ARIA News Flash
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Test of pressure equipment : Ensure the safety of personnel !

Hydraulic, leak or strength tests, internal or external inspections are just some of the operations conducted to verify the reliability of pressure equipment, with the aim of preventing pressure risk. Yet even though these tests appear simple to implement, they have still been the source of accidents on a number of occasions, as the following events attest.

1st case - 26th July 2010, Dunkirk (ARIA 39186):

(Clamp collar
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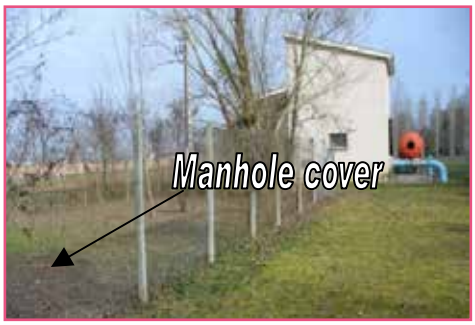
In an upper-tier Seveso-rated oil depot during a **permeability test** conducted subsequent to installing a joint on a sleeve, a **temp worker** used a 30-cm spindle to tighten the clamp collar on a plug in order to eliminate an air leak on a pipe section (pressure: 6 bar, diameter: 150 mm). The threaded pin broke and the plug was blasted by the pressurised air, seriously injuring the technician in the face with fractures to both his nose and jaw.
The administrative unit responsible for supervising pressure equipment only learned of the accident on 12th August. Its investigation was conducted jointly with the Labour Inspectorate on 18th August. Findings revealed that **no procedure had been adopted for using clamped couplings**, especially regarding **torque and tightening steps**. Employees were commonly relying on a 30-cm pin to reinforce clamping. The injured technician had not received any **safety training** when assigned to his post.
According to the coupling supplier, this equipment is only sold for use on pipelines carrying liquids and, under no circumstances, for compressible gases like air.

2nd case - 15th February 2010, Montauban (ARIA 38443):



An expert was dispatched by a certified body, accompanied by a colleague, to conduct a periodic re-certification inspection on an anti-pulsating air/water tank (pressure: 16 bar, volume: 8,000 litres) connected to an irrigation network. To carry out the internal inspection, the device was prepared the previous Thursday by another employee. The preparation step involved bleeding air from the tank by removing an elbow on the water inlet and unscrewing the bolts securing the manhole cover. The employee was executing this sequence of tasks for the very first time; the extent of his training had consisted of verbal explanations from a co-worker present on the day of the accident.

At the time of the inspection, the manometer indicated a pressure of approx. 5 bar; in asserting that the manometer was inoperable, the employee along with the expert sought to lift the manhole cover using a hammer and large screwdriver.
The cover loosened and was blown off landing 30 m away. The employee's left arm sustained a fracture.

(Photographs courtesy of the DREAL Midi-Pyrénées Agency)

The administrative agency overseeing pressure equipment noted the **noncompliance of the body's safety guidelines**. In reality, these experts had not checked for the presence of pressure. The lack of **appropriate technician training**, combined with the operator's failure to provide **safety instructions** relative to the pressure risk, the absence of a more **senior employee** during a preparation operation assigned to an employee with no experience and the **excessive confidence displayed by the on-site team**, are all to be included as causes of this accident.
The intense cold and damp weather during the week and weekend preceding the accident might explain why the cover remained stuck to the manhole flange even though the bolts had been removed and the pressure had only read around 5 bar.

3ème Cas : 22nd March,1999 - Turquey - Dortyol (ARIA 15518)

Following a malfunction on a hydraulic pump used to test 115-m³ tanks, a subcontractor completed his operation with a bottle of compressed oxygen. A valve failed beneath one of the tanks undergoing testing and struck a pipeline connected to an adjacent tank. A liquefied gas leak ignited and the tank exploded (BLEVE-type explosion) 20 min later. **Two workers died and 6 others were injured**. Property damage was confined to the site boundary.

Inspector conducting a hydraulic test

How to make a safe control ?

- Does the device need to be tested or does it fall under a regulatory exemption instead?
- Are the technicians assigned to prepare the equipment properly trained to work with pressure risks?
- Has the equipment been properly impounded? By which means (closing of valves, use of a form to record the operations performed to turn off / idle the equipment, absence of pressure)?
- Has the device been well prepared using appropriate components (flanges, joints, etc.): no leaking around any of the joints, no seepage? Are all sidewalls accessible?
- Has the testing zone been adequately marked? Is access denied while tests are ongoing?
- In the case of a hydraulic test, can the structure withstand the water mass held in the container being tested? Have additional sections (with taps, a full buffer, etc.) been allocated to resist the test pressure? Can the pump used to conduct the test accommodate a slow pressure rise so as to prevent any measurable permanent deformation from occurring?
- Have assembly specifications been established for flaps, plugs and hoses? Are these specifications compatible with the test temperature and pressure?
- During testing, is the pressure increased by incremental steps to ensure the joints, hoses, flanges, etc. are able to resist?

The right reflexes during a test:

- Avoid placing yourself in front of taps, joints, hoses, etc.
- Wear appropriate protective gear
- Avoid all shocks with the pressure equipment (last-minute work on the equipment)
- Refrain from retightening bolts or performing any other mechanical action
- The first time a defect is observed or even suspected, lower the test pressure

For any comments or suggestions, or to report an accident or incident: srt.barpi@developpement-durable.gouv.fr
The summaries of accidents recorded in the ARIA base may be consulted at: www.aria.developpement-durable.gouv.fr