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LAND LEVELLING WITH SCRAPERS

By K. R. SOUTHON, Irrigation Technician, Bunbury.

A VARIETY of earth-moving equipment can be used in preparing land for flood irrigation, but the best machine for extensive earth moving over some distance is a power-driven, carry-all scraper.

Scrapers ranging in capacity from 11 to 32 cubic yards are commonly used. Most economical use of larger machines is made where there is a large quantity of earth to be moved.

Where to use a scraper

A scraper is the most economical machine where earth has to be moved more than 5 chains in areas over 5 acres. A normal grader will only shift about 2 cubic yards of soil in a single sweep. Scrapers are very satisfactory for constructing water storages, and their rubber tyres exert greater compaction on built up soil than do grader tyres or bulldozer tracks. A scraper is also an ideal unit for site development, pond digging and stripping top soil.

Scrapers are not effective on slopes over 30 per cent, and in practice, slopes over 10 per cent. are hard to work. Flood irrigation on slopes over 4 per cent. must be treated with great care to prevent erosion, so that, in practice, scrapers will be able to work on most sites suitable for flood irrigation.

Features of a scraper

Taking a 300 h.p., 20 cubic yard scraper as an example, it can pick up about 14 cubic yards, has a top speed of 30 m.p.h. when empty, and, when filled, can travel up to 10 m.p.h. in the paddock. In average conditions it takes about one minute to load the scraper bowl, and in a 10 hour day it can shift 2000 to 4000 cubic yards depending on soil conditions and distances.

The cutting edge on the 20 cubic yard scraper is about 10 feet long. In normal conditions the blade makes a cut about 3 inches deep, but it can cut as deeply as 5 inches in friable soil. Both time and distance of loading are affected by depth of cut. In good conditions a scraper can pick up a full load in 40 yards.

Depth of spread during unloading is controlled by varying the height of the bowl and ground speed. A quick dump can be made within 16 seconds, or the material can be spread to within an inch of final grade. It is usually advisable to finish the paddock with a grader.

Estimating quantities and costs

An accurate contour survey is needed to estimate the quantities of earth to be moved. The volume of earth to be moved can be calculated mathematically or, more easily, from a series of cross sections drawn from the plan. Where a survey has been carried out by a Departmental Officer or a surveyor employed by the contractor, the estimation can usually be done by the person drawing up the plan.

From the quantities involved, an approximate cost of the work can be estimated. This will vary from 10 to 30 cents per cubic yard, depending on the topography and distances involved, or the scraper may be hired by the hour.

Preliminary land clearing

Unwanted trees and stumps should first be removed. Where the land has carried annual pastures, it should be grazed as heavily as possible before working, but ploughing will usually not be needed as the cutting edge can deal with light turf. Old summer pasture land is more difficult and the surface root mat must be broken down. This is best done in spring, with a rotary hoe, or cross cultivation with disc harrows, when the soil is moist and time can be allowed for the plant material to decompose before scraper operations in summer. Poor structured soils should not be worked more than is absolutely necessary, as powdery ground is hard to grade.