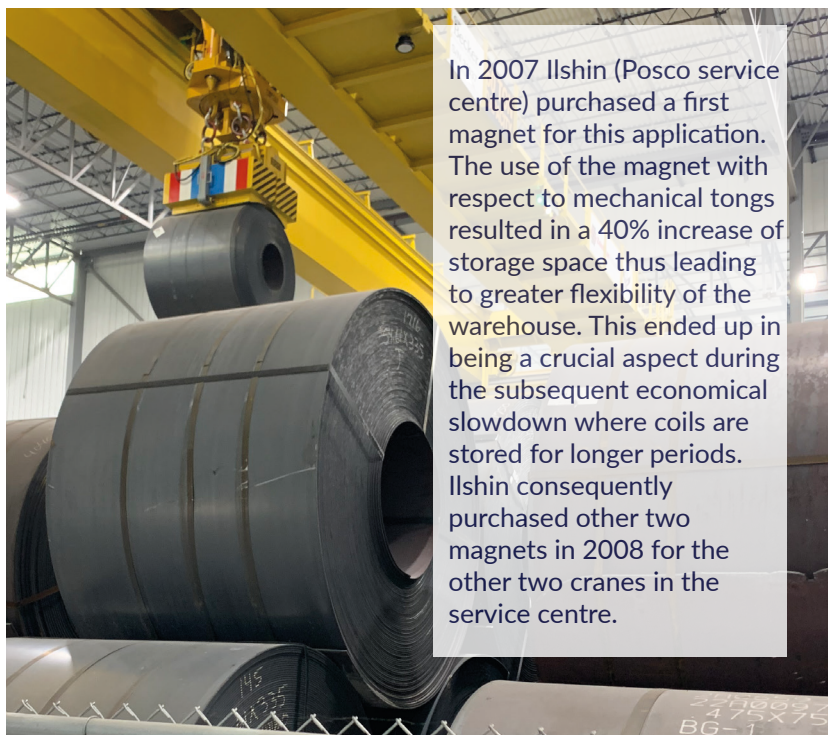


ELECTRO LIFTING MAGNETS

Eye Horizontal Coils



In 2007 Ilshin (Posco service centre) purchased a first magnet for this application. The use of the magnet with respect to mechanical tongs resulted in a 40% increase of storage space thus leading to greater flexibility of the warehouse. This ended up in being a crucial aspect during the subsequent economical slowdown where coils are stored for longer periods. Ilshin consequently purchased other two magnets in 2008 for the other two cranes in the service centre.

The SGM magnetic system features an exclusive proprietary safety device (CDMD) specifically developed to monitor the two main critical elements that characterise this application:

- possible vertical flexing of the coil turns while lifted in the air by a magnet;
- proper contact condition between magnet polarities and coil, especially in presence of strap closing clips, last turn position of high gauge sheets, abnormal packaging thickness.

SOME REFERENCES

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SAFETY

SGM Patent: SGM has a patent pending for a system where magnet pole shoes are motorized (sliding pole shoes) in order to adjust their distance to always benefit the coil outside diameter.

This results in an always optimum contact condition between the pole shoes and the coil outside diameter. Consequently, the weight and overall size of the magnet can be reduced.

Possible vertical flexing of the coil: Coils, especially when hot rolled and of a certain gauge, can present the risk of a "yoyo" effect when lifted in the air if not compactly wound. Magnets are sized and designed to take care of the gravity force applied to coils (their weight) but in case of vertical flexing, additional forces have a direct negative impact on the lifting safety margin of the magnet.

The SGM patent pending CDMD (coil dynamicities measuring device) monitors and verifies the compactness of the coil in the very first few seconds of the lift, allowing the operator to stop proceeding with a risky lift or to take adequate care. Possible airgap exceeding specifications: The SGM patent pending safety device CDMD monitors and verifies the contact condition between the coil and the magnet pole shoes before each manoeuvre.

Consequently it is possible to see whether the minimum safety factor coefficient of the magnet on the load during transportation is met.

In this way it is possible to detect potentially dangerous situations, such as the coil tail under the magnet pole shoes, strap closing clips under the magnet pole shoes or higher coil temperatures to the ones in customer's specifications. Should the safety factor coefficient not be respected, then the crane travel motions will be stopped and the operator must restart the lift.

The SGM electronic magnet control system also includes a series of devices which optimise safety by continuous monitoring during operation: magnet internal temperature; proper condition of power cable to the magnet (with the possibility of providing double cable path to magnet), magnet winding electrical resistance, magnet electrical insulation to ground and the automatic check of the proper functioning of the magnet emergency battery back-up system. With respect to the use of mechanical tongs, the handling of coils with magnets can be carried out by a single operator from the crane cabin, from the ground at a distance from the coils or from the control system of a fully integrated automated storage system.

PRODUCTIVITY

Optimisation of storage area on floor surface with possibility of using up to 90% with respect to the 40-60% achieved by mechanical tongs.

Approach and contact with coil can be controlled a lot better than with mechanical tongs allowing for a drastic decrease of typical damages to finished product coils provoked by tongs. No more need for cutting off damaged tails and customers receive the exact coil length they requested.

Thanks to the SGM voltage forcing device (a special device which consists in powering the magnet with an over-voltage for a few seconds so as to significantly shorten the time current takes to reach the rated value), the time magnet requires to grip and to release a coil is reduced to just a few seconds.

USER FRIENDLY

Unlike mechanical tongs, SGM electromagnets do not require particular maintenance as there are no moving parts inside the magnet. The use of anodized aluminium (aluminium strip chemically transformed on its outer surface into an insulation material able to withstand temperatures beyond the melting point of the aluminium itself) as an electrical conductor and specific resins provides the SGM magnets with outstanding heat dissipation capacity that makes them extremely performing for high duty cycle and/or high temperature applications. The continuous monitoring of magnet internal temperature allows operator to be informed of any critical thermal situation for the proper functioning and integrity of the magnets.

The SGM magnets can be supplied with a rotating device for

+90/-180 rotation.

Unlike mechanical tongs, the SGM magnets do not have sensors which can easily break or motorized parts with the risk of oil leakages on finished product coils.

SGM magnet control system able to work in local or remote mode with simple transfer of data and interface with other systems (diagnostics).

