

The Power Of Ergonomics



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When someone says the words “ergonomic equipment,” what comes to mind? For most, it’s features such as cushy suspension, custom handgrips and adjustable parts.

Often, the physical fit between man and machine is the defining factor in ergonomics, or human factors engineering—an approach to design that considers human strengths and weaknesses. But the discipline goes much deeper than that.

Ergonomic design takes into account the full scope of use, evaluating human anatomy, physiology and psychology. It shapes the form of a product to achieve not only optimal fit and comfort but also to maximize productivity and to protect the user from injury.

“It’s hard to distinguish ergonomics from safety and productivity,” says Ed Wright, director of engineering at [Wright Manufacturing](#), Frederick, Maryland. “If you’re doing one well, you’re achieving all three.”

In short, paying attention to ergonomics can have a profound impact on a landscape business. A look at how operating lawn care machines can affect the human body helps explain why.

Occupational hazards



Performing any activity for a prolonged period of time can lead to injury. Landscape crews are especially vulnerable because they must engage in strenuous physical activity under intense time pressure. “It’s no secret that landscaping crews are often expected to operate a mower for up to 10 to 12 hours a day during the busy mowing season,” says Chris Hannan, marketing manager at [The Toro Co.](#), Bloomington, Minnesota.

Each of the different styles of mowers landscape contractors use can put different kinds of stress on the body, Hannan adds. For [commercial walk-behind mowers](#) and hand-held landscaping tools, injury to hands and wrists is a common problem due to the frequent manipulation of controls. For stand-on mowers, operators occasionally have issues with the knees, feet and lower back. With zero-turn mowers, problems can be concentrated in the lower back.

Regardless of the type of equipment, the combination of noise and vibration is often the biggest cause of operator fatigue—a major contributing factor to injury. “Vibration plays a huge role in the impact that repetitive actions can have on the body,” explains John Adams, industrial design studio manager at [Ariens](#), Brillion, Wisconsin. “Adding vibration in a repetitive activity increases the impact. The lower the vibration, the less chance there is for long- or short-term injury.” Vibration can contribute to nerve damage anywhere in the body, but especially in the hands, feet and back.

Noise also contributes to fatigue and can become distracting to some individuals, removing their focus from the job. Noise itself is also a safety hazard. Most lawn mowing equipment operates at 100 to 105 decibels, well in excess of the Occupational Safety and Health Administration’s recommended [limit for sustained noise exposure](#).

In addition to its impact on the operator, noisy equipment can shorten the window of operating hours. The greater the noise, the greater the restrictions contractors face about where and when they can work. Some homeowners associations limit lawn mowing, leaf blowing and other activities to certain hours.

Ergonomics and profitability

By incorporating ergonomic design, manufacturers minimize the physical stress of prolonged equipment use. This reduces both lost work hours and workers’ compensation claims and can lower insurance costs.

Ergonomics also can contribute to a more productive crew. When the stress of operating a machine is reduced, a worker can perform more and higher quality work. Even a slight increase in efficiency can add up to significantly higher production over the course of a season and positively affect the contractor’s bottom line.

Ergonomics affects the psychology of a company as well. Employees who constantly wrestle with equipment or fear injury are less likely to remain loyal to their employers. By keeping crews comfortable and safe, mowers and other equipment with ergonomic features can help a company retain top-quality operators and minimize turnover.



Injury to hands and wrists is common with commercial walk-behind mowers due to the frequent manipulation of controls.

PHOTO: HUSQVARNA

Advancements in mower ergonomics

The exploding field of materials science is opening up new possibilities for ergonomic design. Look for landscape equipment manufacturers to focus on innovative material applications in future models. Meanwhile, here are some of the latest trends in landscape ergonomics:

Vibration reduction: Minimizing the impact of vibration is the most prevalent theme in equipment design today. Most manufacturers have introduced features to isolate the user from vibration during operation. These include innovative suspension systems in both stand-behind and riding mowers, rubber isolation on handgrips and suspension seating.

Noise reduction: Noise is actually a type of vibration, and some of the same innovations that reduce vibration also make equipment quieter. The type and quality of engine is a big factor. A well-balanced engine will operate more quietly. With advancements in battery technology, a lot of landscaping equipment—especially [hand-held machines such as backpack blowers and trimmers](#)—is now available in cordless electric models. These tend to operate more quietly and with less vibration.

Fit and adjustability: Modern manufacturers are recognizing that equipment operators come in all shapes and sizes. Many producers are abandoning the one-size-fits-all approach in favor of equipment that can be adjusted for safe and comfortable use by both large and small individuals.

Visibility: “One of the things we think about as equipment designers is seating and the operator position relative to the controls,” says Jeff Hickman, director of industrial design at [Husqvarna](#), Charlotte, North Carolina. If an operator has to strain to see the controls, this can contribute to accidents and create strain and fatigue. A lot of effort is put into pinpointing specific locations for certain controls as well as designing machines so that operators can clearly see their work area regardless of the task.

Innovative material selection: The choice of materials can make a big difference in operating comfort. For example, special vibration-dampening polymers are already used on some mowers. Designers also consider how a material interacts with the human body and reacts to factors such as temperature and light. From heat retention and conduction to sun glare, the side effects of a material influence the user’s focus on the job. Even color choices can affect performance. For example, some manufacturers only use specific shades of gray for their seating material; they avoid black and silver because those colors absorb heat.



With zero-turn mowers, contractors can experience overuse problems with the lower back.

PHOTO: TORO

Ergonomics and product pricing

It's easy to assume that ergonomic features will raise the price of a machine. But this is not always the case.

"There will always be complicated ways to build in features that can improve ergonomics, but a lot of times it's just paying attention to the details that fit the human body. And that can be free. Sometimes it's a matter of designing the appropriate size, geometry or material. Those details can deliver a big benefit without increasing the cost," Adams explains.

That said, ergonomic innovations still require development and testing. Manufacturers often need more parts and higher quality parts. Adding adjustability to a static part, for example, will inevitably raise the cost of production. All of these factors can affect the price of the final product.

Additionally, manufacturers must stay on top of changing customer needs. For example, the [American National Standards Institute](#) stipulates that equipment must be designed to fit individuals in the fifth through the 95th percentile in size. For males, the 95th percentile jumped from 243 pounds to 270 pounds in the 12 years between 1994 and 2006. Depending on the model, accommodating those extra 27 pounds could require a complete—and costly—suspension system redesign.

Most manufacturers offer different price points, and many of the more advanced ergonomic features are found on more expensive mowers. However, some may be available as upgrades on a lower-priced machine; it never hurts to ask, especially if a particular feature is a priority.



When using stand-on mowers, operators can occasionally experience issues with the knees, feet and low back.

PHOTO: WRIGHT

The right fit

How much emphasis should contractors place on ergonomic design when selecting a machine? The answer depends on individual needs. Budget is always a deciding factor, but many buyers don't take into account the full impact of their purchasing decisions. Understanding how the design of a machine can impact employees, productivity and morale—and, therefore, profitability—can influence decisions. Contractors should not hesitate to try before they buy, ask dealers and manufacturers about ergonomic features and involve operators in purchasing decisions.

One last thing to remember is that the machine is only half the equation. Ergonomics training for operators will go a long way toward avoiding injury and improving profitability no matter what tasks they tackle.