SAFETY IN Hydraulic Pressure TESTING:

Recognizing Potential Hazards & Ensuring Secure Processes

Addressing the Dangerous Myth of Hydraulic Pressure Testing Safety

The potential for serious injury and even death is inherent in pressure testing. Historically, the focus has been on the dangers of pneumatic testing because it has greater potential energy than hydraulic testing. However, data compiled over the past 10 years by the United Kingdom's Health and Safety Executive (HSE) shows that hydraulic testing is not safer and may actually pose a significantly higher risk of injury—or even death. Two recent fatalities of hydraulic fitters that occurred when a pressure test fitting was ejected under force from a hydraulic cylinder have, unfortunately, proven the myth of hydraulic testing being safer to be untrue.

Haskel®

eBOOK

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Recognizing the Risks of Hydraulic Pressure Testing

Preventing hazardous events related to hydraulic pressure testing is achieved through understanding and mitigating the risks associated with it. Complacency during routine tests, not following safety protocols and underestimating risks all add to the danger of pressure testing. Providing staff with ongoing awareness training and safety procedures is essential to avoiding hazardous events.

The very real and serious dangers inherent in hydraulic pressure testing make it absolutely necessary for facilities to take appropriate steps to prevent hazardous events from occurring.

Dangers in hydraulic pressure testing usually occur due to either a functional failure where equipment stops working completely or a material failure when a small leak occurs, but the equipment remains functional.

It's important to be aware of:

- A rupture of the assembly while people are in the danger zone (the area in close proximity to the pressure test).
- Failure of a fitting or component forming part of the assembly, which is then ejected under force as a projectile.
- Detachment of a test hose, which becomes a dangerous whip, striking people within the danger zone.
- Sudden release of test fluid, causing eye injury or pressure injection into body tissue.

Hydraulic pressure testing dangers

To avoid injuries or fatalities due to ruptured hydraulic cylinders, detailed guidance on pressure testing safety has been developed.

These types of situations can result in:

- Slip and fall injuries.
- Burns from hot hydraulic fluid spray.
- Injection of hydraulic fluid into the skin, causing poisoning.
- Loss of limbs or even loss of life.

Pressure injection injury

Laceration without whip restraint

Loss of limb

Reducing Hydraulic Pressure Testing Dangers

Given the serious dangers inherent in hydraulic pressure testing, facilities must take appropriate steps to prevent hazardous events from occurring. Those responsible for testing should take precautions based on the HSE's GS4 testing standards.

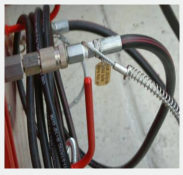
To ensure safety in pressure testing procedures, complete the following actions:

- Know how the item being tested can be safely energized, monitored and vented.
- Understand how the test medium can be discharged without having personnel in the test danger zone.
- Inspect equipment for leaks, remotely if possible and practical. Intervention may be required to check for the origin of a leak. This should be done at a lower pressure and in controlled conditions.
- Use a hierarchy of control measures to reduce risk if intervention during pressure testing requires people to be placed in the danger zone.

In conjunction with changes to process protocols, equipment and system modifications can also reduce hydraulic pressure testing dangers. Make sure that:

- Products being tested are fully enclosed.
- Operators perform remote operation outside of the test danger zone.
- Anti-whip restraints and other safety devices are used to reduce unintentional pressure release or over-pressurization of equipment.
- Equipment being used during testing is fully maintained.
- Hoses, fittings and connectors are inspected and changed when worn or fatigued through repeated use.

Fully enclosed testing system



Hose testing equipment

Whip restraints

A New Approach to Mitigate Pressure Testing Dangers

Haskel has applied many of these safety measures to its design of hydraulic test systems, including anchoring points for hoses and using only hoses that have anti-whip restraints or can be fitted with whip restraints. In the event of a coupling, fitting or hose failure under pressure, these restraints prevent a hose from injuring someone in the testing danger zone.

Beyond physical restraints, Haskel is building remote capabilities into the testing setup, which removes test operators from the danger zone. Fully enclosed testing units with secured access are also being used to prevent entry into the test area while systems are under pressure.

Haskel has made investments to develop a new high-pressure test facility equipped with an external control console, enabling an extensive range of proof and performance high-pressure tests to be carried out. The control console is also fully interlocked and has oxygen depletion sensors to control any gas leakages. Haskel's dedication to safety is aimed at eradicating hazards such as chemical injection type injuries or lacerations from loose hoses.

David Angus, Haskel's QHSE Manager at the Sunderland test facility, provided his knowledge on high-pressure testing to help author this eBook.

About Haskel

With over 70 years of unrivaled expertise in high-pressure, liquid and gas transfer and pressurization technology, Haskel is the solution provider for applications in aviation, defense and aerospace, oil and gas and other critical industries. Haskel meets complex and critical challenges with innovative solutions that ensure safety, reliability and the highest quality. As the clear market leader in high-pressure pumps, Haskel products are made to fit customer needs and market demands. Whether working in oil and gas, automotive and defense or extracting cannabis oil in the emerging medical market, every Haskel product provides the performance that is expected from a global leader.

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