



Tools With an Impact

by Felix Marti

Twenty-five years ago I was on a job that required bolting several thousand running feet of 2x4 plates to the tops of steel truss joists in preparation for laying subfloor. The work was overhead, and the socket wrenches I used were real knuckle-busters. At the time, I'd have sold my soul for a tool to ease my task, but it never occurred to me to use an impact wrench.

Unless you work on engines or change a lot of tires, the pneumatic impact wrenches your local auto mechanic uses aren't always a good fit for a construction job site. But an *electric* impact wrench may be a good investment for those of us who bolt together massive trusses, assemble or attach nailers to structural steel, fabricate flitch beams, fasten seismic hold-downs, or lag deck ribbons to house framing.

Over the last several months, several of my coworkers and I experimented with two electric 1/2-inch impact wrenches — the *Fein ASbe 642* and the *Porter-Cable 625*. Both tools have good torque for an electric tool — neither had any trouble starting a 1/2x7-inch lag screw without a pilot hole and driving it all the way home. How I wish I'd had either one on that steel truss joist job long ago.

Engineered for impact. By the time we tested these impact wrenches, I had

long-since stopped using socket wrenches on jobs where we had to drive a lot of long lags or big bolts. Instead, I rigged up a square-drive extension to fit the chuck of a 1/2-inch drill. While this contraption allowed me to use standard drive sockets, the drill tended to yank itself out of my hands as the bolt or lag tightened down, sometimes causing a nasty wrist sprain and more skinned knuckles.

The design of an impact wrench, however, is such that the shaft that holds the socket is not directly connected to the motor. Instead, the socket shaft has a paddle wheel, or "butterfly," that aligns with a large mass, called the hammer, that rotates with the motor. The hammer is held against the paddle wheel by a strong spring. So long as the dogs on the hammer engage with those on the paddle wheel, the socket will rotate. But when rotation slows — from resistance from a long lag, for example — the extra force compresses the spring that holds the hammer forward. As the spring compresses, the hammer slips back, eventually disengaging from the paddle wheel. This releases the compressive force on the spring, which immediately slams the hammer forward, where it reengages with the paddle wheel. The momentum of the massive rotating hammer imparts a lot of torque to the fastener: The wrench literally hammers the screw or bolt home.

This cycle of engaging and disengaging is repeated hundreds of times each second, depending on the resistance of the fastener. Because excess force is never transferred back to the armature for more than a split second, very little torque reaches the hands and wrists of the person holding the impact wrench. It's also virtually impossible to stall the motor.

Porter-Cable 625. This tool is a very compact 9⁵/₈ inches long and weighs 7 pounds. Overall, it has good balance and feel, although it's a little front-heavy.

The 625 has a unique way to reverse



An electric impact wrench can "hammer" long lags or heavy machine bolts into place without transferring much torque to the handle or stalling the motor.



A quick turn of the black housing cap on the Porter-Cable 625 (top) reverses the motor direction. The Fein ASbe 642 (above) is the only electric impact wrench on the market with variable speed and variable torque.

the motor rotation. Instead of a switch that flips the internal electronics, the back of the housing rotates about one inch. This aligns the brushes over a second set of contacts that reverse the motor polarity. According to the folks at Porter-Cable, this method extends the life of the brushes, which are not subjected to the arcing a switch creates. While we didn't use the tool long enough to test this claim, the method of reversing works well. The housing provides a large surface area to grip, so it rotates easily. And unlike a sliding switch, there is never any danger of accidentally reversing motor direction.

Fein 642. As far as I know, Fein is the only manufacturer producing a 1/2-inch-drive impact wrench with variable speed and variable torque. The variable speed is controlled by the trigger, but to change torque settings you have to rotate a wheel in the base of the grip, near where the cord enters the tool. It was difficult to turn this knob with cold, stiff, or oily fingers. When I asked Fein about it, the tech reps there told me that if the wheel turned more easily, it might "self-adjust" from vibration. In any case, changing the torque setting is something you would rarely do for each fastener. Variable torque does come in handy, however, when you switch between materials of different densities, or when

switching from, say, long lags to small-diameter machine bolts.

The reverse switch on the Fein is conveniently placed just above the trigger, but it's a little flimsy. We also found that the mount for the auxiliary handle is too far forward. The handle is too close to the work when the fastener is nearly driven home, especially when driving at an angle: There's still room for your fingers, but not much.

Cost. What we liked least about the Fein is the price: about \$750 on the street (list is \$890). The Porter-Cable is much more reasonable at about \$250 (list is \$427). Since most of the extra expense for the Fein is in the variable-torque mechanism, it's worth thinking hard about how often you would use this feature. But we all agreed that it would be worth having either tool on hand for projects where lots of bolting had to be done. One job like that truss project I struggled through will nearly pay for the wrench in labor saved, and morale among the crew will hit an all-time high.

Tips and cautions. No matter which brand of impact wrench you use, it's important to observe a few simple rules. First, despite what you see while watching pit crews change tires at Daytona, don't remove the wrench from the work until the socket has stopped turning; otherwise, you may round off the fastener head. You should also use sockets that are specifically made for impact wrenches — look for a black finish and a slightly thicker cross-section. Ordinary sockets will not stand up to heavy use and could break and send metal flying.

If you're not getting enough torque, check the socket to see if it's rounded. A series of extensions will also reduce torque, as will a voltage drop from using too long a power cord.

Finally, the joint you are fastening may have some inherent elasticity that causes you to feel as if you are getting nowhere. Once the fastener head has made contact with the washer or plate to which it's being tightened, continued impacts beyond five seconds will have no appreciable effect. ■

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