WATERBOUND/DRYBOUND MACADAM (SURFACE OR BASE OPTION No. S 06)

INTRODUCTION

Water Bound Macadam (WBM), or Dry Bound Macadam (DBM), are road surface improvement or paving options that use **natural stone** and are suitable for construction using **labour** and **simple equipment**. Other options are Hand Packed Stone, Telford Paving, Cobble Stones, Stone Setts or Pavé, Dressed Stone, and Stone Chippings. None of these options normally require the use of expensive bitumen or cement binders, or high-cost equipment. Therefore a high proportion of the costs may be spent in, and benefit, the local community. Water Bound Macadam or Dry Bound Macadam are suitable for use as a surfacing or road base in appropriate circumstances. Crushed Stone Macadam is a different equipment-intensive technique.

DESCRIPTION

Water Bound Macadam consists of a layer of broken or crushed stones of size up to 50mm, with finer, cohesionless (without clay) material laid on top and **washed** into the voids, with the use of water, to bind the layer together and increase strength. The layer is then compacted with a vibrating or non-vibrating roller. The development of small vibrating rollers has made the use of this technique attractive for rural road works in some locations. Water-bound macadam is built up in layers of thickness equivalent to about twice the nominal stone size, until the required overall layer thickness is achieved. Dry Bound Macadam relies principally on the vibration equipment to penetrate and interlock the finer material into the stone matrix; it is preferable for locations with water shortages or water-sensitive foundations/environments.

ADVANTAGES	DISADVANTAGES
❑ Proven performance in all climates. ❑ Suitable for light and medium traffic ❑ Does not require expensive equipment ❑ Water/Dry Bound Macadam can be built with stones crushed by hand or equipment. It is therefore suitable for construction by small contractors or communities themselves. ❑ Labour breaking and laying of stone can be used in remote areas with access problems for crushing equipment or heavy plant. ❑ W/DBM can be later upgraded by covering with a sealing layer in a stage construction strategy. ❑ DBM can be used in water-scarce and water-sensitive locations.	❑ The hand crushed aggregate is usually single size, which creates poor interlock and strength. Improving the grading of such poorly graded aggregate can be achieved on site by adding and mixing different size material, however this requires careful supervision and additional labour resources. ❑ Stone type and shape is important ❑ If non-vibrating compaction equipment is used for WBM it should be heavy. ❑ WBM not suitable for use on weak subgrades (foundations), as the excessive use of water in construction will weaken the subgrade. ❑ If used as a road surface, it will probably require medium levels of maintenance. ❑ WBM requires water to be available. ❑ Smooth to medium surface roughness.

