



GOOD PRACTICE GUIDE FOR HANDLING SOILS

Sheet 16:

Release & Removal of Stones and Damaging Material from Excavator Replaced Soils

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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

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SHEET 16 RELEASE & REMOVAL OF STONES AND DAMAGING MATERIAL FROM EXCAVATOR REPLACED SOILS

The purpose of this Guidance Sheet is to provide a model method for best practice where stones and/or potentially damaging materials are to be released from excavator replaced soils (see Sheet 4). 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 soil handling method uses a back-acting excavator to remove stones and damaging materials (eg. wire rope, concrete blocks) from replaced layers of soil or treated basal layers.

The occurrence of stones and materials can affect the agricultural quality of the restoration, largely through interfering with cultivations.

The advantage of this method, if correctly carried out, is that it should avoid additional deformation of the soil (compaction) as trafficking is avoided.

The key operational points to ensure avoidance of severe soil deformation are as follows:

- (i) To minimise compaction:
 - the excavator must only operate on the basal layer.
 - the operation should only be carried out when the soils are below their plastic limit.
 - the excavator is only to work when ground conditions enable maximum operating efficiency.
 - if compaction is caused, then measures are required to treat it (see Sheet 18).
- (ii) To minimise soil wetness and re-wetting:
 - see Sheet 4.

The Release & Removal Operation

16.1 The removal of large stones (>150mm) from shallow depths of replaced soils (<300mm) is possible using an excavator fitted with a Geith Stone Rake Bucket (R) or similar. This is a slatted bucket with 'teeth' (150mm apart and about 300mm long). The same equipment can be used for the basal/formation layer provided it has been decompacted first, either by an excavator with a standard bucket (see Sheet 18) or ripping with tines (see Sheet 19). Where the stones to be removed are less than 150mm, but greater than 20mm, a specialist stone picking machine should be used. The use of such equipment is generally

only applicable to the topsoil layer. The removal of these smaller stones should be part of the cultivation phase for cropping, and is outside the scope of this document.

- 16.2 The effective removal of materials (wire rope, drums, tree roots, concrete lintels, etc) damaging to aftercare operations (eg. cultivation, under-drainage installation) is generally not effective with the above bucket method. This operation is best undertaken using ripping equipment and practices described in Sheets 17 and 19.
- 16.3 An excavator with a Geith type of bucket 'combs/rakes' the surface to a depth of up to about 200-250mm of each soil layer when it has been replaced to level along the strip, and before the next layer is placed. The combing action is used to release and windrow the stones, and the bucket is used to load them into a dump truck for disposal or utilisation elsewhere.
- 16.4 The combing action serves to level the soil surface and can also break up soil clods. Where the soil is of a very fine texture (clayey) and has a relatively high moisture content, it can be difficult to break down soil clods and release the stones. In these circumstances the stone rake bucket can be ineffective in releasing and removing stones.
- 16.5 Where required, in conjunction with the excavator-dump truck combination, the above is to be integrated into the procedures listed in Sheet 4.
- 16.6 Stone removal from the topsoil layer can be delayed until the whole area has been restored. If this option is adopted the use of the bucket method is not appropriate, and a tine cultivation method should be used followed by removal of the stones by hand or machine. In this situation, a final deep ripping of the soil profile is likely to be required on completion (see Sheet 19).

SHEET 16

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