

Track Work Instruction 2P034

How to change a steel sleeper

Introduction

This Track Work Instruction covers the removal and replacement of a steel sleeper.

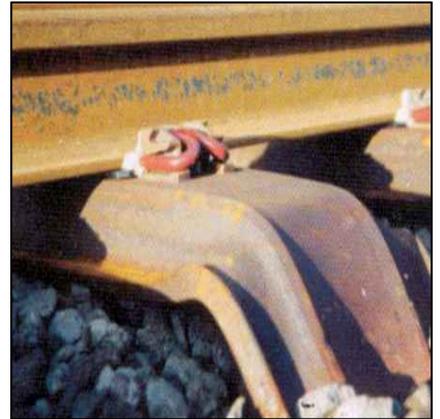
Steel sleepers should not be replaced by concrete or timber, as this leads to maintenance problems, both top and alignment.

See also separate instructions:

TWI 3P036 How to re-rail CWR

TWI 2P036 How to change a timber sleeper

TWI 2P043 How to change concrete sleeper



Competence

You must be competent to carry out this work.
See TWI 2G086 - Competence requirements.

Risks

Manual packing of steel sleepers is very difficult. It takes a long time before full compaction is achieved. Without full compaction it is likely that the track will deteriorate leading to very poor top and subsequently in to cyclic top.

Shovel packing is impossible. Sleepers must be 'kango' packed.



Tools and Equipment

Cross level
Thermometer

Shovels
Ballast forks

Bars
Jacks

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Materials and Spares

Pads	Clips
Insulators	Ballast

Just in case

Tie bars	Spare sleeper
Sleeper lifters	Timber dogs (nips)

Method

Caution! You must not start work if the rail temperature is greater than either 32°C (or the Critical Rail Temperature CRT (W) if less than 32°C), or if the rail temperature is forecast to exceed 38°C within the next three days.

Work must be stopped if the rail temperature rises above either 32°C (or the CRT (W) if less than 32°C). The track must be fully ballasted and the temperatures checked for three days following.

Do not attempt to start work if the rail temperature is likely to drop below 0°C.

There are three ways of removing and replacing a steel sleeper.

1. Barring out the rails and lifting the sleeper out complete. This is the preferred method if there are a number of sleepers to change. However, since most steel sleepers track is CWR, it will require the rails to be cut in order to provide sufficient gap for the sleepers to be lifted out.

2. Leaving the rails undisturbed and cutting the sleeper up into three or four pieces.

Note! This method is not recommended if there are a number of consecutive sleepers to change.

3. Excavating the crib next to the sleeper so that the sleeper can be rolled over and pulled through. This method causes extensive disturbance of the ballast and is not a preferred method.

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Method continued

Method 1. Barring out the rails and lifting the sleeper out complete.

In CWR, cut in to the rail close to where the sleeper/s are to be replaced, but at least 4.5m from the nearest weld

Undo the fastenings and release the rails from the sleepers.

Bar the rails clear of the sleeper ends.

Clear any ballast off the sleeper and put well clear of the sleeper bed.

Pull back the ballast from the sides of the sleeper to prevent it from falling in to the sleeper bed.

Carefully prise the sleeper up off its bed and set aside.

Carefully clear away any stone that falls onto the sleeper bed.

Note! Take care! The idea is to try and disturb the existing sleeper bed as little as possible. By doing this the track bed will be retained and the new sleeper will settle down quickly causing the least amount of problems in the future.

Carefully lower the new sleeper into position taking care not to disturb the sleeper bed.

Reposition the rails and fasten down using new pads and insulators.

Note! When fastening down take extra care to ensure that the pads and insulators are positioned correctly. A serious problem with steel sleepers track is track circuit failure due to incorrectly placed pads and insulators.

Stress and weld the rails.

Backfill and pack making sure you do not over lift the track.

Re-profile any disturbed ballast shoulder.

Monitor the track.

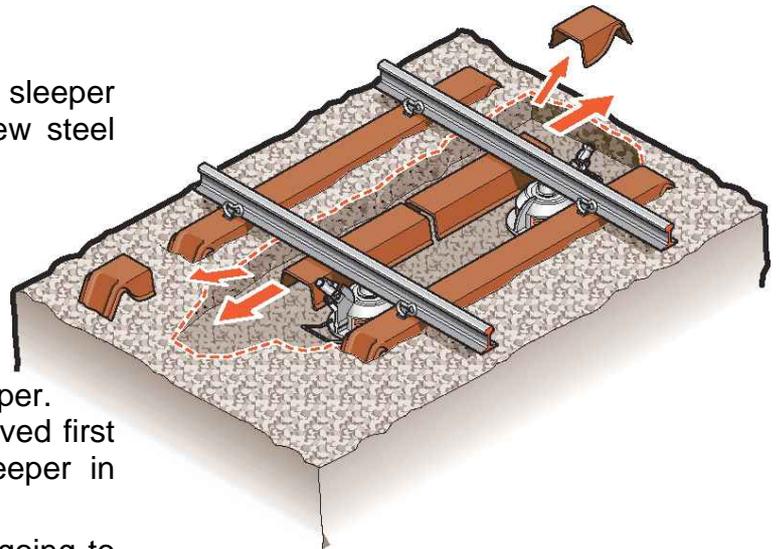
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Method continued

Method 2. Leaving the rails undisturbed and cutting the sleeper up into three or four pieces.

The new sleeper should be a wooden sleeper because of the difficulty in getting a new steel sleeper in to position.



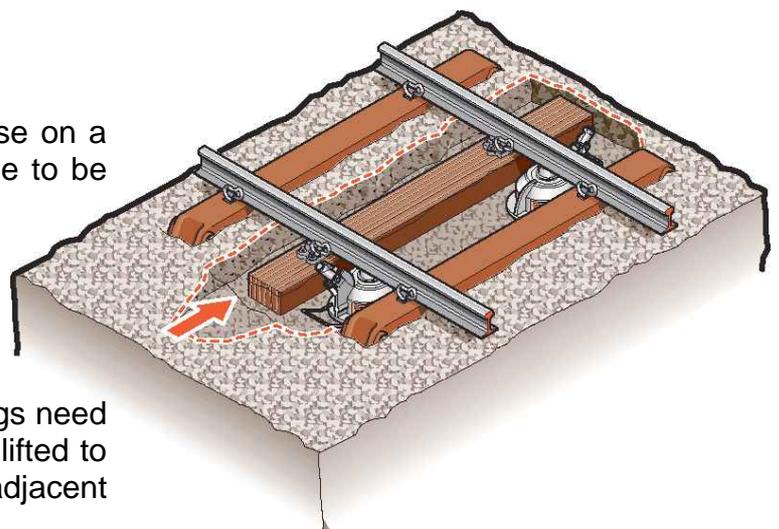
Clear ballast from the sleeper.

Mark where you are going to cut the sleeper.
(It is easiest if the spade ends are removed first and then cut the remainder of the sleeper in half).

Clear ballast away from where you are going to cut.

Using burning gear cut up the sleeper.

Remove the rail fastenings including those on a number of sleepers either side of the one to be replaced.



Note! A sufficient number of rail fastenings need to be unfastened so that when the rail is lifted to remove the existing sleeper none of the adjacent sleepers are lifted out of their beds.

Jack up the rail just enough to clear the housings and pull out the remains of the sleeper.

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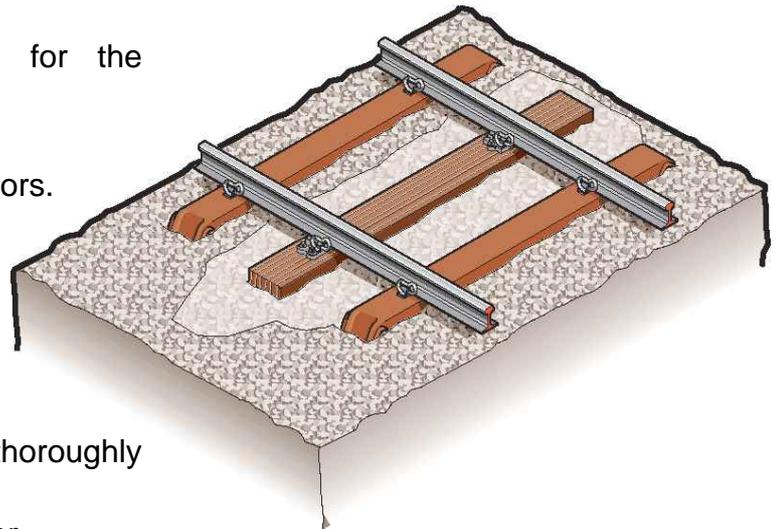
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Method continued

Excavate the bed to make room for the replacement wooden sleeper.

Slide in the new sleeper.

Refasten all the track using new insulators.



Pack the replacement sleeper thoroughly ensuring you do not overlift the track.

Re-profile any disturbed ballast shoulder.

Monitor the track.

Method 3. Excavating in the crib next to the sleeper enough so that the sleeper can be rolled over and pulled through.

The new sleeper can be either steel or wood.

Excavate in the crib and shoulders next to the sleeper to be removed. You will also need to excavate some of the bed as well.

Excavate the shoulders of the sleeper to be removed right down to below the spade end level.

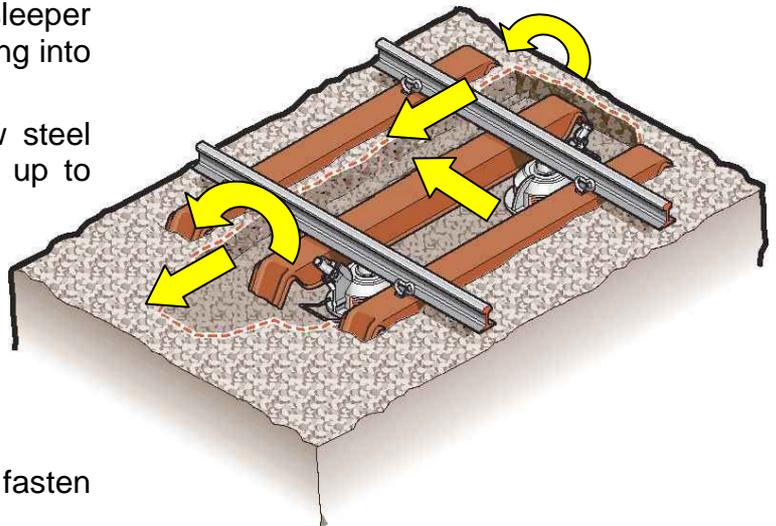
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Method continued

Unclip the sleeper and roll it into the excavation. (You may have to roll the sleeper over to prevent the spade end from digging into the ballast).

Pull out the old sleeper. Thread a new steel sleeper into the excavation and offer it up to the rail.



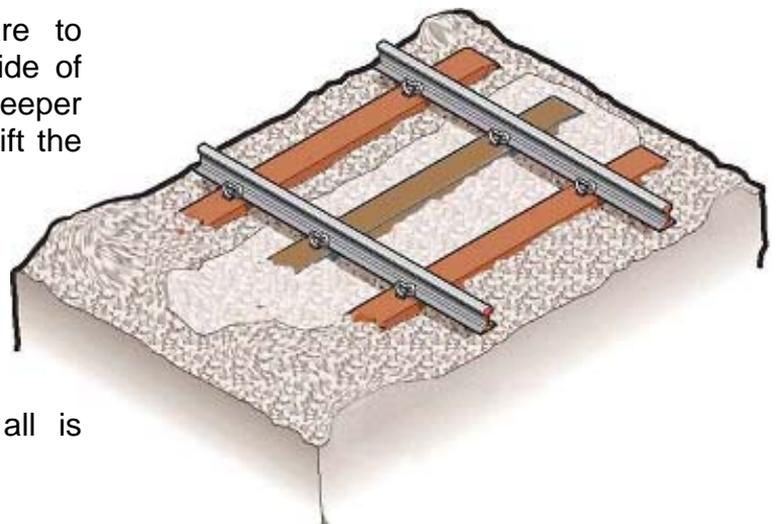
Slide the new sleeper along the rail and fasten it up using new pads and insulators.

Replace the ballast. Take great care to compact the ballast under and to the side of the new sleeper - especially if a steel sleeper has been used. Ensure you do not overlift the track.

Re-profile any disturbed ballast shoulder.

Watch the track under traffic and continue packing until movement stops.

Revisit the site daily and pack until all is secure.



Before you leave the site

Site Clearance

Clear all scrap.

Box in to the correct ballast profile.

Is the replacement sleeper well compacted?

Are all pads and insulators properly fitted?