EXAMPLE- NUMBER OF TRUCKS

The material excavated by the backhoe of the previous example is to be dumped by 12 m^3 (loose/heaped) trucks to a dump area which is 12 km away. Determine number of trucks needed so that backhoe Works in an efficient way if

V_{haul} = 40 km/r, V_{return} = 60 km/hr , t_{spot} = 3.5 min, t_{dump} = 4 min

k_t = 0.90 ; k_e = k_{te} = 50 min.

V_t= = 12 m^3 , k_t = 0.90

$$t_l = \frac{V_t \times k_t}{q_h \times k_d} \times c_t$$

$c_l = \frac{c_s}{k_{ad}} \times c_t = \frac{23}{1.105}$=20.81 sec.

$q_h * k_d$ = 0.95 * 0.975= 0.9263

$t_l = \frac{12 \times 0.9}{0.9263} \times 20.81 \times \frac{1}{60} = 4.04$ min

$t_{ct} = 4.04 + (\frac{12}{\frac{40km}{hr}} \times 60\text{min}) + 4 + (\frac{12}{60} \times 60) + 3.5$

t_{ct} = 41.54 min

$Q_{truck} = (12 * 0.90) * \frac{60}{41.54} * \frac{50}{60}$ = 13 m^3 / hr

Number of trucks = $\frac{Q_l}{Q_t} = \frac{133.42}{13}$ = 10.26 ~10 trucks are needed

COST CALCULATION

How much will 1 m^3 of excavation (bm) and hauling cost to subcontractor considering only equipments if;

$C_{backhoe}$ = 60 tl/hr ; C_{truck} = 15 tl/hr , Q_{loose}= 133.42 m^3 / hr

$Q_{bm} = \frac{133.42}{1.25}$ = 106.74 m^3 / hr

$C_{excavation} = \frac{60}{106.74}$ = 0.56 tl/ m^3

$C_{hauling} = \frac{10 \times 15}{106.74}$ = 1.41 tl/ m^3

C_{total} = 0.56 + 1.41 = 1.97 tl/ m^3