Scraper Productivity, Cost, and Size Selection Generator

Abstract: My project consists of the analysis of scraper productivity and cost comparisons through excel sheets I have created . These excel sheets allow me to enter information such as cycles times, load calculations, and costs to create a cost and productivity comparison between rental equipment and in-house equipment as well as different models and sizes of scrapers. Once the specific job information has been put into the program it then is able to compute the most time and cost efficient fleet for your project. By inputting data into these excel sheets it has the potential to aid industry professionals in making key decisions when selecting a fleet of scrapers of scrapers for their project.

Key Words: Scraper Productivity, Cost Analysis, Size Selection, Wheel Tractor Scrapers, Fleet Optimization

Methodology

- Research and observations of scrapers in order to create program
- Qualitative approach of interviewing 3+ industry officials
  - All on site interviews while watching and observing scraper fleets
  - Series of questions attaining to overall goal of fleet
  - Present program to industry officials and collect feedback and future possibilities of program

CAT 657		
SINGLE MACHINE CAPACITY	44	CY (HEAPED)
% FULL	80%	
TOTAL	35.2	
HOURLY PRODUCTION	**669**	**cy**
DAILY PRODUCTION	**6,019**	**cy**
TOTAL MACHINES	1	each
HOURLY FLEET PRODUCTION	**669**	**cy**
DAILY FLEET PRODUCTION	**6,019**	**cy**
Hourly Cost (INHOUSE)	$ 500.00	hr @ #####
Daily Cost (INHOUSE)	$ 5,000.00	PER DAY
Hourly Cost (RENTAL)	$ 545.00	hr @ #####
Daily Cost (RENTAL)	$ 5,450.00	PER DAY
DAYS TO COMPLETION PER PRODUCTIVITY	1.66	DAYS
COST OF CAT 657 **INHOUSE** DURATION OF PROJECT	$ 8,306.75	
COST PER CY	$ 0.83	PER CY
COST OF CAT 657 **RENTAL** DURATION OF PROJECT	$ 9,054.36	
COST PER CY	$ 0.91	PER CY
DIFFERENCE	$ 747.61	

Sample of productivity/cost generator

SUMMARY											
	CAT 657	CAT651	CAT 637	CAT 631	CAT 627	CAT 621	TOTAL PRODUCTIVITY PER DAY	PROJECT DURATION	COST PER DAY	COST OF PROJECT	COST PER CY
SCENARIO 1	2	0	0	0	0	0	12038	8.31	$ 10,000.00	$ 83,067.52	$ 0.83
SCENARIO 2	0	0	3	0	0	0	13954	7.17	$ 13,500.00	$ 96,749.23	$ 0.97
SCENARIO 3	0	0	0	0	5	0	16416	6.09	$ 15,000.00	$ 91,374.27	$ 0.91
SCENARIO 4	2	0	0	0	2	0	18605	5.37	$ 16,900.00	$ 90,836.77	$ 0.91
SCENARIO 5	0	0	1	0	0	0	4651	21.50	$ 4,000.00	$ 85,999.31	$ 0.86
SCENARIO 6	0	0	0	0	0	1	3110	32.15	$ 3,000.00	$ 96,450.62	$ 0.96

Sample of Fleet Selection Generator

Goals of the Project:

- Generate Productivity rates of machines
- Generate Productivity of entire Fleets
- Compare Costs and Productivity of Different Sizes
- Create and Compare different combinations of Fleets
- Compare costs of In-House and Rental options
- Breaks down cost and productivity per phase
- **Gives the contractor the knowledge to select the right fleet for their project**

Industry Feedback

- Program was found to be too linear when comparing scrapers
- Different sized scrapers used for different scopes of work
- Lacks variables such as mobilization and site logistics
- Beneficial comparing same size scrapers (Twin Vs Single Engine)

Future Possibilities

- Potential utilization in the classroom to show students differences of production between different scrapers
- Developing the program to compare and contrast similar scrapers

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