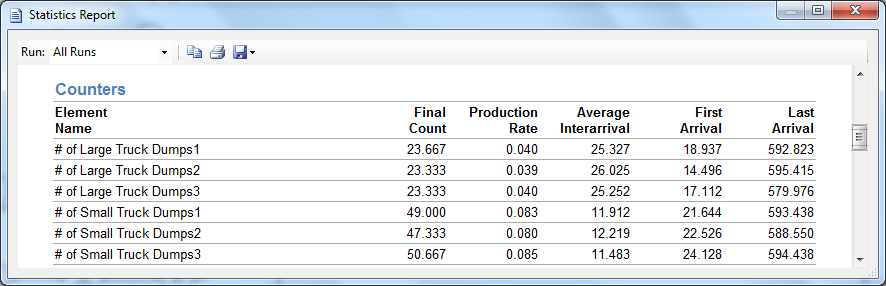
Chiteri, Martin Akolo **Student ID:** 1231525 *CIV E 606 Assignment 4* ***8th March, 2016***

**Question ONE**

i) Determine the utilization and queue length associated with shovels and crusher

ii) Which of the truck sizes is more productive at the end of the stipulated duration?



Small trucks, trips made in 600 minutes

= 49 + 48 + 51 = 148 trips in total (From the final values of counters associated with them)

Capacity dumped = 148 x 20 = **2,960 tons / 600** minutes or **4.93 tons / minute**

Large trucks, trips made in 600 minutes

= 23 + 23 + 22 = 68 trips (From the final values of counters associated with them)

Capacity dumped = 68 x 50 = **3,400 tons / 600** minutes or **5.67 tons / minute**

**Therefore:** Large trucks seem to have more productivity per minute (5.67 ton / minute) given the observations made in the 600 minutes of simulation time.

iii) What is the average cycle length for small and large trucks?

*Small trucks*

|  |  |  |
| --- | --- | --- |
|  |  |  |

= ( 49.22 + 50.27 + 40.108 ) minutes = 139.60 minutes

Trips made = 148 from question (ii) above

= 139.60 mins / 148 trips = 0.9432 minutes per cycle or approximately 57 seconds per cycle for a small truck

*Large trucks*

|  |  |  |
| --- | --- | --- |
|  |  |  |

= ( 24.70 + 25.02 + 23.66 ) minutes = 73.38 minutes

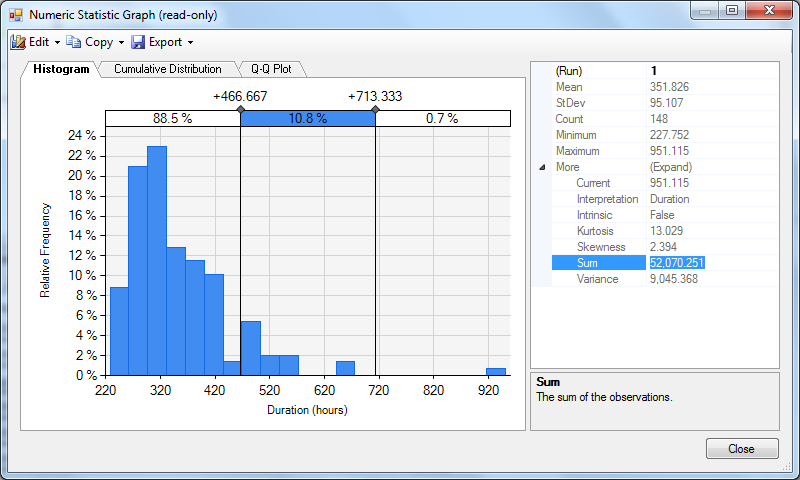
Trips made = 68 from question (ii) above

= 73.38 mins / 68 = 1.0791 minutes per cycle or approximately 64.75 seconds per cycle for a large truck

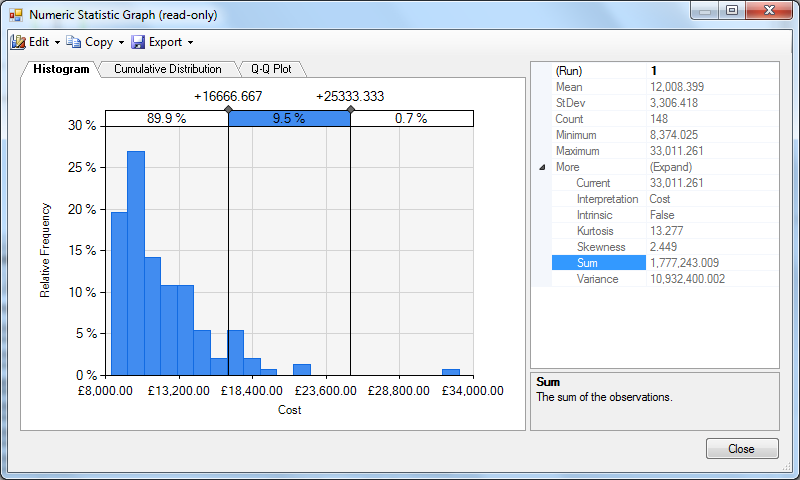
**Question TWO**

1. *How much time and money does it take to obtain a successful contract?*

**Duration** spent is 52,070.25 hours in total from 148 bids successful observed. The average time observed for all averages is **351.83 hours.** See screenshot attached below of the associated statistic collect element.

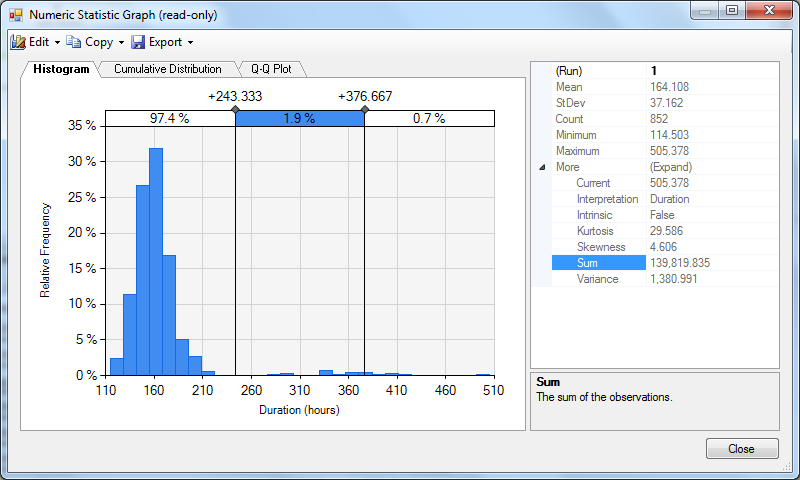


The amount of **money** spent is $ 1,777,243.01 in total from 148 successful bids. The average amount observed for all averages is $ **12,008.40.** See screenshot attached below of the associated statistic collect element.

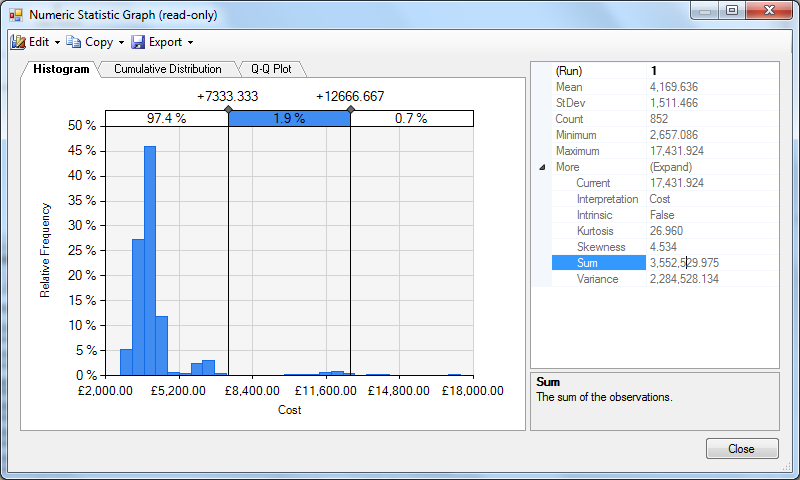


1. How much time and money is spent in bidding for contracts that are lost?

**Duration** spent is 139,819.84 hours in total from 852 lost bids observed. The average time observed for all averages is **164.19 hours.** See screenshot attached below of the associated statistic collect element.



The amount of **money** spent is $3,552,529.98 in total from 852 lost bids. The average amount observed for all averages is $ **4,169.64.** See screenshot attached below of the associated statistic collect element.



iii) *What is the probability of winning and losing a contract?*

*The probability of winning a contract*

= (0.95 x (0.9 x 0.8) x 0.44) = 0.1871 or 18.71%, That is without revisions & modifications after a single pass

= (0.95 x (0.9 x 0.8) x 0.44 x 0.88) = 0.1646 or 16.46%, With a revision & modifications after a single pass

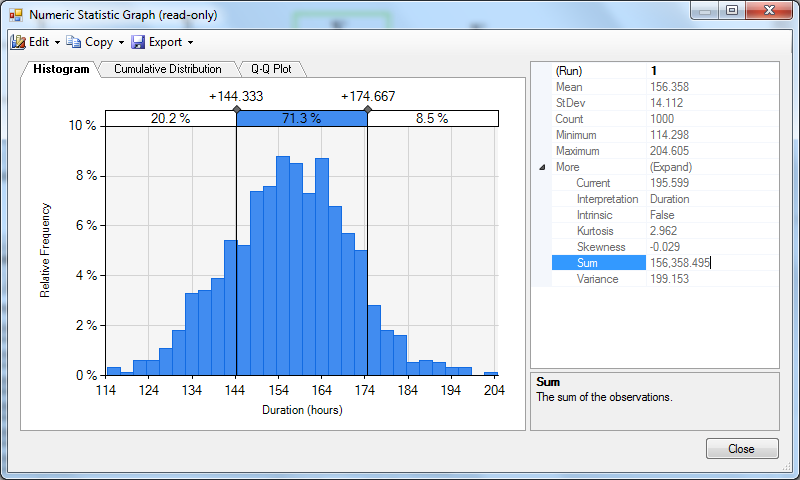
*The probability of losing a contract*

= 1 – (0.95) = 1 – 0.59 = **0.4**1 or **41%**, if the first internal study report is not recommended

= 1 – (0.95 x (1 – 0.95)) = **0.7581** or **75.81%**, If the first internal study report is recommended but not approved

1. *How much time and money are spent in the first phase of the bidding process (after finishing the first internal study)?*

**Duration** spent is 156,358.50 hours in total from 1,000 bids for contracts. The average time observed for all averages is **156.36 hours.** See screenshot attached below of the associated statistic collect element.



The amount of **money** spent is $ 3,793,780.38 in total from 1,000 bids for contracts. The average amount observed for all averages is $ **3,793.78.** See screenshot attached below of the associated statistic collect element.

