

Date: Fri, 17 Apr 1998 14:49:57 -0500
From: Meredith Brown <racer@lanl.gov>
Subject: Pantex Yellow Alert: Air Hose Failure

Dear LL Readers, this was a one of a kind experience at Pantex, and we'd like to share it with you. Do not hesitate to send me comments. Thank you. John Rayford, Mgr. Pantex Lessons Learned Program, (806) 477-4009.

Title: Air Hose Failure on Compressed Air System in Building 12-44, Cell 2

Identifier: ALO-AO-MHSM-PANTEX-1997-0079

Date: 4/17/98

Lesson Learned Statement: Air hose assemblies may become damaged over time. An inspection program should be implemented to provide a systematic method for checking the equipment for damage. Although this event was not the result of the hose end being whipped by flow of escaping air, it is considered a best business practice to turn off the compressed air stations and disconnect the hoses when not in use.

Discussion of Activities: On July 28, 1997, the Operations Manager for Building 12-44 reported an air hose failed on the compressed air system in Cell 2. Upon entering Cell 2, production technicians (PTs) heard the sound of air blowing. They discovered that the coupling had detached from the air hose and air was being released within the facility. They disconnected the hose and notified their operations manager and the assistant facility manager. The PTs verified that the pressure on the air system gauge registered 80 lbs.

A stand down order was issued for compressed air operations involving special nuclear material, explosives or nuclear explosives until an inspection of similar hose fittings could be completed by Tooling Warehouse, operations and facility personnel. The inspection was completed on June 29, 1997.

The air hose, which is used to connect tooling, has a quick disconnect/connect fitting which is screwed onto a crimped hose fitting. The fitting on this particular hose was crimped in two places (parallel to the axis of the hose) at 180 degree separation, using a die set that consisted of two dies.

An inspection was conducted of eight randomly selected hoses available for issue in the Tooling Warehouse. Two hoses had a similar two die crimp configuration, but the other six had four or eight die crimps. Based on the tooling warehouse inspection, operations involving special nuclear material, explosives or nuclear explosives use of air hoses were suspended until an inspection of the hose fittings was completed. All hose fittings with only two die crimps were removed from service.

There were no injuries to personnel as the result of this event. Photographs were taken and no damage to the facility was identified. One small trash can was damaged and paper debris was scattered in the vicinity of the hose. There were no nuclear weapons in Cell 2 at the time of the

event. There were containerized explosives within the cell but they were out of reach of the air hose.

Analysis: As the result of pressure testing performed on the fittings and hose, the failure is believed to have been a relaxation of the clamping force caused by damage from an external energy source (e.g., forklift, work stands, transportation carts). The external energy source has not been definitively identified because the specific date that the damage occurred remains unknown. This failure is classified as a one time failure, an isolated event.

The Air Hose, 12250, with the Hansen #5000 Quick Connect Socket, US Steel Brass Fitting #6RLA-6MP and the Jaberman #FBL-650 Brass Hose Ferrule separated from the 3/8 I.D Accuflex #K3150 Clear Braided PVC Hose. The separation occurred with the hose connected to the air supply with air pressure on the hose. Physical evidence indicated that after the socket/barbed fitting separated from the hose/ferrule that the hose whipped, due to the escaping air, until the ferrule separated from the hose. Plant air pressure should be a maximum of 115 to 120 psi.

The pressure testing resulted in the following conclusions:

(1) The whipping of the hose end, caused by the flow of escaping air, could not flatten a round ferrule over a hose into a fairly uniform elliptical shape.

(2) An unknown outside energy source is believed to have flattened the fully assembled ferrule over the hose and barb into the elliptical shape and caused the two internal cracks in the hose. The dimensions of the elliptical ferrule, hose and barb diameters strongly indicate this scenario. The slight flattening of the axial crimps from the internal pressure caused by compressing the hose could cause a relaxation of residual clamping force of the ferrule to the hose.

(3) A relaxation of the clamping force is the main probable cause of the hose/fitting failure and should be classified as a one time failure caused by damage from an external energy source.

(4) Analysis of measured dimensions on the opposite end ferrule indicate a diametrical hose compression of .047." This should be approximately the same as the original compression of the failed hose end.

(5) As a result of the pressure testing and manufacturers data on the fittings and hose, any of the known type crimps of ferrules on the existing hose assemblies meet all requirements if not physically damaged.

Recommended Actions:

01) Develop criteria and pressure test to failure various styles of crimps and hoses to determine cause of event. Point of Contact: D. Stoddard, Eng. & Design, (806) 477-4081

02) Revise drawings of three air hose types to add support data sheet for annual visual inspection by the Tooling Review Team. Point of Contact: D. Stoddard, Eng. & Design, (806) 477-4081

03) Implement Annual Visual Inspection by Tooling Review Team to check for physical damage to existing hoses and fittings. Point of Contact: J. D. Hall, Mfg., (806) 477-4866.

04) Issue Standing Order to require turning off compressed air stations when not in use and to disconnect hoses. Point of Contact: J. Angelo, Mfg. Div. Mgr., (806) 477-4514

05) Change STD 7-5000 to incorporate requirement to turn off compressed air stations when not in use & to disconnect hoses. Point of Contact: J. Meyer, Mfg., (806) 477-4589

06) Issue a Lesson Learned to remind personnel to inspect air hoses for damage prior to use. Damaged hoses are to be identified and reported to supervision for replacement. Point of Contact: J.D. Hall, Mfg., (806) 477-4866

Originator: John Rayford

Contact: D. Stoddard, Eng. & Design, (806) 477-4081

Name of Authorized Derivative Classifier: Terri Smith

Name of Reviewing Official: James Fine

Priority Descriptor: Yellow/Caution

Functional Category: Occupational Safety and Health

Keywords: The air hose, which is used to connect tooling, has a quick disconnect/connect fitting which is screwed onto a crimped hose fitting.

References: NONE Meredith Brown ESH Lessons Learned Program Manager 505 667 0604