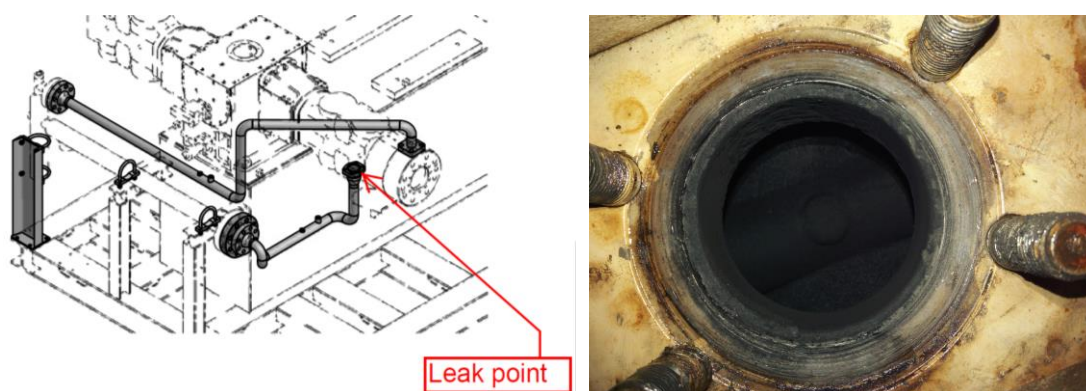


### Incident description: gas leak 2017

A gas leak occurred due to a blown gasket on a spool connected to a gas lift compressor. The way the connection was designed, alignment was more critical than on other more typical flanged connections on hydrocarbon systems. The recommended practice specified by the gas lift compressor manufacturer was to remove the complete spool (both flange pairs) during maintenance, and replace/install the connection where the leak occurred first. Thereafter, the other flange pair should be installed. The above was not known by the involved personnel, and the maintenance was carried out by only disconnecting and replacing the connection where the leak occurred (see right picture below).



### Causes

#### Direct cause

- Lost containment in a flanged connection due to loss of bolt tensioning.

#### Underlying causes

- The design of the bolted connection was not sufficiently robust to cope with loads imposed by vibration, temperature variations and frequent restarts.
- Reinstallation of the pipe spool was not performed according to recommended practice as only one flange pair was released when the gasket was replaced. Recommended practice was not known by the involved personnel, and was not described in any procedure.
- Insufficient planning: It was decided to use own work force for the repair work.
- Insufficient quality of procedure: Specific competence requirements were not known, and no procedure was available describing the requirements for the installation sequence of the spool.
- Insufficient organization and management priorities: The inadequate flanged connections should have been investigated on an earlier stage as near misses had been reported three times for the same type of connections. No lessons learned from previous failed leak tests and loose nuts: A work instruction could have been developed, specifying that flanged connections that are prone to leak after restart should be tightened prior to restart.

### Lessons and recommendations

- Implement a revised bolted solution as recommended by the gas lift compressor manufacturer.
- Update work instruction to check bolted connections prior to restart of the gas lift compressor. Revise current manual to include specific installation sequence for critical spools.
- Evaluate if the gas lift compressor manufacturer should be more involved in future repair work.
- Revise the barrier system to include more thorough evaluation of Synergi reports to discover similar incidents at an early stage.