

# Battery-Powered Reinforcing Bar Tying Technology Improves Efficiency and Reduces Repetitive-Use Injuries

by Mustafa Ali, MAX USA Corp.

About 30 years ago, the first battery-powered reinforcing bar tying tool was invented. These tools have been used successfully since 1993, saving money for general contractors by speeding up their tying work as well as reducing the risk for work-related injuries.

It is no surprise that construction workers face the potential for occupational injuries. From prefabrication yards to road and bridge construction, workers perform demanding functions that may require repetitive motions. These workers are often positioned in cramped conditions where they overexert their energy for eight-hour shifts or longer. Over time, the repetitious work of manually tying reinforcing bars can lead to carpal tunnel syndrome or back pain, which may force workers to take time off from work and lose wages. The incidence of injuries ranging from mild lower-back fatigue to severe musculoskeletal injuries results in incurred costs to contractors, including worker compensation claims, higher insurance rates, and even unforeseeable labor shortages.

To reduce these risks, workers and employers can benefit from the enhanced development of battery-powered reinforcing bar tying tools available in the marketplace. From handheld options to stand-up reinforcing bar tying tools, workers can integrate this technology to avoid musculoskeletal injuries and fatigue from labor-intensive job functions.

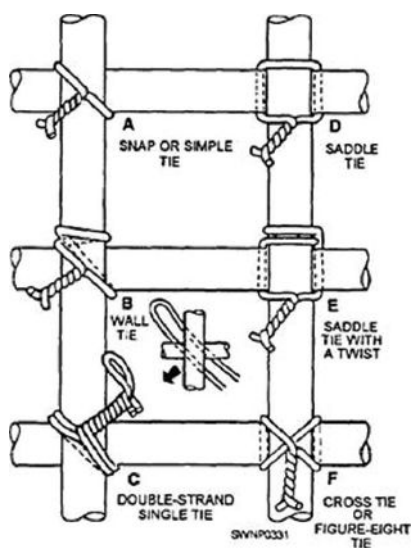
While the technology has not yet evolved to perform more complex ties such as saddle ties, these tools are an excellent option to quickly finish tedious snap ties.

The National Institute for Occupational Safety and Health (NIOSH) evaluated workers' risks of developing back and wrist disorders associated with tying reinforcing bar and the possible benefits of using a battery-powered tier (BPT) to prevent upper-extremity and lower-back musculoskeletal disorders on a particular project.<sup>1</sup> NIOSH concluded that the risk for developing a hand or wrist musculoskeletal disorder is reduced when a BPT or BPT+E (battery-powered tier and extension arm) is used. Using a BPT also lessens stress on the lumbar spine. Because only one hand is required to use a BPT, the free hand or arm is available to support the worker's upper body weight, which should reduce the compressive forces applied to the lumbar spine. Following the development of the extension arm, the first battery-operated stand-up reinforcing bar tying tool was introduced in 2020.

Reinforcing bar tying requires considerable labor; on average, it takes a worker 1 minute to complete five ties (12 seconds per tie). In contrast, a worker using a battery-powered reinforcing bar tying tool can secure a tie in approximately 0.5 seconds. Thus, a worker using a battery-powered reinforcing bar tying tool can expect to achieve an average of 17 ties per

An extension arm can be used to make a stand-up battery-operated reinforcing bar tier for horizontal applications such as bridge decks. Use of such tools may reduce the risk of occupational lower-back injuries. All Figures and Photos: MAX USA CORP.





Battery-powered reinforcing bar tiers are an excellent option to quickly finish tedious snap ties; however, the technology has not yet evolved to perform more complex ties such as saddle ties.

A worker uses a handheld battery-powered reinforcing bar tier.

minute, a rate that is more than three times faster than the unassisted rate. One of the fastest solutions available for tying no. 3 × no. 3 up to no. 7 × no. 7 reinforcing bars offers a wire coil with a minimum of 145 ties and a maximum of 265, providing 5000 ties per charge. Similarly, the battery-powered stand-up tool for tying no. 3 × no. 3 up to no. 6 × no. 6 reinforcing bars, provides a coil with a minimum of 155 ties and a maximum of 260, yielding 4600 ties per charge. These impressive statistics demonstrate that certain tasks on a construction project can be completed in record time.

**Reference**

1. National Institute for Occupational Safety and Health (NIOSH). 2005. *NIOSH Health Hazard Evaluation Report: Genesis Steel Services, Inc. Baltimore, Maryland.* HETA 2003-0146-2976. Washington, DC: NIOSH. <https://www.cdc.gov/niosh/hhe/reports/pdfs/2003-0146-2976.pdf>.

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