



# **GOOD PRACTICE GUIDE FOR HANDLING SOILS**

## **Sheet 18:**

### **Soil Decompaction by Excavator Bucket**

**Issued by the Farming and Rural Conservation Agency, Cambridge**

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## **MAFF FOREWORD**

Standards of restoration of minerals and waste sites have steadily improved in recent years, with operators increasingly aware of their environmental responsibilities. The industry is putting forward more imaginative restoration concepts to a variety of afteruses, and is more aware than ever that it will be judged on the standard of that restoration, and the sustainability of the development.

Sustainable mineral development means balancing economic, environmental and social needs, whilst using resources wisely. The UK Strategy for Sustainable Development recognises the importance of safeguarding agricultural land to meet the needs of future generations, and minimising the loss of soils to new development\*.

Improved restoration standards have sometimes enabled planning permission to be given for best and most versatile agricultural land to be worked for minerals, on the basis that it can be restored in a way that safeguards its long-term agricultural potential\*\*. Inherent in these high standards of restoration is the requirement to handle soils in such a way that damage to their structure is minimised. It is the aim of this Guide to provide comprehensive advice on soil handling “Good Practice” to operators, soil moving contractors, consultants and planning authorities.

The Guide is in the form of 15 Sheets giving advice on soil stripping, the forming and taking down of soil storage mounds, and soil replacement operations using excavators, earth scrapers or bulldozers. There are also four Guidance Sheets on remedial works involving the removal of stones and damaging materials, and decompaction during the replacement operations.

This document should be cited as MAFF (2000), Good Practice Guide for Handling Soils (version 04/00). FRCA, Cambridge.

**Any views expressed in the guidance are those of the consultant and do not necessarily represent the view of the Ministry of Agriculture, Fisheries and Food.**

\*(DETR, A Better Quality of Life, May 1999, paragraphs 6.66 and 8.50)

\*\*MPG7 (November 1996, paragraph 3).

### **Acknowledgements**

The Guide was written and prepared by Dr R N Humphries of Humphries Rowell Associates, Charnwood House, Loughborough, LE11 3NP, UK.

## **SHEET 18 SOIL DECOMPACTION BY EXCAVATOR BUCKET**

The purpose of this Guidance Sheet is to provide a model method for best practice where an excavator bucket is used to decompact soils and basal/formation layers. Excavators are most likely to be used for this purpose where soils are replaced by either excavator and dump truck or bulldozer and dump truck combinations. This Guidance Sheet comprises 3 pages of text and a user response form.

The model may need to be modified according to site conditions or requirements of the Planning Authority. Where this is the case, deviation from the model should be recorded with reasons. The guidance does not specify the type, size or model of equipment, but this should have been agreed as part of the planning conditions or as a reserved matter. The machines should be of a kind which will cause the minimum compaction whilst being operationally efficient (eg wide tracked), and must be well maintained at all times.

Persons involved in the handling of soils, overburden etc., and in the construction or removal of mounds or tips, must comply with the Health and Safety at Work Etc. Act 1974 and its relevant statutory provisions, and in particular those aspects which relate to the construction and removal of tips, mounds and similar structures. This requirement takes preference over any suggested practice in the Sheets.

The user of these guidelines is solely responsible for all liabilities that might arise. No liabilities are accepted for any losses of any kind arising from the use of this guidance.

This decompaction method uses an excavator (back-acting type) with a bucket to dig the soil layers to relieve compaction and smearing.

The advantage of this model method, if correctly carried out, is that it should result in the complete lateral decompaction of the soil layer. However the method is limited to relatively shallow depths due to practicalities and bucket size. There is no advantage

of this method over the use of tines (Sheet 19) in respect of soil water content, the soil must be dry enough to shatter.

There are a number of key operational points:

- the excavator is only to stand on and work from the basal/formation layer.
- the moisture content of the soils should be at least 5% below their plastic limit, or greater than this if so advised.

### The Decomposition Operation

- 18.1 The excavator is only to stand on and work from the basal/formation layer.
- 18.2 The bucket is to be of a type with teeth.
- 18.3 Where the soil layer to be decomposed is up to about 0.5m thick the following procedure can be adopted. The excavator is to decompose the specified layer by systematically digging along a working face from the back to the front of the strip, working in sections. The digging is to be a cutting action, with the bucket down to the full depth of the layer to be decomposed, and through a scooping motion the soil material is lifted and re-deposited. It is essential each successive bucket 'dig' overlaps with the former both to the back and side of the dig. Finally, the bucket edge can be used to lightly grade the finished surface.
- 18.4 Where the soil layer is deeper than the capability of the bucket (about 0.5m), a 'double-digging' approach is needed. The process is to systematically work its way along the strip, and the next layer of soil is not to be laid until this operation is complete. The method is particularly time consuming and the method described in 18.5 below is recommended.

18.5 The alternative for deep profiles to be decompacted by this method is to place the layer in several layers, each up to 0.5m in thickness, and to sequentially decompact each layer as described in 18.3 above. The next layer is to be placed on the decompacted strip, but only when the former layer has been laid and decompacted along the entire length of the strip. The process is repeated until the soil horizon is replaced to the required thickness and has been ‘dug over’.

**SHEET 18**

Version: 04/00

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