

Vortok International

Stressing Roller - eVSR

Usage and Maintenance Guide

Vortok's stressing roller (VSR) system is a very fast fit and fast removal roller system designed to reduce friction during stressing operations. The VSR replaces under-rollers and side-rollers and can be used on all rail profiles, curves, straights, cants etc on CWR irrespective of the sleeper material. The system offers higher productivity with a significant reduction in manpower and achieves time-savings of up to more than two hours on a standard 900m stressing operation. The VSRs provide a very safe method of stressing with a hugely reduced risk of damage to hands and insulators. The use of rail hammers (sometimes used to overcome friction during under-roller operations) is now eliminated as is the need to provide and carry rail jacks.

Usage

Assuming all permissions, blockades and a safe method of working have been established the method of installation and usage is as below:

From the weld position marked every 10th sleeper¹ where the VSR will be fitted. (Other spacing is permissible depending on local conditions, rail temperature and track curvature.) It is important to check that the rail is not dragging on the pads or housings between the VSRs.

Leave a gap of at least 20 sleepers between the last clip or fixed point of the rail and the first VSR. This is to avoid overstressing the VSR.

On track where there appears to be adhesion between the rail pads and the foot of the rail, use pairs of VSRs at a closer pitch than every 10 sleepers.

On curves extra supplementary pairs may be placed on the curved section (see spacing table at the end of this section).

Ensure all the rail fastenings are removed from all the housings and will allow the rail to be raised.

If difficulties are experienced when lifting rail there is normally a good reason and rather than straining the units it is better to seek the root cause. Some of the situations which lead to excessive force are as follows:

- Not all the rail fastenings have been removed.
- The rail pads have adhered to both the sleeper and the foot of the rail.
- The lift is occurring too close to the unclipping machine or clipped rail.
- Only a single VSR is being used at a time.

If there is a weld at one particular sleeper position (within 200mm) it is recommended that the VSR is moved to the next sleeper.

Select and fit a pair of VSRs from the stillage / link trolley / tote bins to the fastening shoulder by ensuring the bolts are withdrawn and lowering the unit onto the housing. This is best done by picking up and carrying the VSR by the main shaft.

Slide the bolts fully home and rotate the handles to the down position. This locks the VSR to the housing.

Sometimes minor variations or grit in the housing make the bolts a tight fit. Remove any obstruction rather than forcing the bolts home. Sometimes the rail pad has worked out and may need to be cut / lifted to secure the VSR.

Using a pair of extended spanners 30mmAF x 650mm long (minimum), fitted to the shaft bolt on the VSR, apply force equally to the VSR pair so that the rollers rotate and come into contact with the underside of the rail to be raised. **Note: Vortok can supply such a spanner part number MC/SR/100/104 but proprietary spanners to this size or even track spanners can be used.**

It is imperative that the VSRs are not used singly. There will be excessive force required and strain placed on the VSR leading to possible damage. For this reason each VSR is fitted with a shear pin which is designed to fail at an extreme load.

The spanners are fitted from the same side of the VSR as the roller arm is resting and during operation are moved towards each other, crossing over at top dead centre.

Increase the force level until the rail is raised from the sleeper. Continue operating until the roller arm goes over top dead centre and comes to rest against the stop.

The spanners may now be removed and the next pair of VSRs can be operated.

After the stressing operation is complete, ensure that there are no obstructions under the rail before reversing this procedure.

Removal is achieved by rotating the arms with the spanners away from the stops to return the rail to its operating position.

Ensure that the rail fits correctly between the insulators.

Remove the VSR by lifting the handles and withdraw the bolts. The unit can now be removed and returned to its box / tote bins.

The rail is now ready for the fastenings to be re-applied.

¹ Some rail authorities specify different spacing. Obey local instructions. The critical factor in selecting spacing is to ensure that the sag of the rail between the rollers does not allow the rail to touch the rail pad or side insulators

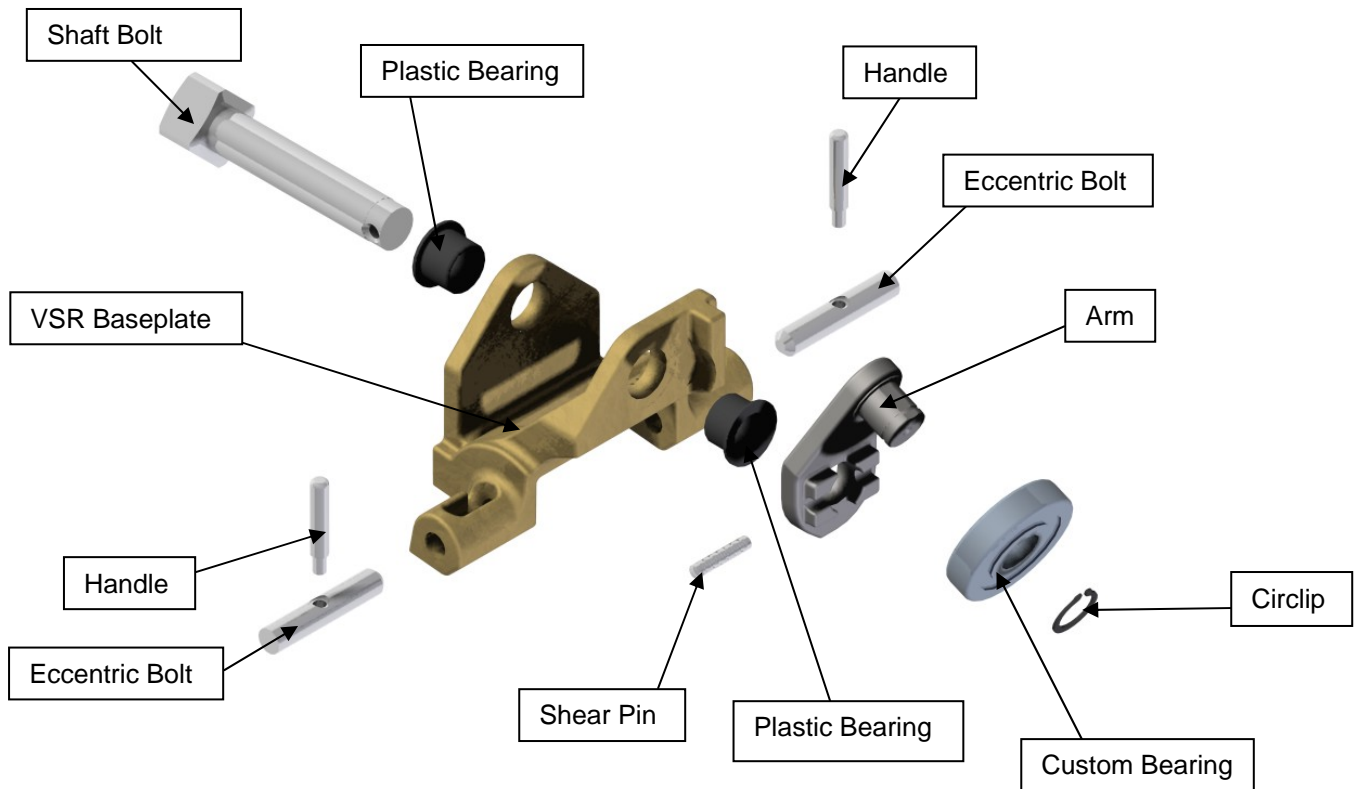
Maintenance

There are very few components in the VSR but they can all be replaced in a suitably equipped workshop. The arm and shaft assembly comprises a headed shaft, two plastic bearings, an arm and a custom bearing which are held together by a shear pin and circlip. Each unit must be checked periodically (preferably weekly) for damage and correct operation. The checklist:

- Is the baseplate cracked or damaged?
- Does the shaft bolt rotate easily without excessive slack?
- Does the arm come to rest against the stops on the casting?
- Are the corners on the headed shaft rounded?
- Is the custom bearing damaged?
- Are the shear pin and circlip present and in good condition?
- Is the handle bent or broken? Is the eccentric bolt seized or bent?

If any of these conditions are not met then a repair must be made before it is used again. The likely failure modes of any on these components are:

- a) The shear pin being overstressed which must be replaced.
 - b) The custom bearing may be damaged, be cracked, have missing seals all of which will require replacement of the bearing.
 - c) The arm casting may be cracked and must be replaced.
 - d) The plastic bearings may be worn, split or damaged and must be replaced.
 - e) The shaft bolt must be replaced if damaged.
 - f) The circlip can only be replaced.
 - g) The handle may be sheared off and both eccentric bolt and handle must be replaced.
- There is no repair option to any of the individual components and replacement is the only possible solution.



Note: the following recommendations are typical railway standards

Curve radius (R) metres	Maximum length of tangent and curve that can be de-stressed in one direction.
R > 4000	900 metres
4000 <R> 2000	600 metres
2000 <R> 1600	500 metres
1600 <R> 1200	400 metres
1200 <R> 800	300 metres
800 <R> 600	225 metres
600 <R> 400	150 metres

VSR spacing table

Curve Radius (R)	VSR pitch
R > 800 metres	Every 10 th sleeper
800 < R > 500 metres	Every 5 th sleeper
R < 500 metres	Every 3 rd sleeper