



Mines Safety Significant Incident Report No. 167

Failure of the rope guide on a Demag overhead travelling crane

Summary of incident

The metal rope guide on the hoist winch (Figure 1) of a three-tonne auxiliary hoist overhead travelling crane (Demag model P416H22L) broke apart while the crane was being set up for a task. A section of the guide weighing about 7 kg fell 23 metres, narrowly missing an employee who had been rigging up for the lift task (Figure 2). Another 2 kg section slid down the rope to rest on the hook sheave (Figure 3), while a third section weighing about a kilogram was found in plant adjacent to the overhead crane lifting bay.



Figure 1 Undamaged metal rope guide on the hoist winch of a Demag crane model P416H22L



Figure 2 Final resting position of 7 kg section of rope guide and location of the employee involved in the near-miss incident



Figure 3 Section of rope guide resting on hook sheave after incident

Probable causes

It appears that there had been a severe side loading or impact event, or both, before the incident involving the rope guide. Evidence included:

- kinking of the wire rope (Figure 4);
- shavings from the rope guide as it wore on the host drum (Figure 5); and
- wire rope impact marks on the rope guide (Figure 6).



Figure 4 Kink in wire rope



Figure 5 Rope guide shavings



Figure 6 Wire rope imprint

This event, or events, had not been reported or communicated to a responsible person. There was no control in place regarding who could use the crane and it is uncertain if the person or people who caused the original damage were:

- competent to use the crane; and
- aware of the potential consequences of such damage.

A pre-start inspection had been performed but it would have been difficult, given the environment (i.e. poor lighting) and location (at height), to determine if the hoist drum was fit for use.

It also appears that this type of incident is known to occur for this type of rope guide but neither the original equipment manufacturer (OEM) nor supplier had been advised of past events, and therefore no safety alert regarding the possibility of equipment failure had been issued.

Action required

- Metal rope guides are common on all Demag overhead travelling crane models that are identified by a "P" prefix, which indicates pre-1985 manufacture. For such cranes, contact the OEM for recommendations on replacement components, fitting or installation procedures, inspection and maintenance requirements, operating instructions and limitations on the crane's use.

Note: After 1985, the hoist drums should be fitted with a plastic rope guide. There is currently no retrofit available to replace metal rope guides with the plastic versions.

- When working with Demag model "P" hoists, be aware that the tolerance angles for vertical lifts are set as:
 - 5° sideways (i.e. parallel to the drum)
 - 15° perpendicular to the drum.
- Ensure the hook block is at its uppermost position when manoeuvring overhead travelling or gantry cranes.
- Maintain a controlled work zone when using overhead travelling or gantry cranes (e.g. marking off or barricade the area to restrict access).
- Ensure appropriate personal protective equipment (PPE) is worn by all personnel in or near the overhead crane lifting bay.
- Ensure there is no rigging equipment (e.g. chain sets, slings) left on hooks when overhead travelling or gantry cranes when they are not in use.
- Consider using a logbook to record usage and ensure only authorised and competent operators are using the crane.
- Ensure appropriate systems are in place to satisfy regulatory reporting requirements and record incidents involving cranes.
- Advise the OEM or supplier about equipment failures so that incident trends can be identified and safety alerts issued to raise industry awareness.



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