

## LTI as a result of a load dropped from lifting magnet

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A load dropped from a permanent lifting magnet hit a person's hand resulting in an LTI.

### What happened?

Polished metal elements had to be lifted a few centimetres with a permanent lifting magnet, in order to put supports underneath it. This task had taken place without mishap around one hundred times when the load dropped without warning.

The injured person had performed this operation around ten times. He knew about the need for a protective layer and used packing paper as advised by his colleagues. At a certain point, however, with no specific reasons he could recall afterwards, rather than use paper packing material (of thickness 0.1 mm) he instead used foil packing material (of thickness between 1.5 and 2.0 mm.)

As the polished element load was lifted, he reached over it to remove some packing material. By chance one of his hands was under the load when it dropped. The load hit his hand, causing an LTI.

### The protective layer

To avoid any damage to a polished metal piece being lifted by a magnet, a protective layer is placed between the magnet & the polished surface. Typically, this can be a piece of paper.

### Magnet holding capacity and the "air gap"

The holding capacity of a lifting magnet depends on the full and uninterrupted operation of the magnetic field. For that purpose the lifted object should have a minimum thickness, and any non-magnetic separation between a magnet's lifting surface and the load, called the 'air gap', reduces the holding power.

This so-called 'air gap' can be anything including scale or paint or the "protective layer".

### What were the causes?

- There was insufficient technical understanding of the magnetic lifting system and its requirements.
- There were undocumented "common practices" in use by experienced crew

#### IOGP Life Saving Rules:



Line of fire



Safe mechanical lifting

that were not completely understood by all.

- The criticality of the 'air gap' was not addressed in any JSAs and toolbox talks.
- The injured person had not realised the criticality of the 'air gap' when he used thick foil instead of thin paper.
- The work instruction was not detailed or specific enough. There was no specific information on:
  - operator instructions pertaining to the selected magnet
  - the reason for the protective layer
  - exactly what the protective material should be and how thick – merely that it should be "cloth"
  - the importance of the 'air gap' and its effect on the holding capacity of the lifting magnet.
- Nobody had challenged the work instruction and crew had continued with what they considered to be a common practice: use a piece of paper.

Load tests after the incident revealed that using this thicker foil instead of thin paper reduced the magnet's lifting capacity to such a degree that there was no safety margin left. As a result, the load had been lifted just a few centimetres when it dropped.

## What lessons were learned?

Our Member notes that permanent lifting magnets are proven reliable lifting appliances but with known and well documented limitations. Care should be taken to ensure that:

- Information is fully circulated – from operator's manuals, lifting plans, work instructions, risk assessments etc. – to all persons involved in the use of such equipment.
- Full understanding – all persons involved should fully understand the limitations and precautions to be taken, including any limitations, for example minimum thickness of the load or the effect of any 'air gap'.
- Knowledge is fully shared with respect to undocumented "common practices" that may be known to experienced persons, but not others.

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