

Radiarc Spray Head

The Radiarc is a mechanical spray head designed to significantly reduce drift and water volume.



Radiarc Design

- Metal housing
- Electric motor drive
- Bearing configuration
- Nozzles mounted on an arc which oscillates at high speed.



Nozzle Configuration

- Interchangeable nozzles range from 0.030" to 0.101" to adjust droplet size and blanks to adjust fan width.
- This makes the head extremely versatile, with a pattern that can be set up from 8° to 180° fan width.



The system was introduced across Network Rails' fleet of eight Multi purpose vehicles (MPV's) in 2005 to replace a conventional nozzle configuration.



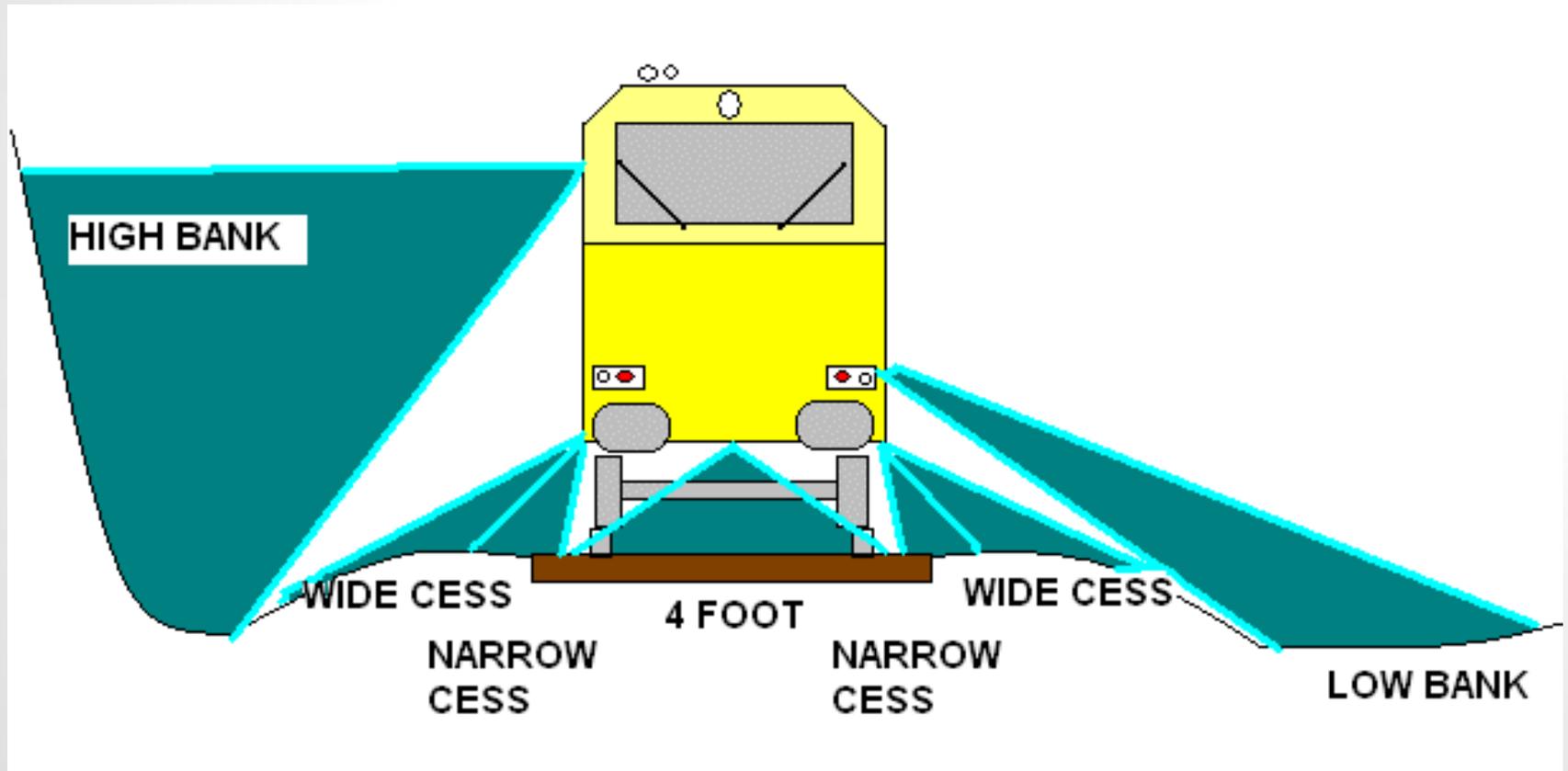
jsd rail 

The Radiarc motor oscillates the spray head breaking up the delivery of water into large droplets.

These droplets reduce drift and therefore have less potential for spray damage whilst increasing foliage penetration.



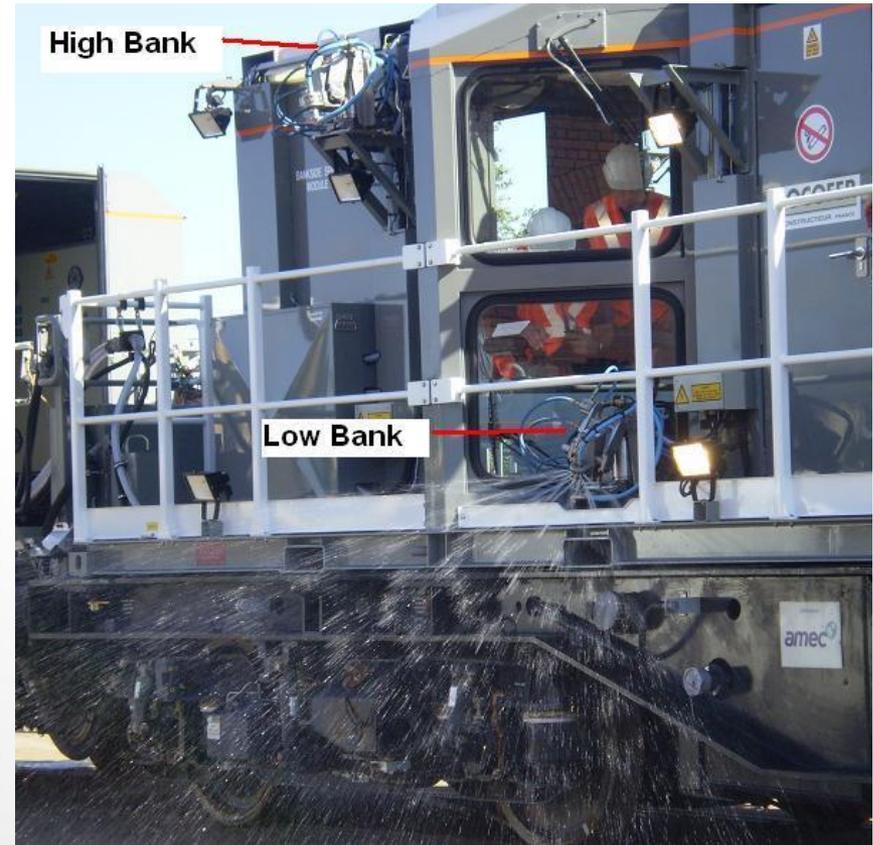
Radiarc MPV sett up



Radiarc positioning

Bank spraying

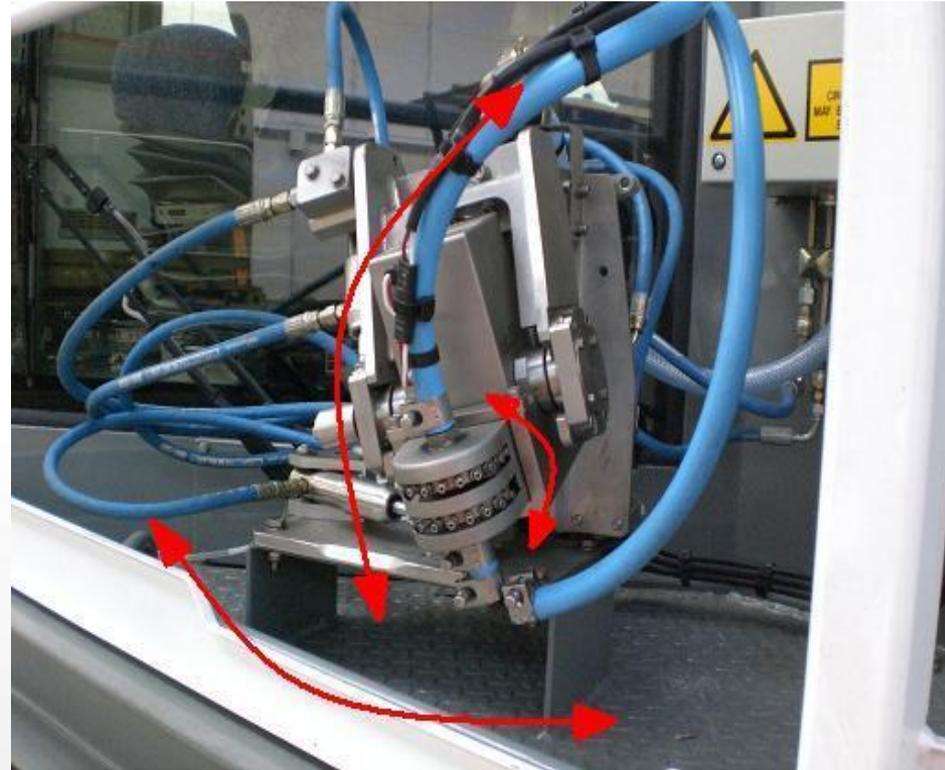
- Two Radiarc are positioned for bank spraying either side of the MPV. This is to treat the 5 meter flail strip adjacent to the ballast shoulder.
1. Position one high bank for use in cuttings
 2. Position two low bank for use on embankments.



Radiarc positioning

Bank spraying

- Each Radiarc has the ability to be moved in three independent directions by the operator using a joy stick.
- The advantage of this is that the angle of the fan is critical in achieving consistent coverage at greater speeds.



Radiarc Trials

Wind tunnel trials with the Radiarc have been undertaken by Clare Butler Ellis at Bayer crop science.

Measurements were taken of droplet size and velocities from a single Radiarc nozzle.



Trial Conclusions

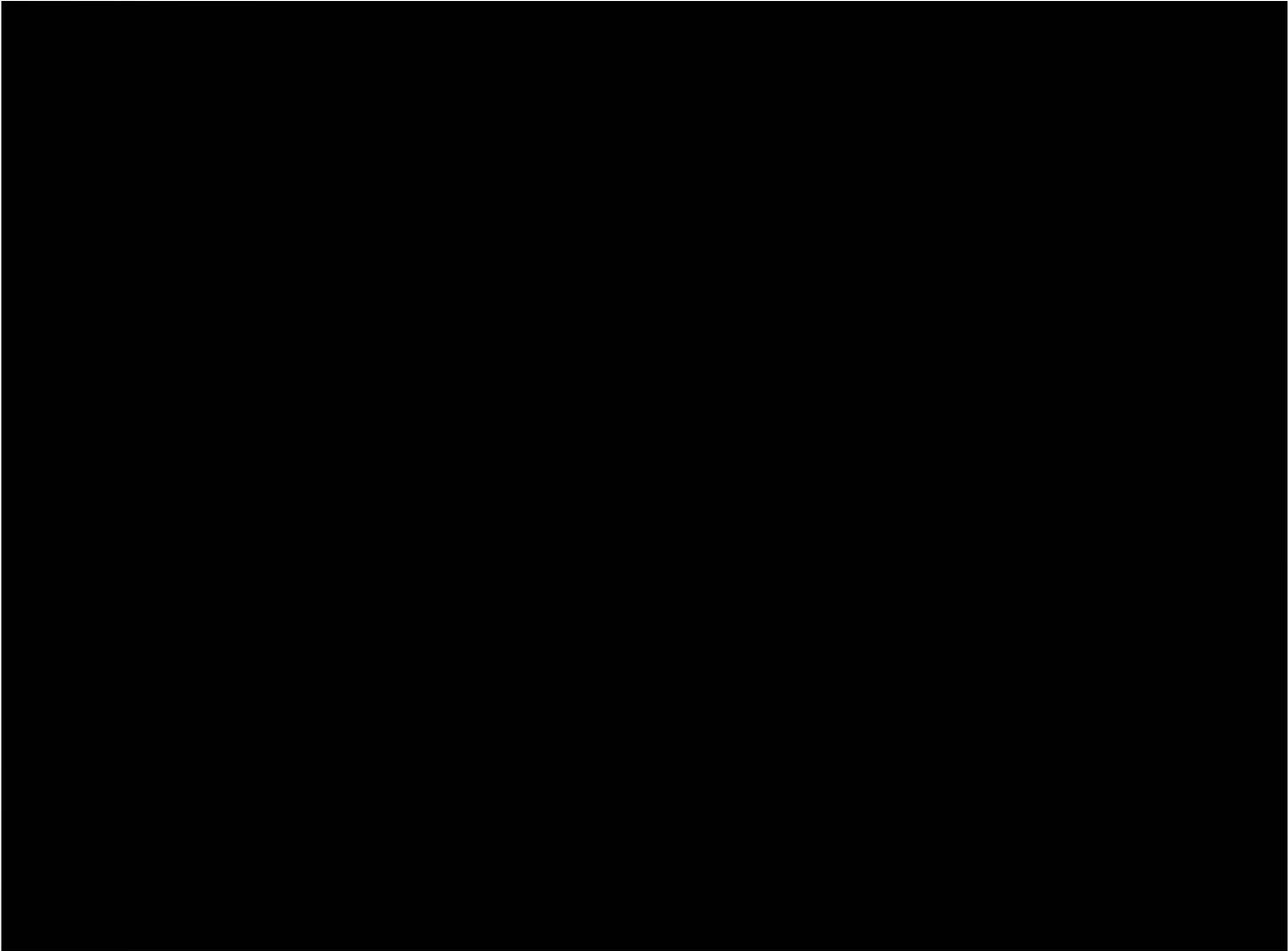
- Simulations of spray drift based on a predictive particle tracking spray drift model, combined with measurements of droplet size and velocity from a Radiarc railway sprayer nozzle have shown that the levels of drift are very low compared with those used in the HardSPEC model.
- For a reasonable wind speed (equivalent to 8 km/h at nozzle height, and above the wind speed recommended for application of herbicides) the drift into the ditch is predicted to be 0.005% of applied volume.
- For a very worst-case situation described by Hollis (2010) of 12 mph wind speed at nozzle height, the drift rises to 0.032%, which is still significantly lower than the 0.1% used in HardSPEC.
- There are a number of assumptions used in the HardSPEC model, particularly in the way that the wind tunnel data was extrapolated to field conditions, which have led to a highly conservative estimate of spray drift being used. It is suggested that the use of a mechanistic model allows a more realistic worst case to be considered, and that the values of drift should be at least an order of magnitude lower than those currently in HardSPEC.

Advantages of the Radiarc

Reduced water volume per hectare;

- Network Rails fleet are set at 200 L/ha but can be as low as 110 L/ha
- Large droplet size gives;
 1. Less drift
 2. Greater foliage penetration achieving improved efficacy.

Demonstration of a Radiarc in operation



MPV using high bankside Radiarc

