

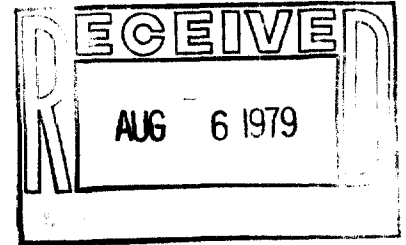
Interoffice Communication

To Distribution

From D. J. Lewis, Chemicals Research, Ponca City

Date July 24, 1979

Subject MEETING WITH BS&B CONCERNING PREMATURE RUPTURE DISC FAILURE
ON PVC REACTORS



The problems of premature rupture disc failure on our PVC Reactors were discussed with BS&B in Tulsa at a meeting attended by John McCulley, Greg Husen, and Duane Lewis. BS&B attendees were Sherrie McCollum, Butch Navel, Jim Burns, Art Purinton, and John Strelow. Jim Rapp of D. D. Frederick Company also attended. It was explained that we have been seeing premature disc failure on both our double disc (8-inch) and our disc/relief valve (6-inch) arrangements. The statement of the problem was two-fold: 1) understand and eliminate causes of premature disc failure, and 2) in the event of a premature disc failure, determine what disc/disc or disc/relief valve arrangements will provide 100 percent reliability in containing the process.

BS&B currently has a fairly good idea of what contributes to premature disc failure. They do not, however, have any data indicating how effective a second disc is in containing the premature failure of the primary disc. They do feel that if the primary disc fails at 70 percent of its rating or lower, then the secondary disc will hold. They also believe that in a disc/relief valve combination no release should occur if the disc fails at 90 percent of its rating or lower.

Causes of Premature Failure

BS&B indicated that there are two predominant causes of premature disc failure: 1) inadequate torquing of the disc flanges, and 2) damage to the disc during handling and installation. Other factors which reduced the disc rating slightly were severe overtorquing and uneven torquing of the flanges. There is also an indication that equipment vibration may cause premature failure.

Recommendations

BS&B has agreed to work with us in eliminating the problem and has suggested several action steps. The following includes several of those recommendations:

1. Be sure that all plant maintenance personnel have had seminar training concerning rupture discs (BS&B will do this on our request.)

DTH 000069703

Distribution
Page 2
July 24, 1979

2. Each time a disc is put into service on a reactor, the reactor should be hydrotested to 90 percent of the disc rating (-170 psig). Any routine hydrotesting should also be to 90 percent of disc rating. An operations supervisor should observe each test.
3. Inspect discs regularly for PVC buildup.
4. A maintenance supervisor should observe the installation of every disc.
5. Use a torque wrench when installing discs to insure that minimum torquing specifications are met.
6. Install maximum readout pressure gauges between discs and on the reactor.
7. When an unfailed disc is taken out of service, the seat area should be inspected for uneven depth of "bite" (from uneven torquing) and for slippage (from inadequate torquing). Each of these discs should also be placed in a test stand and the actual burst pressure recorded.
8. Accurate records should be kept of each disc changeout and should include dates of service, any observations on the seat area, and the burst pressure recorded at the test stand.
9. Any disc which fails in service should be sent to Duane Lewis, R&D, along with all information concerning the disc life and failure. The disc must be handled carefully to avoid altering its condition.

Subsequent to the BS&B meeting, several other ideas were originated and are presented for consideration:

1. Pressure switches should be installed in the reactor and between the discs with an alarm in the control room. This will tell of any pressure pulses in the reactor and when during the cycle they occur. It will also indicate immediately a failure of the primary disc.
2. Install a ball check valve on the excess flow relief valve between discs. This will eliminate bleed back during evacuation if the primary disc is cracked.
3. Install flexible connections to isolate the disc assemblies from downstream equipment vibrations.

DTH 000069704

Distribution
Page 3
July 24, 1979

4. There may be a problem with rain water collecting on the top disc and freezing during the winter. This could seriously affect the set pressure.

The first step in solving the problem is to completely document the failures to date. This should be done as soon as possible in order to get all the aspects of the problem defined. Manpower for this will be supplied by either R&D or PED. We will also be working closely with BS&B in determining the cause of our premature disc failures. BS&B is preparing a test program to evaluate double disc and disc/RV arrangements to contain a premature failure.

Pending the results of this program, evaluation of disc/disc or disc/RV arrangements on the reactors may be recommended.

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