



**worcestershire**  
county council

Environmental Services

**Report on trial of ceramic  
insert snow plough blades**

February 2012

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## **Description**

Ceramic insert plough blades have been in use on the Continent for over 20 years. The technology is well established and has recently been made available in the UK through a UK distributor of German manufactured blade rubbers.

This type of blade consists of substantial rubber compound detachable blade rubbers containing ceramic cylinder inserts at intervals of approx 6cm. The cylinders are in stacks of three within the rubber and make contact with the road surface to reduce the rate of wear of the blade and to enable the blade to run just in contact with the road surface. The rubber blade is capable of deflecting over ironwork and road studs because of the arrangement of the cylinders within the encasing rubber.

Manufacturer's information is available here:

<http://www.kueperblades.com/gk5.html>

## **Operational trial in Worcestershire**

The trial commenced in the 2011/12 winter season. Eight routes were selected to provide a mix of dual carriageways, principal rural and urban roads and other routes with particular emphasis on high ground to increase the likelihood of suitable snow conditions occurring.

Dual carriageways are predominantly flat in cross section whereas other routes are predominantly cambered and with less even or uneven longitudinal profiles. Cambered roads are principally responsible for increasing the wear on plough blades so that the centre wears away to match the camber. This occurs even with the ploughs set to ride clear of the surface by 25mm.

## **Observed performance**

A brief snow event occurred in early January 2012 with some positive reports received from the drivers.

A more substantial snow event occurred over night on 5/6 February with accumulations of 10cm in many areas of Worcestershire, particularly on higher ground. During this event each route was ploughed three times.

Early on the morning of 6 February visual observation of routes ploughed with conventional and ceramic blades was made. Photographs are included below.

The ceramic ploughs were found to be capable of removing snow to reveal the carriageway in one pass. A residual thin layer remained between the wheel tracks. Conventional ploughs leave a thicker overall layer which later accumulates between the wheel tracks with the passing of traffic.

During operations, when gritters were returning to depots and came across slush on the road left on other routes not in the trial, ploughs were lowered to remove all snow and slush from the carriageway.

Photographic comparison of blade effectiveness:



Route ploughed with conventional rubber blade



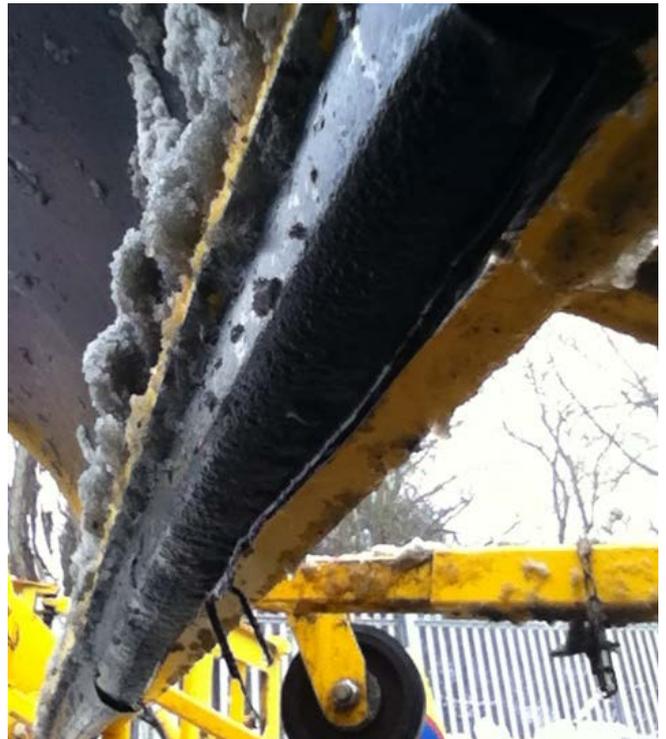
Route ploughed with ceramic insert blade

### **Wear characteristics**

As a result of the three passes during this event, conventional rubber ploughs clearly show wear due to camber and will need to be turned over to make use of the unworn edge, whereas with the ceramic blades wear is hardly discernable. Contact with the road surface is by adjustment of the jockey wheel heights. The effect of surface contact, with the plough hydraulic controls set to float, is that the ceramic is left slightly proud of the surrounding rubber matrix by about 2mm as the rubber wears away.



Ceramic inserts



Conventional rubber

### **Operational considerations**

The ceramic blades are supplied pre-drilled for mounting. It is necessary to supply template dimensions for this to be carried out accurately since not all ploughs necessarily have identical mounting hole configurations.

Upon initial fitting and testing pre-season there was concern about the strength of the mountings to the vehicle. The blade manufacturer (Econ) attended and carried out some strengthening modifications to the frames.

Road studs do not seem to be a problem. One or two cats eye rubbers were observed to have been partially dislodged and this tended to be in locations where they are not usually subject to traffic over run, such as mandatory lines at approach to roundabouts, possibly due to normal wear not having occurred leaving them particularly proud in their casings.

## **Benefit assessment**

The trial is providing good evidence of ceramic blade effectiveness at clearing snow and slush from carriageway surfaces. Clearly there is an immediate benefit to road users.

During snow clearance operations salt is spread to deal with residual snow left on the carriageway and to be available for treating further accumulations. Since it requires 10 grams of salt to melt 10mm of snow in typical conditions, reducing the residual snow from typically 20-30mm depth to almost nothing results in almost all the salt being available to treat further accumulations. Whilst this may not necessarily have an impact on the spread rate used during ploughing operations, potentially there could be a reduction in the number of treatments needed at the end of a snow event and there should be less snow lying on the network. Less surface snow would mean that traffic action in dispersing accumulations should be more noticeable with a consequent beneficial effect on network availability. Possibly gritters could become available sooner to move on to dealing with secondary routes. Experience of further snow events will be needed to test these contentions.

Whilst ceramic blades are considerably more costly there should be an offset in that conventional rubber blades rapidly wear to the road profile resulting in more frequent renewals and fitter's time in turning blades between changes and in down-time during operations. This wear factor also causes conventional blades to be less effective over time in that greater amounts of snow and slush remain on the surface. The ultimate durability and cost comparison will be determined through actual use; at this stage it would be too early to attempt to make a detailed cost comparison. However, it is very promising.

The benefits can be summarised thus:

1. Very effective clearance to black.
2. Greater network availability, less disruption, potentially fewer vehicles stranded.
3. Less work for the salt to carry out following a pass.
4. Potentially less salt needed during a snow event.
5. Potentially good return on costs in relation to realised benefits.
6. Reduced down-time.

## **Conclusions**

The observed superior effectiveness of ceramic blades during this trial is sufficient for WCC to convert all routes in preparation for next season. This action is already being carried out.