Pulley Encyclopedia Article

Pulley

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Pulley

The first pulley was likely part of a simple crane dating back to around 1000 B.C., though there is pictorial evidence that pulleys may have been in use since 8000 B.C.

A pulley may be defined as any wheel that supports a rope, belt, cable, cord, or chain for the purpose of transferring motion and energy. Pulleys are affixed to frames or blocks and an entire pulley system is usually referred to as a *block and tackle*. The principle governing the mechanics of pulleys, outlined by Archimedes, is virtually the same as that for levers. Consequently, pulleys are employed to gain a mechanical advantage through a reduction in the effort required to move or lift an object.

In the case of single pulleys, there is no real mechanical advantage and the main benefit consists only of changing the direction of the force. Compound pulleys--pulleys containing several wheels--date back to about 400 B.C. A five-pulley, two-axle arrangement of this period, the pentapaston, produced a 5:1 mechanical advantage. (Ratios for compound pulleys may be calculated by simply counting the number of pulley wheels on both the upper and lower axles. The magnification of effort is equal to this number. However, it must be kept in mind that the magnification will always be slightly less than this ideal number, given the presence of friction.) Interestingly, Greek dramatists may have been among the first to avail themselves of compound pulleys, in order to create such special effects as gods descending from the heavens.

Pulley systems, for centuries, have been used in construction and manufacturing for centuries. However, elevators, escalators, and a large number of other commonly encountered devices are also founded on the operation of the pulley.