

# Getting a Leg Up on Chain Saw Safety

By Ariana Zora Ziminsky

You're out in the field, and you're feeling invincible. You've got your chain saw rarin' to go, and you and your co-workers have just felled a tree and are ready to work on the ground now, preparing to reduce it to easily dragged pieces.

You've done this a thousand times, so you feel confident in your ability to handle the chain saw. It's a hot day; you are wearing gloves as well as head protection, and are perfectly comfortable without chaps, which can be a little uncomfortable and are waaaaay over there in the truck ...

Without so much as batting an eyelash, you fire up the chain saw and get down to business.

Wrong choice.

Already in violation of ANSI Z-133, you run the risk of sending yourself to an emergency room for a leg laceration that didn't have to happen.

It's easy to overlook leg protection when using a chain saw. Chaps and pants can be heavy, bulky items that trap in heat and can make working uncomfortable. Taking the extra time to walk over to the truck to fetch the required leg protection might seem like more hassle than its worth. For seasoned tree care workers, using a chain saw comes as naturally as breathing – so taking the extra safety precautions might seem like a waste of time. But the facts speak otherwise.

OSHA asserts that the risk of injury from a chain saw is present whenever a chain saw is being used. This conclusion is drawn from a Bureau of Labor Statistics Work Injury Report that claims, "chain saw kick-back and sudden cut-through, which are major causes of chain saw injuries, are not



*The above photograph illustrates how the basket-woven Kevlar fibers stretch across the chain's cutters. This, in effect, slows its penetration, allowing increased reaction time.*

dependent on whether the chain saw is used frequently or regularly by the operator."

Simply put, the data says that regardless of whether you use a chain saw once a day or once a year, you still face the same chance of getting hurt.

Recent data from the Tree Care Industry Association (TCIA) Illness & Injury Survey indicated that 40 percent of all lacerations that occurred on the job were from chain saws. Of those injuries, about 20 percent were cuts to the legs.

That means that, according to the data collected from 6 million-plus man-hours worth of work in tree care operations in 2003, there were eight chain saw injuries to the leg. As Peter Gerstenberger, TCIA senior advisor for safety, compliance & standards, explains, these were "eight cuts that should have been prevented and would have been prevented if the operator had been wearing proper leg protection."

"Leg injuries from a chain saw – when

they occur – are very costly," Gerstenberger iterates. "Exceedingly high cost, not only in the monetary cost to the employer, but in pain and anguish, lost productivity and a strong likelihood of serious, permanent damage to the chain saw operator's leg."

In an industry where the rate of injury is four times higher than the national average, following required safety protocol is absolutely essential.

## **The message is simple: Protect your legs**

For Scott Prophett, business manager at Sherrill and a treeworker, using leg protection while running a chain saw is a no-brainer: He's seen his share of both injuries from not using protection as well as close calls where the chaps or pants did what they were intended to do.

On a moment's notice, Prophett can think of several instances where protective pants played a key role. At one occasion, a worker "didn't even realize that he had accidentally bumped his leg with the chain

saw till he looked down and saw the gash in the Kevlar,” Prohett recalls.

In fact, he continues, quite often “you don’t really know that (chaps and pants have) done their job till you are taking the chaps off at the truck” at the end of the day – and notice the small nicks and cuts from the chain saw. “You can tell right there it did its job.”

David Tilton, marketing manager for Tilton Equipment Company in Rye, N.H., couldn’t agree more.

“This is absolutely essential equipment,” he says of chain saw leg protection.

In Tilton’s opinion, folks aren’t ignoring leg protection because they are unaware: “I think that they know that they should be (wearing it),” he says. “The attitude (is) it’s a hassle; some folks don’t want to spend \$75 (on leg protection); and don’t realize what a trip to the emergency room would cost them” if they did injure their legs.

### What’s out there for safety products?

The range of leg protection for chain saw workers on the ground is relatively simple: The basic options are protective pants, chaps, wrap-around chaps or bib/pants combinations. The protective material is generally either a form of Kevlar or a warped-knit nylon material, and must be compliant with national standards (see sidebar). Other materials can be combined with the Kevlar and ballistic nylon to provide warmth, aid in cooling, or add water resistance.

The long-standing debate of whether chaps or pants provide the best protection has proven to be somewhat inconclusive, according to Gerstenberger.

“It’s more of a theoretical debate – at least in the tree care industry,” he says. “The question is, if you lay a running chain saw across your leg with chaps, (would the chain saw) pull the protection around and cut the leg underneath?” Gerstenberger explains. “At this point, we really don’t have enough data to prove or disprove this



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theory.”

Prohett agrees that chaps and pants are equals in the protection they provide. The main difference between the two, he says, has little to do with safety: It’s mainly a matter of comfort: “Pants you would wear all the time. Chaps are designed so that you can put them on over your work clothes when you need them. “They’re all going to be safe,” he adds. Comparing the safety of partial-wrap chaps to full-wrap chaps to pants “is not a major issue.”

### How does leg protection work?

The main function of chain saw leg protection is simply to give the operator an extra barrier. Leg protection is not designed to necessarily stop an injury from happening; instead, it slows down the rate

at which it happens, giving the operator more reaction time to prevent the injury.

Protective pants work in two different ways: The standard Kevlar pants add a thick, tough layer that can withstand minor cuts and will slow down any major cuts into the fabric. The threads in a pair of warped-knit nylon pants come apart when it comes in contact with a chain saw, and the threads get caught in the chain, locking it up and in essence turning the chain saw off.

The warped-knit nylon is a newer innovation that has been around for the past decade or so, according to Prohett, but Kevlar is the more popular type of leg protection sold by Sherrill.

“They are a little more durable,” Prohett explains. If you “snag and pull the warped knit nylon, they are damaged ... (and) you have to throw them away.”

Along that same line, it is important to ensure that the protective pants and chaps you have on your work truck are not damaged to the point where they no longer offer the full amount of protection. Inspect them frequently for any damage that would compromise the level of safety they should be providing, and replace them when necessary.

As Tilton points out, “It is vital to remember that “pants and chaps are not cut proof. What they do is buy you time.”

Prohett echoes that sentiment: “If you try hard enough, you can cut through Kevlar chaps (or the) ballistic nylon. But it’s better than not having them on at all.”

### Standards for leg protection

Leg protection for chain saw operation on the ground is specifically required in the United States by ANSI Z-133. OSHA general industry regulations for PPE leave the employer that doesn’t require it in an almost indefensible position.

OSHA Regulation 1910-266 requires that “The leg protection shall cover the full length of the thigh to the top of the boot on

each leg to protect against contact with a moving chain saw.”

The industry standard for protective chaps and pants while using a chain saw are outlined in ANSI Z-133, section 4.2.1.: “Chain saw resistant leg protection shall be worn while operating a chain saw during ground operations.”

Chain saw pants and chaps need to meet other national quality standards (see sidebar).

In Europe, leg protection standards are more stringent than those in the United States. Paul Verhelst, export and product manager for SIP Protection in Belgium, explains how European standards have led to production of leg protection pants where comfort is as important as safety.

“In Europe,” Verhelst explains, “anyone working with chain saws must wear pro-

TECTIVE pants; that means also the tree climbers working in the tree.”

Also, he adds, employers are required to provide chain saw operators with appropriate leg protection when it is deemed necessary; if the worker does not wear the PPE, then he/she is responsible for any injuries, and an insurance company could very well not pay if there is an accident and the required leg protection was not worn.

“Because of this regulation,” Verhelst continues, “manufacturers in Europe have tried to come (up) with much lighter and more comfortable garments ... since everyone has to wear them. ... The market was big enough to investigate” and make an effort toward creating better products.

The European EN 381-5 Norm – the European standard for leg protection for chain saw users – defines three types (or designs) of leg protection wear, according

to the kind of protection they provide: The clothes of type A and B – which are similar to partial-wrap chaps – are intended to be used mainly by professionals. The clothes of type C – which wrap fully around the legs – are a requirement for students as well as others who don’t normally work with chain saws, or are using a chain saw in an “exceptional situation.”

Similarly, the UK’s Health and Safety Executive, which plays a role similar to OSHA in the United States, has a directive of its own:

Personal Protective Equipment (EC Directive) Regulations 1992 calls for “protection for legs incorporating loosely-woven long nylon fibres or similar material. All round protection is recommended.”

As explained in “A Short Guide to the Personal Protective Equipment at Work

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## WHAT DO THE STANDARDS MEAN?

When shopping for chaps or pants, you'll want to see mention of the following quality standards:

### F1897-04

Standard Specification for Leg Protection for Chain Saw Users

1.1 This specification specifies minimum requirements for the design, performance, testing, and certification of protective garments and protective devices designed to provide cut resistance protection to the legs of operators of power chain saws.

1.2 The objective of this specification is to prescribe fit, function, and performance criteria for protective garments and protective devices that, when worn by chain saw operators, are intended to reduce leg injuries caused by contact with a running power saw chain.

### Tested by Underwriters Laboratory to Comply with ASTM F1414-99

Test Method for Measurement of Cut Resistance

1.1 This test method measures cut resistance of garments and devices worn to protect the lower (legs) body when operating a chain saw.

1.2 This test method may be used to test for compliance to minimum performance requirements in established safety standards.

1.2.1 By agreement between the purchaser and the supplier, or as required by established safety standards, it will be decided if this test method will be used to determine any one or all of the following: (1) threshold stopping speed; (2) success/failure (jamming/chain stop) at specified chain speed; or (3) cut through time.

1.3 This test method may be used to determine levels of protection for areas of coverage as stipulated in established safety standards.

Regulations 1992,“ the PPE regulation is “not compulsory and you are free to take other action. But if you do follow the guid-

ance you will normally be doing enough to comply with the law. Health and Safety inspectors seek to secure compliance with

the law and may refer to this guidance as illustrating good practice.”

## Summary

Chain saw injuries to the leg can be drastic, tragic events that can cripple a tree care worker for life. Adhering to the simple requirements set forth by national agencies, investing in a quality pair of chaps (usually less than \$100) and properly maintaining personal protective equipment will go a long way to keeping you intact while operating a chain saw.

The best approach to leg protection is simple. In Prophet's words, he “wouldn't leave home without them.”

Chaps and pants might run you \$75 bucks or so, he says, but a chain saw's cut to the leg – “It's going to (cost) thousands!”

*Ariana Zora Ziminsky is a former assistant editor of TCI magazine.* ⚡

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