



SAFETY NEWSLETTER

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EUROPEAN INDUSTRIAL GASES ASSOCIATION

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The purpose of this NEWSLETTER is to help EIGA Companies to improve their Safety Performance.

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Safe design and recommendations

The facts

A pallet was lifted onto a catwalk on a movable crane. A person wanted to lift the gate arm away to get access to the cylinders. The gate arm was not fixed and the operator dropped it, and it fell 13.5 m down and hit another person, who was wearing a safety helmet and safety shoes. The person received concussion of the brain and was out of work for approx. 1 week.

The report to SAG has caused that SAG informs all companies of EIGA about some (basic) rules concerning pallets/baskets.

Message to the owner and/or user

Introduction

This note does not apply to pallets which are used in extreme environmental or operational conditions as e.g. equipment used in the offshore industries.

A pallet is a portable assembly which is designed for being routinely lifted with a forklift truck and in some situations by a crane as well.

Due to its size, weight and working environment, a pallet may be subject to rough handling in the course of routine operations.

Therefore, it is recommended to follow safe design and manufacturing basis rules as detailed below :

1. All parts must be fixed to pallet frame. No part including straps shall be removable. A pallet shall be regarded as hoisting accessories and must be designed and dimensioned for the total weight it will carry (See also item 6, if the pallet is equipped with lifting eyes).

2. The frame shall retain securely all the components in the pallet and shall protect them from damage which may be caused by horizontal and vertical impact loads, handling loads or vibrations which are experienced in normal operation. Generally – all weldings on the frame have to be continuous.
3. The front bar must be locked in closed (horizontal) position. The front bar must be secured against falling down in opened (vertical) position. One good design is when the front bar in the opened position is dropped down into the frame pillar (like a telescope).
4. The bottom of the pallet is normally a bar grating. For stability of the cylinders the bar must be plane, rigid and withstand the rough handling. In order to prevent damage by the fork it is useful to have guard plates below the bar grating. Poor condition of the bottom of the pallet is common reason for cylinder falling unintendedly.
5. At all four sides the pallet must have closed ducts for the fork. This means that the ducts shall be closed on their lower side (bottom), and the pallet cannot tip down from the fork. The forks of the truck shall be positioned symmetrically about the centre of gravity of the pallet and their size shall be appropriate to the pockets of the pallet. The forks shall be designed such that the pallet cannot accidentally disengage from the forks.
6. If the pallet is equipped with 2 lifting eyes, it is recommended that one eye shall be strong enough to carry the total weight of the pallet and similar if the pallet is equipped with four lifting eyes it is recommended that two lifting eyes shall be strong enough to carry the total weight of pallet.
7. The breech lock on the front bar must be locked in closed position so that it cannot open inadvertently during transport.

8. There should be a clamping band/strap for tightening the cylinders inside the pallet which among other things reduces noise during transport. The clamping band should be vertically adjustable in order to accommodate small or large cylinders. The strap needs to be fastened to the pallet at least on the rear side at different heights in order to accommodate any regular size of cylinders.
9. If pallets are intended to be stacked up there shall be provisions in the design to ensure that their positions are correct and that the pallets withstand the extra load.

Key operating instructions

- ☞ Pallets need to be inspected before loading.
- ☞ Pallets which are exhibiting defects must be taken out of operations and repaired or scrapped.
- ☞ Prior to unloading a pallet and opening the front gate/bar, the strap must be loosened a bit and a cylinder must be moved in order to release possible instability of cylinders inside the pallet.
- ☞ The highest safety during loading/unloading of pallets is always obtained and **only** when the pallets are placed horizontally on a plane and stable base.

Safety critical instruments

For decades we have in the gas industry a trend to reduce the number of persons at the production sites, thus achieving increased productivity. The change implies that the safe and reliable operation of the plants will be increasingly dependent on accurate monitoring and controlling instruments and their proper use. At the SAG meetings there have been reported some incidents where one of the causes has been identified as related to the use of instruments.

One accident occurred at an electrolytic hydrogen plant with oxygen recovery where an explosion seriously damaged the plant. The investigation revealed two causes related to the instruments.

Firstly, one temperature monitoring and tripping instrument on the purifier vessel was wrongly

installed since start up many years ago. Secondly, there had been for some weeks an operating problem with another safety critical instrument. But the site management decided incorrectly to rely on a third instrument to monitor that the process was running as intended. This was not according to the established operational procedures but done in the spirit of maintaining production and believing that they still have an appropriate safety level. Nevertheless, the explosion in the oxygen gas holder revealed clearly the risk of violating the stated procedures.

The second accident also resulted in significant damage to plant equipment when the critical safety interlocks were overridden to allow the plant to continue operating. In this case local adverse weather conditions (thunderstorm) were causing transitory interruptions to the plant by tripping the oxygen monitors on a purifier vessel. To maintain continuity of operation the monitors were bypassed temporarily during the period of the thunderstorm. Unfortunately, during this period the plant ran off purity and since there were no oxygen alarms operating, high oxygen levels were allowed into the purifier causing an increase in temperature and damage to the vessel.

A combination of incorrect design and an inadequate review of the proposed change led to the circumstances in which the incident occurred.

Some lessons learned are:

- ☞ During the design of a plant there should be procedures in place to ensure that appropriate risk assessments are carried out.
- ☞ The risk assessments should be revised if the design or equipment is altered.
- ☞ Start up reviews are essential to ensure that the plant is built and equipped as designed and that all decided changes at meetings, reviews, risk assessments, etc. have been implemented.
- ☞ All instruments and other safety critical equipment shall systematically be calibrated and maintained as required.
- ☞ All managers and the personnel must respect and comply with the standard operation and maintenance procedures.

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