Problem 1

A power-shift track-type tractor with 220 HP and weighing 46,000 lb will be used to push wet clay 200 ft. Estimate the bcy production rate (bcy/hr) of this tractor when it operates at an efficiency of 50-min hour. Assume a job condition factor of 0.75 for an average operator.

***** SOLUTION *****

Production (lcy) = $\frac{\text{net hp X } 330}{D+50}$

$$= \frac{220(330)}{[200+50]} = 290.4 \text{ lcy}$$

Total Correction Factor = $\frac{50}{60}(0.75) = 0.625$

From the Table, for wet clay, the swell factor = 0.74

Actual Production (bcy) = 0.625 (290.4) (0.74) = 134.3 bcy

Formulas and Tables

The International Harvest (IH) Formula bulldozer production:

Production (lcy) = $\frac{\text{net hp X } 330}{D + 50}$

Table 1. Properties of Earth and Rocks

Material	Bank Weight (lb/cu yd)	Loose Weight (lb/cu yd)	Swell Factor
Clay, dry	2,700	2,000	0.74
Clay, wet	3,000	2,200	0.74
Earth, dry	2,800	2,240	0.80
Earth and gravel	3,200	2,600	0.83
Sand, dry	2,600	2,260	0.87
Sand, wet	2,700	2,360	0.87
Shale	3,500	2,480	0.71