



Safety

Take a Load Off: Modern Safety Shoes Beef Up Protection While Shedding Weight

James Langford | Feb 22, 2024

These aren't your dad's steel-toed safety boots.

Today's lightweight, style-conscious shoes with slip-resistant soles and protective inserts made from composites are light-years beyond the 20th century's military-style boots with steel inserts—in protective capability as well as comfort.

Both qualities are vital to meeting tightening safety standards as regulators and industry leaders work to curb workplace injuries related to falls, the leading cause of on-the-job fatalities in the U.S.

Comfort, however, addresses an especially insidious risk: that workers whose safety shoes chafe their feet or make walking difficult will simply remove them, exposing themselves to injury and their employers to liability in case of an accident.

The 'Ah' Factor

"We intentionally design what we call the 'ah' factor into our products," says Robert Petersen, director of product and portfolio management for Tingley, a 128-year-old safety apparel and footwear supplier based in Piscataway, New Jersey. "The second you put that boot on, we want you to say, 'Ah, that's comfortable. That feels great.' We want people to wear the product because that's how it protects them. If they're not wearing it, they're not going to be safe."

Like Tingley, personal protective equipment makers worldwide are increasingly recognizing the importance of designing for comfort, since studies show that workers are less likely to wear gear that's uncomfortable, fits poorly or inhibits the movement and dexterity they need to do their jobs.

As a result, a wealth of more comfortable safety shoes are hitting the market at the same time that regulators are stepping up their focus on fall prevention, helping drive \$2 billion of growth over the next six years in a market already valued at \$9 billion, according to a *Global Market Insights* report.

In the U.S. alone, falls from elevated heights contributed to **13 percent** of on-the-job deaths in 2021,

according to the U.S. Bureau of Labor Statistics. In response, the U.S. Occupational Safety and Health Administration introduced an initiative last year stepping up inspections of fall-safety practices at **worksites**.

“Since slips and falls are responsible for so many workplace injuries, shoes with soles made to prevent slips and falls are every worker’s first line of defense,” the nonprofit National Safety Council says.

It **recommends** shoes with flat heels, a patterned tread covering a sole made of nitrile rubber and grooves at least 2 millimeters apart to prevent water retention and 3 millimeters deep to disperse liquids.

Thanks to a new standard from the American Society for Testing and Materials, meanwhile, it’s easier than ever before for safety managers in the U.S. to ensure protective footwear is giving workers the slip resistance they need.

Slip-Resistance Standard

Shoes that meet **ASTM standard F3445-21**, introduced by the benchmark-setting organization in July 2021, have been **tested** for forward slippage when wearers put the heel of their front foot on the ground to take a step ahead and backward slippage when wearers press the toe of their rear foot to push themselves forward. Evaluations are conducted in both wet and dry conditions.

Along with providing slip resistance, protective footwear must keep wearers safe from heavy falling or rolling objects, sharp items that might pierce the sole and electrical shocks, all of which are covered under OSHA’s rule requiring employers to supply **protective footwear** when needed.

The regulator fined U.S. businesses **more than \$76,000** for violations of that standard in the 12 months through September 2023, with 46 percent of the fines imposed on manufacturers.

While discomfort and mobility limitations have long been challenges for businesses trying to ensure worker compliance with regulations, they’re growing easier to handle with advances in protective footwear design and materials.

Boots with protective toe inserts made of composites (non-metallic materials such as carbon fiber, Kevlar and plastics, for example) provide strong protection while weighing much less than old-school steel inserts.

Additional advantages are that they don’t conduct electricity, and they don’t transmit heat and cold as readily as steel does.

Composite toes are among the hallmarks of Tingley’s Flite® safety boots, which are made from Aerex 1.5.5®, a thermally insulative microcellular polymer, and roughly 40 percent lighter than steel-toed PVC boots. A nitrile sole provides enhanced traction.



Tingley's Flite® safety boots include both a composite toe and a nitrile sole. | Photo courtesy of Tingley
Shop boots and shoes at MSC

"It's a very functional product," Petersen says, citing military studies that show that removing 1 pound of footwear weight is equivalent to taking 5 pounds of weight off the wearer's back—or expending 5 percent less energy during the day.

"Often, people working in plants are doing 10- to 12-hour shifts, and if they grow exhausted because heavy footwear leaves them feeling sluggish, then they start making mistakes," he explains.

"There are a variety of benefits that can come when you're in footwear or apparel that's comfortable, doesn't feel heavy and is just a good fit and a functional product," Petersen adds. "Businesses get compliance rates where they want them to be and get workers that are more efficient, more productive and make fewer errors. And because of that, there are fewer workplace injuries."

How have safety shoe upgrades benefited your business? Tell us in the comments below.

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