The Barn Raiser

Mid-South Engineering Company

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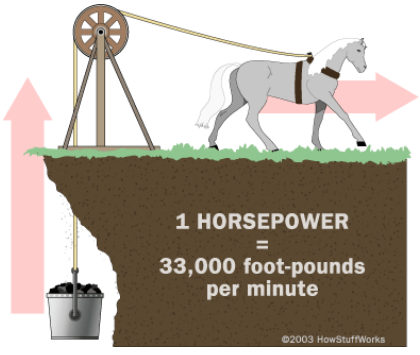
How Horsepower Works

Definition

The term horsepower was invented by the engineer James Watt. Watt lived from 1736 to 1819 and is most famous for his work on improving the performance of steam engines. We are also reminded of him every day when we talk about light bulbs and their wattage.

The story goes that Watt was working with ponies lifting coal at a mine, and he wanted a way to talk about the power available from one of these animals. He found that, on average, a mine pony could do 22,000 foot-pound of work in a minute. He then increased that number by 50 percent and pegged the measurement of horsepower at 33,000 foot-pounds of work in one minute.



It is that arbitrary unit of measure that has made its way down through the centuries and now appears on you car, your lawn mower, your chain saw and even in come cases your vacuum cleaner!

What horsepower means is this: In Watt's judgment, one horse can do 33,000 foot-pounds of work every minute. So imagine a horse raising coal out of a coal mine as shown above. A horse exerting 1 horsepower can raise 330 pounds of coal 100 feet in one minute. You can make up whatever combination of feet and pounds you like. As long as the product is 33,000 foot-pounds in one minute, you have a horsepower.

You can probably imagine that you would not want to load 33,000 pounds of coal in the bucket and ask the horse to move it 1 foot in a minute because the horse couldn't budge that big a load. You can probably also imagine that you would not want to put 1 pound of coal in a bucket and ask the horse to run 33,000 feet in one minute, since that translates into 375 miles per hour and horses can't run that fast. However, if you have read how a block and tackle works, you know with one you can easily trade perceived weight for distance using an arrangement of pulleys. So you could create a block and tackle system that puts a comfortable amount of weight on the horse at a comfortable speed no matter how much weight is actually in the bucket.

Horsepower can be converted into other units as well. For example:

- 1 horsepower is equivalent to 746 watts. So if you took a 1-horsepower horse and put it on a treadmill, it could operate a generator producing a continuous 746 watts.
- 1 horsepower (over the course of an hour) is equivalent to 2,545 BTU (British thermal units). If you took that 746 watts and ran it through an electrical heater for an hour, it would produce 2,545 BTU (where a BTU is the amount of energy needed to raise the temperature of 1 pound of water 1 degree F).
- One BTU is equal to 1,055 joules, or 252 gram-calories or 0.252 food calories. Presumably, a horse producing 1 horsepower would burn 641 calories in one hour if it were 100-percent efficient.

"The Barn" built in the 1930's to house Welsh ponies, serves as Mid-South's offices.

Moving Ahead Sometimes Requires Letting Go

If you're a manager, then you know that administrative items can consume too much of your time. Are longer hours the answer? Or, can you delegate many of these time consuming tasks? Make no mistake, delegation is not always easy. Learning to let go of an issue and allowing someone else to have control is more difficult for some of us than others. If you won't allow those who are delegated tasks to make decisions without you then work stops, and more bureaucracy exists in the management process. The key is understanding how delegation works.

• Talking about delegation is only talk. You have to choose the person(s) and make it happen which includes **giving authority** not just responsibility.

• Delegation does not mean you loose control. Ultimately, the chain of command and authority remains.

• Age and experience are not required for all delegated tasks. If someone has potential and can be trained in an area, use them now so that they can contribute both now and in the future.

• Delegation is not dumping. Mentoring is needed so that those with less experience can learn how to make good decisions. Information and guidelines are strategic to success.

• Delegation is not a single act. Delegation is a shaping process that reinforces desired behaviors, and requires planning and follow-up.

• Delegation means allowing a decision or situation to run its course differently that the way you would have structured it. You can't clone yourself. There are many ways to cook an egg, but if breakfast is what you want, then the results are the same.

Expect mistakes and treat them as learning experiences. Set goals and time limits so that everyone has a clear measure of success. Your dates may change, but avoid the stress of ambiguity. Your patience and willingness to teach will make success out of your employees and free up time for work only you can do to build the business.

IEEE 841 Motors

Until recently, when there was a requirement for a severe-duty TEFC, 3 phase electric motor, a detailed specification had to be written, calling for various electrical and mechanical characteristics that were considered necessary for the intended application.

Authorship of the specification was tedious and largely dependent on the experience and skill of the writer. Sometimes important features were omitted that diminished the performance and/or reliability of the motor.

The specifications were given to various motor vendors, who then quoted the special features that were called out. The successful bidder then constructed the motor to order. Prices were high and deliveries were drawn out.

Today, all of the above is history. IEEE standard #841 provides a specification for NEMA frame, totally enclosed fan-cooled motors meeting the severe duty requirements of most heavy industries. The Institute of Electrical and Electronics Engineers (IEEE) prepared this standard under the joint sponsorship of the Industry Applications Society Petroleum and Chemical Industry Committee (PCIC) and the Power Engineering Society Rotating Machinery Committee (RMC).

Motors built in compliance with IEEE-841 are the most reliable, smooth running, easily maintained, bearing protected, severe-duty motors ever constructed. They meet or exceed government efficiency mandates and are readily available from most motor vendors at competitive prices.

All major motor manufacturers offer IEEE-841 motors, including Reliance, General Electric, US-Emerson, Baldor, Marathon, Siemens, Teco-Westinghouse, Toshiba, Lincoln, and ABB.

You don't have to be an author to specify a severe-duty motor. JUST SAY "IEEE-841".

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