

COMPACTION DENSITY STUDY AUSTIN, TEXAS NOVEMBER 2012

Texas Disposal Systems and Humdinger Equipment jointly conducted a compaction density study using a 2011 model Caterpillar 836H and a 2012 model TANA E520. An independent surveyor, Lynn Rutter, was hired to take measurements each day before and after the compactors began and stopped working.

The study was performed at the Texas Disposal Systems (TDS) landfill located in Creedmoor, Texas. The TDS landfill is permitted to receive (1) municipal and residential waste, (2) commercial waste, (3) environmental waste, and (4) construction and demolition waste.

Each day of the study the compactors ran for an equal number of hours. Sections of the working face were separated and the two compactors worked their assigned side. The scale house directed some trucks to be sent to the working face where we conducted the study and other trucks went to other areas in the landfill to be unloaded. Waste trucks that were sent to the study area working face were directed on a rotating method to unload the waste on each side of the working face. The directions were given by TDS staff to the waste trucks with oversight by Humdinger Equipment staff. Humdinger Equipment and TDS staff documented the sides each waste truck was unloaded. A minimum of three staff documented the area each truck was unloaded. The three sets of documentation were used to audit and verify for 100% accuracy of waste distribution. The study was videotaped in its entirety. All variances in documentation were verified through the video documentation as required. Summaries of waste trucks per side were tabulated by the TDS scale house determining the total tonnage received by each side. Independent surveyor, Lynn Rutter, provided the total area of each side, and the total air space usage per side.

The same two landfill compactor operators drove the Caterpillar 836H and the TANA E520 during the study. The compactor operators each have over fifteen (15) years each of operating Caterpillar and TANA landfill compactors, respectively.

The study's results show the TANA E520 landfill compactor with a 10% density compaction advantage over the Caterpillar 836H landfill compactor. The results also indicated that the TANA E520 landfill compactor has a density compaction advantage over the Caterpillar 836H landfill compactor in excess of 14% when the tonnage per hour was in excess of 160 tons. The results show a lower density compaction advantage of 2% the TANA E520 has over the Caterpillar 836H landfill compactor when the tonnage per hour was less than 160 tons.

Through the statistical results of the test and observation it was apparent that the TANA E520 was able to reach a higher level of density compaction much faster than the Caterpillar 836H. If the volumes of waste was low the Caterpillar 836H was able to continue to work the same areas multiple times reaching a higher density compaction result than when the volume of waste was higher and the 836H had to work the new waste into the working face resulting in overall lower density compaction result.

The study also shows the TANA E520 used over 8% less fuel while achieving a higher density compaction result than the Caterpillar 836H. The TANA E520 uses a Cummins 15 Liter engine compared to the Caterpillar CAT 18 Liter engine.

Soil cover was not part of the study. There was a consensus through observation that the flatness and smoothness the TANA E520's twin drum technology offers will make the covering process easier and reduce the amount of soil required to properly cover the working face.

LANDFILL COMPACTOR SPECIFICATIONS

	<u>CATERPILLAR</u>	<u>TANA</u>
Model	836H	E520
Weight	122,586 (55,604 KG)	112,436 lbs (51,000 KG) Without cooling fluid in drums
Gross Power	555 HP	589 HP
Engine	CAT C18 ACERT	Cummins QSX15
Transmission	Direct Drive	Hydrostatic
Wheels/Drums	4 - Oscillating Wheels	2 - Full Width Drums
Max Speed	7.1 MPH	4.5 MPH
Drum Width	55 Inches	150 Inches
Drum Diameter	68 Inches	48 Inches
Diameter with Teeth	81 Inches	64 Inches
Teeth per Machine	140 Teeth	220 Teeth
Ground Clearance	24 Inches	35 Inches

*Above data per Caterpillar and Tana specification documentation

STUDY STATISTICS

	CATERPILLAR	TANA	TOTALS
Tonnage	3,487	3,591	+3% 7,078
Air Space Usage (lbs/cubic yard)	6,006	5,637	- 7% 11,643
Pounds Per Cubic Yard			
Study Totals	1,161	1,274	+10%
Days above 1,400 Tons	1,093	1,247	+14%
Days below 1,400 Tons	1,296	1,323	+ 2%
Fuel Usage Gallons	951	879	- 8%

A Complete report can be obtained from Tana North America at 806-771-9944.

PICTURE DOCUMENTATION



