ASSIGNMENT NO 2

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SUBJECT NAME: CONSTRUCTION ENGENERING

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Q1: How the production of an excavator is estimated

The methodology of calculating the productivity of an excavator emerged together with the first excavator machines. Essentially, excavator productivity is typically measured by the volume of loose or rock soils the machine can displace in a hour of continuous operation. In other words, the productivity of an excavator is determined by the volume of the soil it can dig up in a minute. The calculations for excavator productivity are straightforward and can be simply completed on a standard calculator.

Excavators with higher productivity work faster.

1. Understand the formula for calculating excavator productivity. The formula is as follows:
2. Q = (60_q_z_n_kf) / kl,
3. where Q is the productivity of the excavator, q is the capacity of each rotor bucket in cubic feet, z is the number of buckets on the wheel and n is the speed of rotation of the rotor, measured in revolutions per minute. kf stands for the filling factor of a bucket while kl represents the soil-loosening factor.
4. Gather the data. Typically, you can get the date for the capacity of each rotor bucket in cubic feet, the number of buckets on the wheel and the speed of rotation of the rotor from the operator's manual of your excavator, supplied by its manufacturer. The filling

factor of the bucket and the soil-loosening factor can be determined experimentally. The filling factor, ranging from 0 to 1, determines the degree of the excavator bucket's utilization. For example, whether it is half-full or three-quarters-full determines the excavator bucket's utilization. To determine the soil loosening factor, which is always greater than 1, calculate by how much the density of the soil in the ground is greater than the density of the excavated soil. For example, if the soil loosens by 10 percent, the soil-loosening factor is 1.1.

5. Use the formula from Step 1 to calculate excavator productivity. For instance, if the capacity of each rotor bucket is 10 cubic feet, the wheel has only one bucket, the rotor rotates at a speed of 5 rotations per minute, and the filling factor and the soil loosening factor are one, the productivity of the excavator stands at:
6. Q = (60_q_z_n_kf) / kl = (60_10_1_5_1) / 1 = 3,000 cubic feet per hour.
7. kf stands for the filling factor of a bucket while kl represents the soil-loosening factor

Q2: Discuss the two major factors which control the shovel production?

This study presents the effect of excavator model, loading operation location, shift availability and truck-shovel combination on loading cycle time and productivity of an open-pit mine. The loading cycle time was used to assess the material loading system performance which is one of the key components of the total cycle time for material transportation in an open-pit mine. Loading is among the components of cycle time during which material is being handled. The data analyzed was collected from a computerized dispatch system at GGM from which 62,000 loading dispatches per month involving several shifts, 14 excavators and 49 trucks were loaded. About 4465 dispatches per excavator and 1276 dispatches per truck were assessed using loading cycle time data for each dispatch for a period of four months (between August and December). Under fixed tonnage loaded and waste type (33 t of non-acid forming waste rock), it was observed that loading cycle time depends on excavator model, location and truck being loaded. Average cycle times, PDFS and CDFS of loading cycle time series were used to identify differences in performance under different situations. It was concluded that shift availability for excavators, loading location, excavator model and truck-shovel combinations strongly affect the productivity during loading process in an open-pit mine.

Keywords
Potentially Acid-Forming (PAF) Rock, Non-Acid Forming (NAF) Rock, Truck Utilization, Truck Fill-Factor, Queuing Time, Loading Cycle Time, Full and Empty Haul, Total Cycle Time, Theoretical Cycle Time, Non-Productive Cycle Time, Cycle Time Performance

Q3: What do you understand by clamshell?

the shell of a clam. 2a : a bucket or grapple (as on a dredge) having two hinged jaws. b : an excavating machine having a clamshell. c : either of a pair of doors (as in an airplane tail) that open out and away from each other