

## Safety recommendations for handling spring back sensitive coils

### Introduction

Coil handling practices must take into consideration the fact that all steel coils exhibit some degree of spring back effect, i.e. the coiled material has the tendency to return to its (almost) flat state and as such the coil will unwind if it is not restrained in some way. The unpacking of steel coils is therefore a potentially dangerous operation and operators must follow safe unpacking and handling procedures.

Material identified as 'spring back' must be handled with extreme care. Failing to do so may lead to physical injuries caused by the unraveling of the coil tail during handling or when one or more straps are cut.

### Definition of spring back

The level of the hazard from a coil is proportionate to the energy that is built-up in the outer laps of the coil during coiling. The higher the yield strength ( $R_p$ ) of the product, the greater the energy in the coil tail. The risk increases with: increasing thickness; increased width; reduced coil diameter; and also surface coating. Spring back sensitive material can also be produced by certain processes in the production route, for instance by cold forming and rewinding.

### The hazards of spring back material

When this energy within a spring back coil is released, it results in the outer lap of the coil springing back over and around the coil and hitting anything in its way with potentially extreme force. If the coil is suspended when this happens the outer laps can unwind in a similar way to a watch spring.

### How to identify spring back coils

Tata Steel Europe is applying labels to identify coils that exhibit spring back characteristics (see Figure 1).

The QR code on this label leads to a website where the latest version of this document and the latest information regarding spring coils can be found in several languages.



Figure 1 Spring back warning label

## Preventing hazardous situations

Never stand in-line with the (un)winding direction of the coil during handling (see Figure 3). Never handle or transport coils when the number of straps is less than mentioned on the label<sup>1</sup> (see Figure



Figure 3 banding should never be removed from a coil suspended from an overhead crane or forklift.

2). Missing bands should be replaced before the coil is handled/transported further. Before the coil is unpacked or bands are removed, replaced or added, it must be positioned so that the coil is sitting on the tail.



Figure 2 Customer label with spring back indication and the minimum number of circumferential and bore bands on the naked coil. This coil requires 3 circumferential bands (3B) and 3 bore bands (3H). For cold wound material only the minimum number of circumferential bands is indicated.

## Coil positioning

To prevent spring back of the coil tail or unwinding of the coil, the coil tail must be placed under the coil at around 7 o'clock  $\pm\frac{1}{2}$  hour (see Figure 4). To identify the position of the coil tail at fully packaged coils, a 'This way up' label is applied on the packaging material (see Figure 5). If this is not the case, the coil must be re-adjusted to a safe position and rotated on suitable equipment such as a mandrel or positioning rolls.

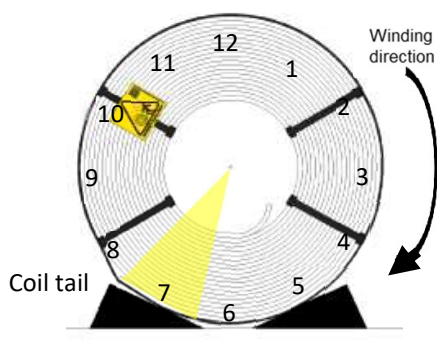


Figure 4 Coil tail under the coil at around 7 o'clock ( $\pm\frac{1}{2}$  hour)

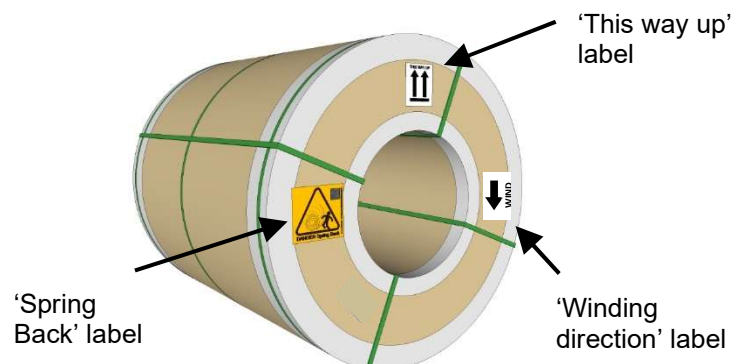


Figure 5 Fully packaged coil with 'Spring Back', 'This way up' and 'Winding Direction' labels.

## Personal Protective Equipment

For safety reasons the operator unpacking the coil must take suitable measures and wear proper personal protective equipment in line with local regulations (e.g. helmet, cut protective gloves, safety goggles or visor, safety shoes and proper working clothes).

## Unpacking the coil

When unpacking the coil, it should be resting on appropriate rolls, stands or unpacking pins. Removal of banding part of the package should never be undertaken from a coil suspended from an overhead crane or forklift (see Figure 3).

After removal of the packaging material the coil should be checked on the presence of the required number of circumferential (B) bands on the naked coil, which are shown on the coil label. The coil should not be moved if any of the required bands is missing or of poor quality.

<sup>1</sup> At this moment the number of required bands are not yet fully available on all coil labels, this will further grow over time.

## Banding removal

Removal of the banding from the naked coil should be undertaken with the coil resting on appropriate rolls, stands or unpacking pins, with the coil weight on its tail. This banding should never be removed from a coil suspended from an overhead crane or forklift (see Figure 3).

Bore bands (H) should be removed before removing the circumferential (B) bands whilst bore bands have less capacity of holding the coil energy.

Circumferential bands must not be removed until the coil is safely resting in the correct position on the decoiling installation.

If banding is to be removed manually, the outer straps should be cut last and from a position that does not place the operator directly in line with the (un)winding direction of the tail end. Do not stand in-line with the (un)winding direction of the tail end; the coil may act as a spiral (watch) spring (see Figure 6).

Appropriate tools such as shears designed for cutting bands must be used.

All bands on the delivered coil should be present during transport. Coils should never be moved after removing circumferential bands.

When partial de-coiling takes place, the safety banding must be restored, respecting number, position and bandtype. Note that when the diameter decreases, the number of bands may need to be increased. Your Tata Steel Europe technical contact is able to advise on the number of bands required in these specific situations.

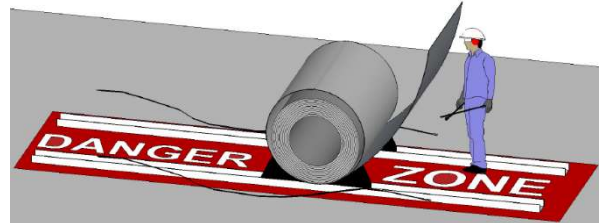


Figure 6 When removing the bands do not stand in-line with the (un)winding direction of the tail end; the coil may act as a spiral (watch) spring.

## Returning coils

Before coils are to be returned to Tata Steel Europe please contact your Tata Steel Europe technical contact who is able to advise on the number of bands required in these specific situations must have the same number and band strength as at delivery. If different strapping is used then a calculation must be done to determine the number of straps needed to secure the coil, for example one strap with a breaking strength of 23,5KN can be replaced by 2 straps with a breaking strength of 12KN or 3 of 8KN. Always use strapping joints that are rated to at least 70% of the tensile strength of the band. Note that when the diameter decreases, the number of bands may need to be increased.

In addition, spring back sensitive material must carry a clear spring back indication on the coil.

## Further questions

For questions or remarks, please contact your usual Tata Steel Europe technical contact.

This document is available on the website [www.tatasteeleurope.com/springbacksafety](http://www.tatasteeleurope.com/springbacksafety)

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