

# FALL PREVENTION THROUGH DESIGN

## WELL-ENGINEERED LADDERS HELP PREVENT INJURIES

Every year over 300 people die in ladder-related accidents, and thousands suffer disabling injuries. Join the American Ladder Institute (ALI) in celebrating the first-ever National Ladder Safety Month, designed to raise awareness of ladder safety and to decrease the number of ladder-related injuries and fatalities.

of completion. The site also allows safety managers to load groups of employees into the site and track their training, giving you a permanent record of who received the training and what they scored on the test. If you prefer hands on training, representatives in your area can come to your safety meeting and provide the training.

Over the last 10 or 20 years, we have greatly increased the amount of ladder safety training available. The problem is that ladder-related accidents are increasing, not decreasing; safety training alone is not enough. We need to stop climbing Grandpa's ladder, both figuratively and, in some cases, literally.

Think about it; there aren't many products that you use today that are the same as they were when your Grandpa was using it. Everything has improved, especially products in the safety category. However, ladders haven't changed much in hundreds of years. Sure, the materials have changed from wood to aluminum to fiberglass but the design has remained fundamentally the same.

When designing a product or process, it is best to design out all dangers. This concept is outlined in the hierarchy of control. Simply put, engineer the danger out. If that is not possible, guard against the danger. If you are unable to adequately guard against the danger, then warn, train and provide PPE.



Using ladders on uneven ground, overreaching (below left), working on ladders backwards, missing the bottom step or standing on the top cap (above) are all human-error reasons why ladder accidents are so prevalent in the workplace.

Unfortunately, long ago someone decided the ladder couldn't be improved, so they just put a lot of warning labels on it and scheduled countless training meetings telling people not to do the things we know they do. Everything else has improved with technology — I think it's time to start improving ladders.

Understanding how people use ladders and, more importantly, how they get injured using ladders, is key to designing new, safer climbing products. Studying the statistics, we can divide ladder accidents into three categories:

1. Strains and sprains from unloading, carrying and setting up the ladder. Almost half of the reported injuries involving ladders are caused by the awkward size and weight of the ladder. The easy solution to this problem is to make the ladder lighter.
2. Using the wrong type or size of ladder for the job. A lot of times this issue is caused by the first problem. The right size ladder is

- too heavy, so we grab the smaller one and try to make it work by climbing too high on the ladder.
3. Falls from height due to overreaching or improper setup.

All three are painful and costly, but more disabilities and fatalities come from catastrophic falls from height, so let's concentrate on that.

"I was just trying to reach that last thing," is the first line of a lot of bad ladder accident stories. We are trained to keep our bodies between the side rails to prevent us from overreaching. However, we know this doesn't always happen. Too often, we stretch to reach that one last thing instead of climbing down and moving the ladder. No matter how much we train people, it's human nature. By understanding this recurring problem,

The SafeFrame is designed to prevent the most common types of stepladder injuries. It has adjustable feet for working in uneven areas.



Far right: Maintain three points of contact.

we can design around it. Again, "Stop using Grandpa's ladder."

Another factor in side-tip accidents is how level the ground is in the setup. When working outside, the ground is almost never level. In fact, a lot of time it's not even level inside. To give you an idea of how much level ground can affect tipping, here's an example: If a 28-foot extension ladder is 1 inch off at the base, the top of the ladder will be 19 inches



Proper ladder usage can be encouraged by well-engineered ladders that help avoid common accident causes "by design." Adjustable leveling feet, outriggers for stability and cages that enclose workers all help minimize user-error risks of accident.

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in industry, we hope that all ladder manufacturers will stop building Grandpa's ladder and start designing ladders built for how people really use them. **CS**

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Systems, has worked in the ladder industry for over 30 years and travels the country performing free ladder safety training for all kinds of companies. He can be contacted via e-mail at [dave@ladders.com](mailto:dave@ladders.com) or [www.laddersafetyhub.com](http://www.laddersafetyhub.com).



FRANCIS

The OSHA standard does not include portable ladders in the six-foot tie-off requirements, but that has not stopped a lot of companies from including it in their best practices. In fact, some companies require tying off when as low as 4 feet off the ground. These rules are meant to protect the user but are very difficult to follow, sometimes even impossible.

Because of these difficulties, some general contractors have imposed restrictions on using ladders on their job sites. They require their subcontractors to find different ways to get the jobs done. We agree, you should stop using Grandpa's ladder and find a safer way.

By combining the platform and handrail system of an enclosed scaffold system with an adjustable fiberglass stepladder, you can solve these issues. These new adjustable safety cages or adjustable enclosed platforms have recently hit the market.

While working in the caged platform you do not need to maintain three points of contact, and you can work freely with both hands in any direction. The 42-inch handrail system on the adjustable safety cages removes the need to tie off from above, allowing operators to get the job done quickly and safely, even when there is nothing to tie off to. The adjustable base would also allow it to work safely on uneven ground and stairs.

Now that these designs are a reality and being widely accepted

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The Adjustable Safety Cage allows you to work safely on stairs and uneven surfaces while being a safe alternative to tying off.



reduce the possibility of a tip due to overreaching. Extension ladders with outriggers are safer than traditional straight ladders.

Another design to help reduce tips on extension ladders is a self-locking attachment at the top of the ladder that secures the ladder in place. These are three innovative tools that will increase stability on an extension ladder and reduce injuries, but what about a stepladder?

Stepladders have different problems to overcome. People still tip over because of overreaching, but you also need to solve the three-points-of-contact issue and any tie-off rules that might apply. You also need to work on uneven surfaces or staircases.

You should always maintain three points of contact when ascending and descending a ladder (two feet, one hand or two hands, one foot) but what do you do when you stop climbing and start working? Most safety people say you should still maintain three points of contact, but workers say it's hard to get the job done using one hand.

off of the center of gravity. That puts the top of the ladder completely out of the footprint of the ladder. Even if you are keeping your body between the side rails, your ladder will tip.

When asked what they do when the ground is not level, most people will say that they use a brick or a board to build up the low side of the ladder. Spending time on a scavenger hunt looking for the right-sized board to level your ladder doesn't sound very productive or safe. OSHA recommends that you dig out the high side of the ladder instead of building up the low side. Because this approach is more time consuming, most people don't do it.

After-market leg levelers can be added to the base of your ladder, but they have two major problems. First, they add extra weight to an already heavy ladder (remember problem number one); and second, they do not add extra stability to the ladder.

When large equipment on a job site needs to be stabilized, the manufacturer adds outriggers for you. Why not do the same on an extension ladder?

#### SAFETY BY DESIGN

By adding outriggers to an extension ladder, we can increase the side-tip stability by over 600 percent. Because level ground is such a big factor in most side-tip accidents, designing the outriggers to adapt to uneven surfaces will also greatly

## NATIONAL LADDER ASSOCIATION PRESIDENT MEETS WITH OSHA LEADERSHIP

The president of the American Ladder Institute (ALI), Ryan Moss, met with OSHA leadership in Washington, D.C., to foster the relationship between ALI and OSHA and discuss strategic plans for collaborating to promote the safe use of ladders.

The upcoming National Ladder Safety Month in March 2017 was also presented and OSHA agreed to work with ALI to raise the public awareness on the proper selection, care, and safe use of ladders. ALI was also invited to participate in OSHA's Alliance Program Construction Roundtable (APCR).

"With more than 300 people dying each year in ladder-related accidents, the American Ladder Institute is focused and dedicated to reducing these numbers," said Ryan Moss, president of ALI and chief executive officer of Little Giant Ladder Systems.



MOSS

"Working arm-in-arm with OSHA to educate the public to the proper selection, care and safe use of ladders will help reduce OSHA-reported ladder-related fatalities. OSHA's support for the upcoming National Ladder Safety Month in March 2017 will raise awareness and complement the combined efforts of leading ladder manufacturers to promote the safe use of ladders."

Every ladder accident is preventable, but without better training and continuous innovation in safety planning and product design, fatalities will continue. U.S. and Canadian ladder manufacturers and manufacturers of ladder components are working with OSHA to collaborate on ladder safety initiatives, disseminate appropriate standards and educate the public to the proper selection, care and safe use of ladders.

#### ADDITIONAL RESOURCES:

- Ladder Safety Trainings: <https://www.laddersafetytraining.org>
- Twitter: [https://twitter.com/American\\_Ladder](https://twitter.com/American_Ladder)
- YouTube: <https://www.youtube.com/user/AmericanLadderInst>
- OSHA Construction eTool – Misuse of Portable Ladders: <https://www.osha.gov/SLTC/etools/construction/falls/mainpage.html>