

ENGINEERING INFORMATION—TORQUE & HORSEPOWER

Example: find the horsepower required to raise a 7,000 pound load at 22 inches/minute using a WJT65 screwjack.

A. Determine the input speed:

From page 18 - 16 turns of the input shaft = 1 inch of linear travel.

16 turns/inch x 22 inches/minute = 352 rpm input required.

B. Determine the required input torque:

From page 18 - .044 in. lbs. torque required to raise each pound of load = .044 x 7,000 = 308 in. lbs.

C. Determine the jack input horsepower required:

352 rev /min x 308 in. lbs./63025 = 1.72 HP required.

Next, utilize this jack in a multiple jack system—for example the "H" system shown (see page 171).

When calculating the horsepower required to drive a jack system it is usually easiest to break the system up into 'sections'. For example the H system can be viewed as two jack systems joined via a speed reducer or miter box. Always remember to take into account the inefficiencies of miter boxes when calculating system horsepower requirements (use a 90% efficiency for RC and MK style miter boxes).

D. Section 1 required horsepower:

Total horsepower required for the left side of the system

= 1.72 HP/jack x 2 jacks = 3.44 HP.

3.44HP/.9 = 3.82 HP required into the miter box of section A.

Since Section 1 is identical to Section 2, Section 2 required horsepower = 3.82 HP.

E. Sum sections A & B to determine the amount of horsepower required from the central miter box.

Two sections each requiring 3.82HP = 2 x 3.82 HP = 7.64 HP required from the central miter box.

Account for the efficiency of the central miter box to determine total horsepower required for the system (A speed reducer may be used here instead of a miter box. If a speed reducer is used, determine the efficiency of the speed reducer as supplied by the manufacturer).

7.64 HP / .9 = 8.49 HP required into the central miter box and for the system.

