Track Work Information Sheet 2P036
How to change a plain wooden sleeper by hand

Introduction

This task covers the replacement of wooden sleepers in all categories of track. It includes the replacement of any chairs, baseplates, clips and pads. For gauge correction see TWI 2G064.

Overview

Possible reasons a sleeper may need changing are:

- Wooden sleeper is rotten
- Wooden sleeper is split
- Excessive chair shuffle
- Inability of wooden sleeper to hold the fastenings

Risks & control measures

This TWI does not include any generic safety or risk information although it does detail some relevant cautions. Risk control measures are detailed in the relevant Work Activity Risk Assessment or Risk Control Sheet and must be implemented as required.

Competence

The site supervisor of this activity must be authorised and competent to deliver this safety critical task.

Critical Rail Temperature

You must not start work if:

- The rail temperature is greater than 32ºC
- The rail temperature is greater than the Critical Rail Temperature (CRT (W)) if less than 32ºC
- The rail temperature is forecast to exceed 38ºC within the next three days

Work must be stopped if the rail temperature rises above either 32ºC (or the CRT (W) if less than 32ºC). The track must be fully ballasted and the temperatures monitored for three days following. If temperatures exceed the CRT (W), protective action against buckles shall be taken.

If the temperature starts to rise rapidly towards 32°C or the CRT then report back immediately. Be prepared to apply an emergency speed restriction (especially if there is insufficient ballast), stop lifting and box in.

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

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General delivery information

- Red zone working shall only be undertaken at line speeds of less than 60mph.
- If changing sleepers red zone, no more than two sleepers can be moved or removed at one time in any 9m length. A minimum of three sleepers must remain in position either side of the sleeper being moved or removed. Ballast must not be removed from more than six consecutive cribs, although alternate cribs may be dug out in advance. The ballast shoulder may also be removed provided the line is blocked to traffic.
- Replacement sleepers in existing track must be of a similar material and design to those being replaced.
- Track gauge must be checked as follows: as the task is being scoped; before the sleepers are removed; after the sleepers are replaced. Gauge must be maintained as original.
- Extra time must be allowed if lateral resistance plates, conductor rail pots or other equipment have to be removed and replaced as part of the same shift.
- A minimum of 4 staff are required to lift wooden sleepers.
- If more than 9 sleepers are to be changed it may be more cost effective to use the RRV mounted sleeper changing and tamping attachment. This process also allows for new sleepers to be brought to site and scrap removed on the RRV trailer.

Planning and productivity

- Standard job ref – 009091
- MNT code - 003
- Norm time per sleeper – 3.25 hours
- Standardised Norm time per person per sleeper – 1.66 hours
- Labour Requirements – 4 staff

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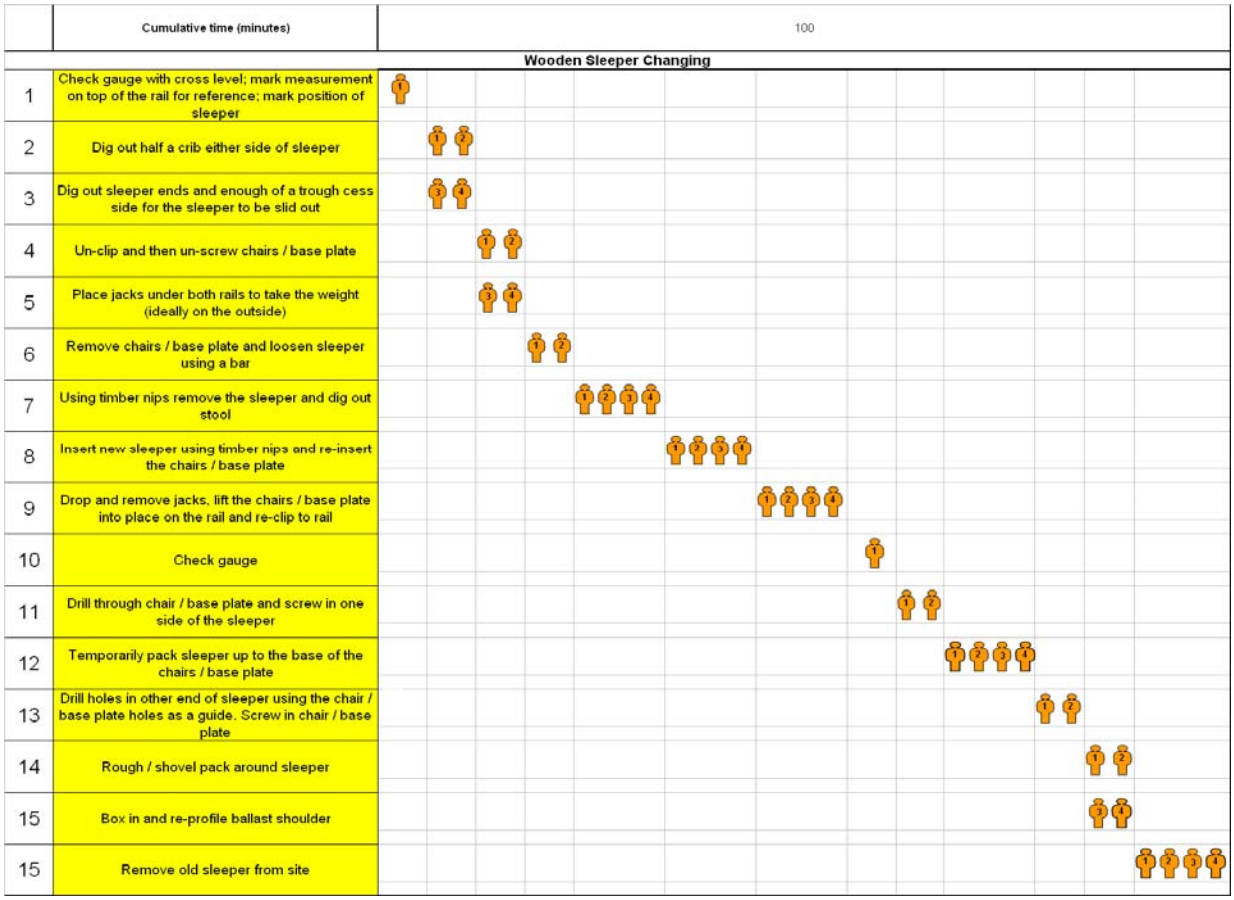
Delivery process for changing 1 sleeper



Tools, plant and equipment that may be required

Tools	***Number***
Cross level gauge	1
Chalk or crayon	As required
Ballast shovels, forks and picks	As required
Rail thermometer	1
Timber nips	1
Bars	2
Appropriate tool for removing and replacing fastenings	As required
Pan lifter	1
Jacks	2
Angle grinder with cutting disk	1 (Through bolts only)
Materials	
Keys or clips, ferrules, pads & insulators	New for each sleeper
Sleepers	New for each sleeper
14mm MSP chippings	As required

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How to change a single wooden sleeper with screw or spike chair fixings and clearance to slide sleeper out of bed

1. Check rail temperature and track gauge. Mark the position of the sleeper(s) to be changed.
2. Dig out half a crib on one side and a full crib on the other side of the sleeper to be changed, to a depth of 2-5cm below the sleeper base. Dig out the sleeper ends and enough of a trough cess side for the sleeper to slide out.
3. Unclip the chairs from the sleeper to be changed and one sleeper either side. Remove the chair screws or spikes from the sleeper to be changed.
4. Place jacks under both rails in the dug out area and jack up the rails 2-3cm. Ideally, place the jacks on the outside edge of the rail foot.

Remove chairs.

5. Using a bar, loosen the sleeper for removal and slide into the dug out crib. Using timber nips, drag the sleeper out through the cess trough taking care not to disturb the stool.
6. Where possible, lay a new sleeper on an existing consolidated stool. However, each stool should be assessed in turn and removed if necessary.
7. A stool should only be loosened to accommodate a slightly deeper sleeper.

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8. Insert the new sleeper. Attach chairs to the rail and align to original markings. Replace the pad if necessary. If spikes were previously used fit a “PAN 11” baseplate as this will offer a more secure method of fixing to the rail.
9. Using a bar, position the sleeper, lower the rail and remove the jacks.
10. Rough pack the sleeper so that drilling to the correct depth for the new screw will be easily achieved.

11. Using the chair as a template, drill through the outside hole of the chair and remove any wood chippings with a pad scraper. After fitting new ferrules insert an “AS” screw and tighten. Drill the other two holes, insert the other “AS” screws and tighten with an impact wrench till the chair is flush with the sleeper. **Note: Do not squash the ferrules.**

Ferrules are designed to be inserted into the holes in chairs or baseplates such that the top of the ferrule is 6mm (1/4") above the upper surface of the chair or baseplate. Full contact must be made between the under side of the head of the screw and the ferrule. The screw must not make contact with the chair or the baseplate.

12. Repeat the process on the other chair.
13. Check gauge and top and amend as required. Pack the sleeper, then fill in the cribs and re-profile the ballast.

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How to change a single wooden sleeper with through bolts and clearance to slide sleeper out of bed

1. Check rail temperature and track gauge. Mark the position of the sleepers to be changed.
2. Dig out the crib on one side of the sleeper to a depth of 6cm below the sleeper base. This is to allow for the head of the through bolt to pass under the sleeper.
3. Dig out the sleeper ends and enough of a trough cess side for the sleeper to slide out.

4. Unclip the baseplate from the sleeper to be changed and one sleeper either side. Remove the chair fixing nuts from the sleeper to be changed.
5. Cut off the protruding part of the thread flush with the top of the chair. Spinning or seized nuts will also need to be cut off.

Try to avoid damaging the baseplate / chair when cutting, see above pictures.

6. Use a drift / steel spike to knock the cut down bolts through the chairs so they are level with the top of the sleeper. This is done to allow the chair to be removed easily.

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7. Place jacks under both rails in the dug out area and jack up the rails 2-3cm. Ideally, place the jacks on the outside edge of the rail foot. Remove chairs.
8. Using a bar, loosen the sleeper for removal and slide into the dug out crib. Using timber nips, drag the sleeper out through the cess trough taking care not to disturb the stool.

9. Where possible, lay a new sleeper on an existing consolidated stool. However, each stool should be assessed in turn and removed if necessary. A stool should only be loosened to accommodate a slightly deeper sleeper.
10. Insert the new sleeper and attach the baseplate to the rail by aligning to original markings. Replace the pad if necessary.
11. Using a bar position the sleeper, lower the rail and remove the jacks.
12. Rough pack the sleeper so that drilling to the correct depth for the new screw will be easily achieved.

13. Using the chair as a template, drill through the outside hole of the chair and remove any wood chippings with a pad scraper. After fitting new ferrules insert an “AS” screw and tighten. Drill the other two holes and insert “AS” screws and tighten with an impact wrench till the chair is flush with the sleeper. **Note: Do not squash the ferrules.**

Ferrules are designed to be inserted into the holes in chairs or baseplates such that the top of the ferrule is 6mm (1/4") above the upper surface of the chair or baseplate. Full contact must be made between the under side of the head of the screw and the ferrule. The screw must not make contact with the chair or the baseplate.

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14. It is good practice to replace through bolted chairs with AS bolted chairs.
15. Check gauge and top and amend as required. Pack the sleeper, then fill in the cribs and re-profile the ballast.

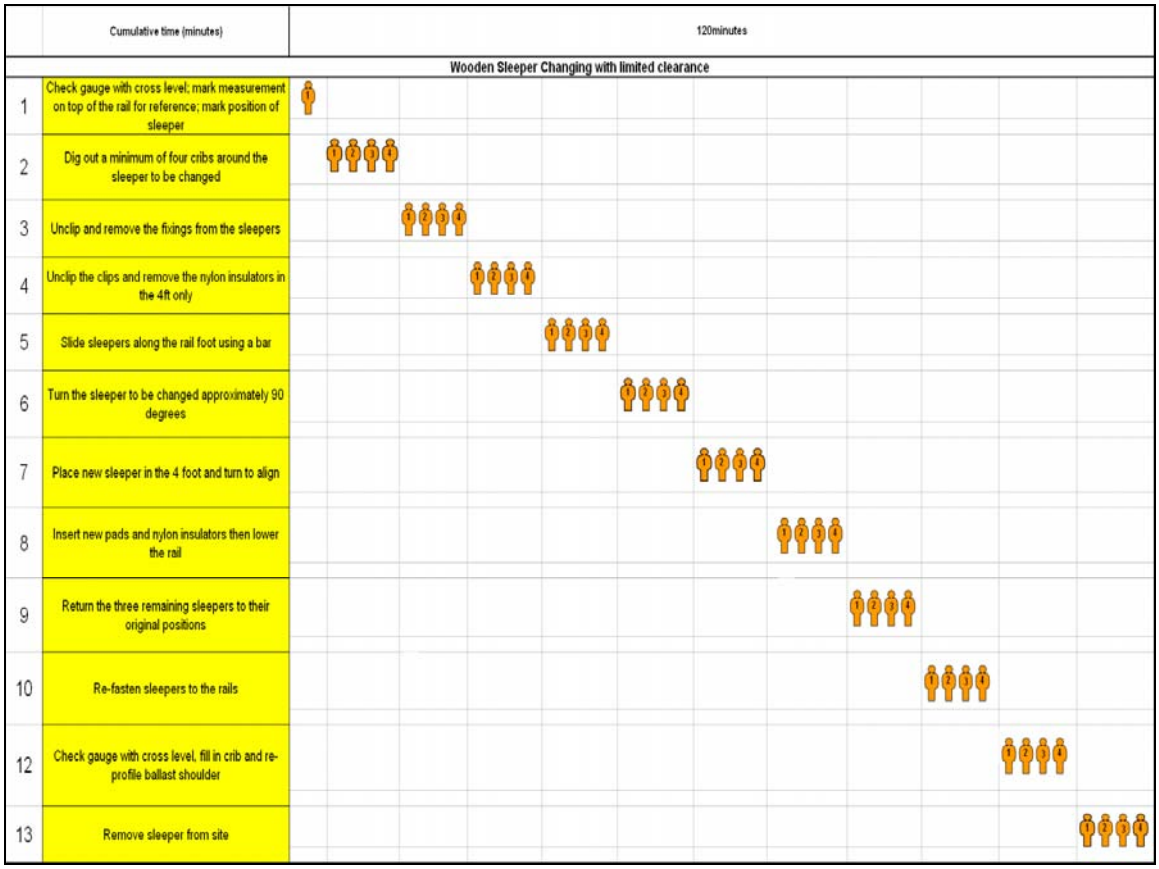
How to change wooden sleepers with screw or spike chair fixings without clearance to slide sleeper out of bed and without removing rail

This task can only be carried out in Green zone.

Planning and productivity

- Standard job ref – 009091
- MNT code - 003
- Norm time per sleeper – 3.25 hours
- Standardised Norm time per person per sleeper without clearance to slide sleeper into cess – 2.0 hours
- Labour Requirements – 4 staff

Delivery process for changing 1 sleeper



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1. Check rail temperature and track gauge. Mark the position of the sleeper(s) to be changed.
2. Clear the ballast from a minimum of four cribs around the sleeper to be changed.
3. Unclip and remove chair fixings from the sleeper(s) to be changed.
4. Unclip and remove the insulators from the 4ft side of the three adjoining sleepers – two sleepers to one side and one sleeper on the other side – so the sleepers remain connected to the rail but can easily slide along the rail foot using a bar.

5. Slide the unclipped sleepers along to their nearest fixed neighbour, so that the resultant gap in the 4ft is large enough to turn the sleeper through 90 degrees. If the sleepers do not slide easily, remove the chair and bar over.
6. Using the bar, loosen the sleeper for removal. Then using timber nips rotate the sleeper through 90 degrees so it's in line with the rails.

7. Using timber nips lift the sleeper out of the 4ft taking care not to disturb the stool.
8. Where possible, lay a new sleeper on an existing consolidated stool. However, each stool should be assessed in turn and removed if necessary. A stool should only be loosened to accommodate a slightly deeper sleeper.
9. Place the new sleeper in the 4ft and twist through 90 degrees to align.

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10. Attach chairs to the rail and align to original markings.
11. Rough pack the sleeper so that drilling to the correct depth for the new screws will be easily achieved.

12. Using the chair as a template, drill through the outside hole of the chair and remove any wood chippings with a pad scraper. After fitting new ferrules insert an “AS” screw and tighten. Drill the other two holes and insert “AS” screws and tighten with an impact wrench till the chair is flush with the sleeper. **Note: Do not squash the ferrules**.

Ferrules are designed to be inserted into the holes in chairs or baseplates such that the top of the ferrule is 6mm (1/4") above the upper surface of the chair or baseplate. Full contact must be made between the under side of the head of the screw and the ferrule. The screw must not make contact with the chair or the baseplate.

13. Check gauge and top and amend as required. Pack the sleeper, then fill in the cribs and re-profile ballast.

Site clearance

Remove any scrap components and sleepers from site. If they are to be left for a scrap vehicle to recover, components must be bagged and sleepers banded together pending removal.

Check

If possible watch the track under traffic. If there is voiding then lift and pack as required. A follow up inspection within 4 days is essential to confirm no excessive settlement has occurred.