PrimEx Transporter Vertical Lift Torque Review

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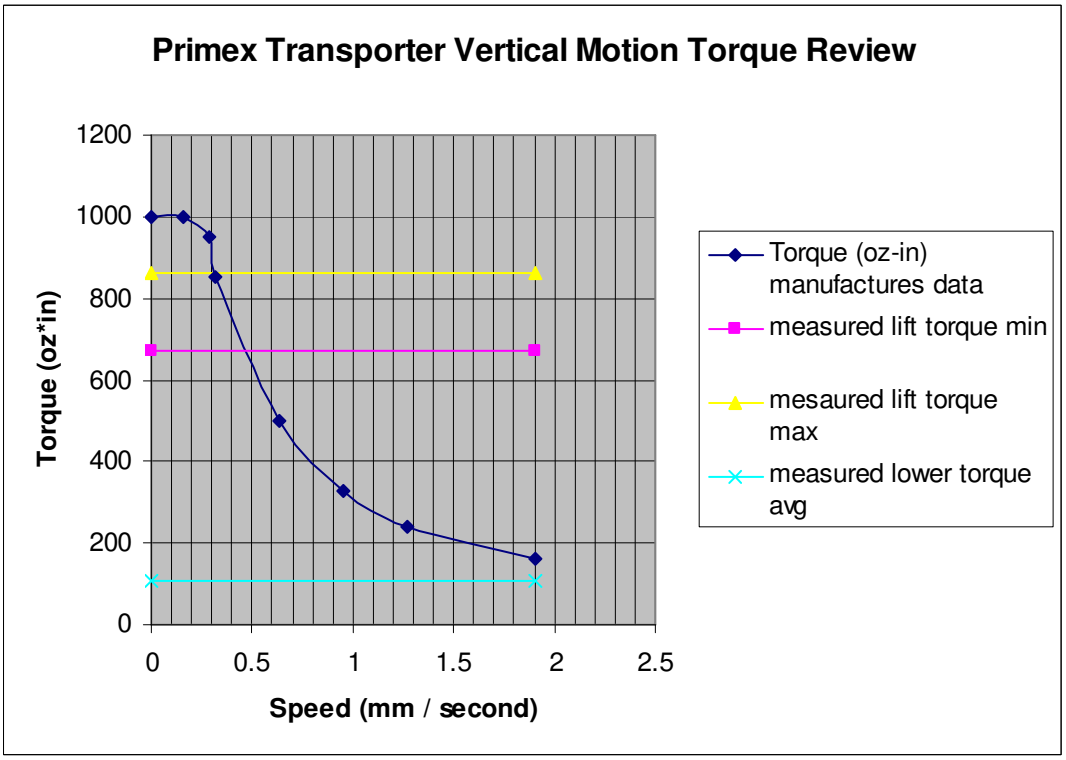
Rev 1.0

We took time to approximately measure the lifting and lower torque of the HYCAL Transporter. We used spring scales and a 6" long lever (vise grip pliers) on the coupling. We did not disconnect the stepper motor but it was set with all windings off.

There was some variance in measured forces.
We measured 7 to 9 lbs to lift and .75 to 1.5 lbs to lower. These were not high accuracy measurements.

The plot below shows the motor torque vs. speed from the manufactures data using the conversion necessary to get lift speed. It also shows the measured torques for lifting and lowering of the transporter. Although we are close to the limit of the stepper motor, we are able to lift the HYCAL on demand. A few times it has stalled and had to be coerced to lift by starting and stopping, or lowering a bit before lifting or slowing the lifting speed. It may be beneficial to apply grease to the main jack screws. This has not been done since initial installation. In the original design of the transporter lifting system in February 2002, HYCAL was thought to weigh ~8,000 lbs, the actual weight is 11,400 lbs which is an increase of over 40%. Initial design including gear box efficiencies said we could lift at ~0.6mm/sec. During load test we were able to lift 13,200 lbs on demand at 0.3mm/sec.