Winch and Hoist Application Guidelines

Determining Required Horsepower

Horsepower is a measurement of the rate at which work is performed.

One theoretical horsepower is equivalent to 33,000 lbs being lifted one foot in one minute.

\[
\frac{33,000 \text{ ft-lbs}}{1 \text{ minute}} = 1 \text{ Theoretical Horsepower HP(T)}
\]

When applied to winches and hoists, the equation to determine the horsepower required for a given line speed and line pull is:

\[
\frac{\text{Line Pull (lbs)} \times \text{Line Speed (fpm)}}{33,000} = \text{HP(T)}
\]

For example, you would need 2.0 HP(T) to lift a 2,000 lbs. load a distance of 33 feet in one minute.

\[
\frac{2000 \text{ lbs.} \times 33 \text{ fpm}}{33,000} = 2.0 \text{ HP(T)}
\]

This equation does not account any of the inefficiencies inherent in motors, gear reductions, bearings or rigging.

Increasing Line Pull or Line Speed Without Changing Horsepower

To increase line pull without increasing horsepower, line speed must be decreased. To increase line speed without increasing horsepower, line pull must be decreased.