PUT YOUR GUARD UP: GUARDRAILS PROTECT EVERYONE

Part one of a series on guardrails from the industry experts at Builders Mutual.

By the time the average residential build is complete, 140 people will set foot on the job-site. If you take commercial job-sites into consideration, that number increases dramatically.

PLANNED AND UNPLANNED VISITORS.

There are usually two groups of people on your job-site. The first group includes your employees, sub-contractors, inspectors, and those making deliveries. Most of them are familiar with potential construction hazards, but accidents can happen to even the most experienced professionals.

The second group encompasses potentially unplanned visitors, including real estate agents, homeowners, trespassers, and children playing in houses under construction in their neighborhood. These are the "visitors" you may not think about when choosing whether to install guardrails.

Every year, Builders Mutual responds to costly General Liability claims when someone is injured from a fall on a job-site. Falls are the No. 1 type of claim that we see and while there are many types of falls, guardrails can often help prevent these injuries.

NOT IN THE PLANS. NOT IN THE TIMELINE.

If you think about your current projects, are you certain that guardrails are in place? If you're not sure, you're not alone. Even on job-sites manned by seasoned professionals, guardrails are often missing around stairways, windows, and raised perimeters.

One reason for this omission in residential construction is that guardrails are simply not in the plans. It's rare that the plans include measuring and ordering the amount of wood that's needed for each opening – and it's even less common that this is included in the budget ahead of time. As a result, workers often find themselves using scrap wood to install makeshift guardrails when they have time.

Additionally, your team is busy. Rough framing in particular is a fast-paced area of construction. Workers are in and out in a couple of days. This timeline can lead to guardrails being omitted, with contractors assuming that the opening will be protected or covered the next day. In the meantime, it takes only a second for an accident to happen.

EVERYONE SHOULD TAKE RESPONSIBILITY FOR GUARDRAILS.

So, who is responsible for pointing out missing guardrails? For installing them? For planning ahead so they aren't missed next time?

Ultimately, the general contractor is responsible for the structure. The GC should take the primary role of establishing when and where guardrails should go up. But we can all share in the duty to protect the site. All subcontractors and employees on the job-site have an obligation to speak up if they see missing rails. They, too, can be held responsible if someone is injured on their watch.

As changes are made on the site to keep the project moving forward, everyone should ask themselves if guardrails are needed at that stage. For example, if guardrails are up around an interior opening but are taken down to install drywall, then the workers at that spot must ensure the guardrails are put back up – even if this means switching to a free-standing boot-system.

CHANGE JOB-SITE SAFETY CULTURE.

It takes only two minutes to install guardrails – and the results are well worth it. Falls that easily could have been prevented by proper guardrails result in injuries ranging from broken bones to death.

We need to change the culture surrounding guardrails to make them a must instead of a maybe. Here are some ways to start elevating your safety culture:

- Incorporate guardrail training into your new hire orientation. Explain why guardrails are important and how to install them properly.
- When you see a missing guardrail, address why it wasn't installed and offer time for questions and answers.
- Ensure the younger generation gets the message. Typically, older, more seasoned workers attend tradeshows and industry meetings. Make sure they know to take learnings back to younger team members on the job-site.

PUT YOUR GUARD UP.

To protect workers and job-site visitors alike, Builders Mutual and our partners are committed to increasing the use of guardrails. We want to empower every person on the job-site to take responsibility for guardrails and if a worker or visitor does not see guardrails in place, we want them to speak up. Guardrails are one of the few safety measures that protect everyone on a construction site.

Learn how to Put Your Guard Up correctly in part two.

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PUT YOUR GUARD UP: MEET OSHA STANDARDS WITH THIS GUARDRAIL CHECKLIST

Part two of a series on guardrails from the industry experts at Builders Mutual.

Guardrails play a critical role in protecting workers and visitors on your job-site, but they work only when installed properly. In this article, we will cover how to Put Your Guard Up correctly.

OSHA REQUIREMENTS FOR FALL PROTECTION

Before work begins, OSHA requires that employers provide fall protection where workers are exposed to vertical drops of six feet or more. Guardrails are one of three main ways to provide that fall protection. You can also deploy safety nets or provide personal fall arrest systems for each employee.

Many times, the nature and location of the work will dictate the form that fall protection takes. Consider inspecting these common fall locations before beginning work:

- Window openings
- Stairways and landings
- Second-story entrances
- Exterior porches, decks, front steps
- Scaffolding
- Around the floor deck in the house (reassess these areas as you build each floor)
- Elevator shaft

YOUR GUARDRAIL COMPLIANCE CHECKLIST

If you choose to use a guardrail system, you must comply with the 10 OSHA provisions listed below. Be sure you have checked all 10 before work begins on your job-site.

1. Top edge height of **top rails** must be between 42 +/- 3 inches above the walking/working level, except when conditions warrant otherwise and all other criteria are met. For example, when employees are using stilts, the top edge height of the top rail must be increased by an amount equal the height of the stilts.
2. **Mid rails** must be installed between the top edge and the walking/working surface when there is no wall or other structure at least 21 +/- 3 inches high.
3. **Mid rails** must be midway between the top edge of the guardrail system and the walking/working level.
4. **Toe boards** must be installed to prevent materials and/or tools from falling to lower levels.

5. **Screens** and **mesh** must extend from the top rail to the walking/working level and along the entire opening between rail supports if material is stacked above the toe board height.
6. You may leave a maximum of 19 inches between your guardrail and a structure to allow for work to be done.
7. Guardrail systems must be capable of withstanding at least **200 pounds of force** applied within 2 inches of the top edge, in any direction and at any point along the edge, and without causing the top edge of the guardrail to deflect downward to a height less than 39 inches above the walking/working level.
8. Mid rails, screens, mesh, and other intermediate members must be capable of withstanding at least **150 pounds of force** applied in any direction at any point along the mid rail or other member without deflecting below 18 inches.
9. Guardrail systems must not have **rough or jagged surfaces** that would cause punctures, lacerations, or snagged clothing.
10. Top rails and mid rails must not cause a **projection hazard** by overhanging the end posts.

MAKE GUARDRAILS A HABIT

While it is ultimately the general contractor's responsibility to have properly installed guardrails in place, everyone can participate in creating a safe job-site. As a team, you can create a safety culture where it is a habit to Put Your Guard Up as soon as an opening is created.

All trades and subcontractors should be briefed on their roles in creating a safe work environment. Often, guardrails must be removed or reworked to accommodate each day's task. For example, one team may take down guardrails to paint the interior. It is now their responsibility to reinstall the appropriate fall protection. Additionally, consider the type of guardrail system you have available to your team. While 2x4s may work during initial stage, you may need to provide free standing guardrails with boots before the end of the project.

Assign someone to review the guardrail checklist at the beginning of each work day. This will help to catch missed openings or places where a guardrail was removed the day before. Anyone on your team could be trained to perform this inspection. You could even rotate the task through the team, making it a great way to engage everyone.

We encourage you to print this checklist and keep it handy in your truck or office for reference.

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PUT YOUR GUARD UP: EXAMINING AN INCIDENT CASE STUDY

Part three of a series on guardrails from the industry experts at Builders Mutual.

Guardrails may seem like a small part of your overall job-site safety plan, but they have the power to save lives and protect workers and visitors from injury. Risk Management expert Sean Purcell joins us to share a real incident that could have been prevented with proper guardrail use. We will review the context of the accident as well as the measures that could have prevented injury.

THE SITUATION

This case involves an employee who worked for a custom home builder. He'd spent 20 years in the field performing residential insulation work. To protect his privacy, let's call this employee Nick.

Nick was a seasoned veteran of construction job-sites who had been through many safety meetings regarding fall protection during his career; however, the safety culture at this company was slack.

Three years ago, his company began an informal Stop Work Authority (SWA) program designed to increase the responsibility of workers who see unsafe conditions. The SWA program was supposed to be reviewed during new-hire orientation, but Nick never received instruction on this specific program or the steps to take to stop work.

Additionally, workers at this company often worked without proper fall protection in place.

THE INCIDENT

On the day of the incident, the crew arrived early in the morning and got started. No one was in a rush or attempting to work too quickly. Nick was working as a member of a crew that was performing air seal work on the second floor of a new residential home.

The crew had not been working long before the incident occurred. Nick was walking backward spraying foam from a can along the rim joist when he reached an unprotected stairway opening. As he stepped back with his right foot, he stepped through the stairway opening. Nick fell head first about eight feet to the stairs below. He continued to tumble another four feet down the rest of the stairs to the first floor.

THE PROBLEMS

With this context in mind, there were five immediate safety failures that led to the incident:

1. The general contractor failed to enforce the use of fall protection onsite or to lead a review of job-site

hazards before starting the day, which should have caught any missing guardrails. The GC has the primary responsibility for the safety culture on the job-site.

2. The framer failed to install guardrails (as required by OSHA) after creating the fall exposure at the stairs. The moment a six-foot vertical drop is established, fall protection is required.
3. The sales employee should have informed the GC that no work would be done without proper guardrails in place.
4. The crew lead should have recognized the hazard and stopped work using the SWA program. When guardrails are not in place, the crew lead should notify everyone, including the GC, of the issue and pause work until the hazard is corrected.
5. Given his industry experience, the injured employee should have recognized the hazard and made sure the crew leader took the necessary steps to ensure the job-site was safe before work began.

As you see, everyone on the job-site plays a role in creating a safe work environment. If any of the people mentioned above had followed OSHA fall protection rules, this incident would not have occurred.

THE RESULT

Following the accident, the GC recognized the need for more training to improve the safety culture. All of the company's employees participated in a 10-hour OSHA training session. Moving forward, all of their employees will be trained on a formal SWA program regardless of how long they have been at the company.

Nick was lucky; none of his injuries required surgery. However, these types of trainings shouldn't wait until someone is hurt. We encourage you to review the training programs and resources you have in place today.

Next in our guardrail series, we will review more real-life incidents and examine the cost of missing guardrails.

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BUILDERS MUTUAL

PUT YOUR GUARD UP: THE COST OF MISSING GUARDRAILS

Part four of a series on guardrails from the industry experts at Builders Mutual.

Several years ago, Risk Management expert Sean Purcell was called to investigate a construction worker fatality in North Carolina. As Purcell pulled up to the job-site, he saw a two-story house with a complete roof and its siding underway. Inside the front door, he found a two-story foyer where the fatality had taken place.

When he looked up, he noticed a walkway that ran from one side of the foyer to the other. There were no guardrails. When he looked down, he saw blood on the subfloor.

At the time of the accident, the employee had been carrying lumber across the unprotected walkway. The employee lost his balance and fell 12 feet to the subfloor below, landing head first and bringing the lumber down on top of him.

The employee was fatally injured in the fall, breaking his neck and sustaining numerous facial fractures and lacerations. He was married with two young children. And although he had been working in construction for five years as a laborer, it was only his second week on this job.

FALLS CAN COST LIVES.

Had there been proper guardrails where required on the job-site, this accident would have been 100% preventable. After speaking with the subcontractor's team, Purcell learned guardrails were not a part of their safety culture. They installed guardrails only when the general contractor specifically required them and felt guardrails took too long to install. Guardrails were the GC's responsibility anyway — or so they thought.

The subcontractor received a large fine from OSHA, as did the GC. Had they realized that a fall would cost a team member his life, perhaps they would have done things differently.

The insurance claim was paid out to the widow, but Purcell is positive she would rather have had her husband and the father of her children home instead.

UNDERSTAND THE FINANCIAL REPERCUSSIONS.

Purcell has investigated many fall-related claims since this case. While falls don't always cost a life, they can cause serious injury and have huge financial repercussions. Take a look at these claims involving the lack of or improper use of guardrails, and notice the total costs from the injury reports:

Total: $2,604,500
The injured worker was on a second-floor balcony when he leaned over to call to an employee below. The temporary handrail wasn't installed properly and gave way. He was put under a chemically induced coma and intubated on a ventilator with a chest tube in place after sustaining 12 broken ribs, a spinal fracture, a sacral pelvic fracture, and a right hemopneumothorax.

Total: $4,110,653
The injured worker fell 36 feet from a third floor that did not have guardrails. He suffered traumatic brain injury, scapula fracture, multiple pelvic fractures, abdominal injuries, pulmonary contusion, and spleen laceration.

Total: $2,470,000
The claimant stepped on a loose board and fell approximately seven feet to the ground through an unguarded opening. The claimant was diagnosed with acute spinal cord injury due to the fall and is completely paralyzed from vertebra T-11 (right above the waist) down.

Total: $4,870,000
A third party entered the insured's home and fell 14 feet through a floor opening that was not properly protected. He sustained right leg, sacral, and scapula fractures, traumatic brain injury, and multiple pelvic fractures.

Total: $3,541,000
A subcontractor fell down an unsecured stairway without handrails, sustaining multiple fractures, spinal cord injury, hemorrhagic shock, and hematoma.

Total: $5,000,000
A real estate agent entered a home with potential buyers. As they went up the stairs, the agent's high heel went into a gap between two 2x4s, and she fell off the unguarded stairwell to her death.

GUARDRAILS SAVE LIVES AND MONEY.

As an industry, we can't afford to continue thinking of guardrails as a *maybe* instead of a *must*.

These totals are high enough to put a company out of business, even if the injured worker is able to return to work. However, the cost of a life is beyond measure.

Guardrails protect your team and your business. We encourage you to review the training programs and resources you have in place. Have you created a safety culture where everyone feels responsible for the lives of workers and visitors alike?

Next in our guardrails series is a product review of the fall protection systems available on the market.

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PUT YOUR GUARD UP: THE OTHER THINGS

Your guardrail is up. What other precautions should you be taking?

If you've read part one of our Put Your Guard Up blog series, you know the reasons why making sure guardrails are installed on your job-site is so critical. 140 people set foot on a typical residential job-site, with many more for a commercial project. Installing guardrails should be a must, not a maybe. But simply installing a guardrail and crossing it off the list isn't enough.

What are some common mistakes made on a job-site when it comes to installing guardrails? What things might get overlooked? We spoke to two industry experts, Builders Mutual Senior Risk Management Consultant Ed Protzman and President of Safety Maker, Inc. Andrew Hilliard, to get their thoughts on what things might get missed on a busy job-site and how you can ensure you Put Your Guard Up without letting your guard down.

PROPER INSTALLATION

Simply putting up a guardrail is not enough. You need to ensure that it has been installed properly so it provides proper protection. Some things to consider when installing guardrails:

- If guardrails are placed on the inside of a staircase when also being used as a handrail, do not place landing railings or flat surface guardrails on the outside of the support posts. When the railing is outside the support post, you lose structural integrity as the nails or screws attaching the railings to the post become the weakest link when pressure is applied to the rail. **Make sure the guardrails are placed inside the support posts to ensure structural integrity.**
- The failure to tie handrails and guardrails together, using blocking or short cross members, creates a railing structure with a greater flexibility as the independent sections won't have the support and benefit of the other structural members when lateral force is applied. The guardrail may meet the 200 lb. requirement, but **stiffening the railings by tying them together creates a firmer structure which allows a falling party to stabilize themselves quickly.**
- An additional technique to strengthen a guardrail system is to alternate the orientation of the vertical posts to transfer the shearing forces when the load is applied to the guardrail. Alternated posts will not have the directional weaknesses as posts with alternative orientation.
- Extra care should always be taken when a guardrail ends without a structural attachment point as the end point can easily flex or move under the weight being placed on the top rail in a fall.

PROPER MATERIALS

The material you choose to use for your guardrail can be as important as the way it is constructed. Here are a few things to look out for when you are choosing guardrail materials:

- Scrap or substandard lumber that have splits, rough edges, or knot holes are often popular guardrail choices because they are seen as materials that cannot be used in construction. They often create substandard guardrails, as splits lead to a less structurally sound railing, rough edges can lead to hand injuries from cuts and splinters, and knot holes can compromise structural integrity and potentially lead to broken fingers, especially if the guardrail is incorporated and used as the handrail.

- Be aware of protruding nails through the railing lumber, as this can cause a potential puncture hazard to users.
- Ensure that toe boards are installed and maintained. Over time on a job-site, toe boards can be bumped and kicked and eventually become loose, which can create a falling hazard below. These are especially easy to miss or forget about on stairway or platform landings.

WORKING AT HEIGHT

Guardrails are designed as barriers aimed to keep workers safely distanced from fall hazards on the job, but workers at heights using stilts or working from step or platform ladders are above the benefits of the guardrail. Here are a few things to keep in mind to help protect these workers:

- Take the height of the elevated work surface, such as worker shoe placement on the stilts or work surface ladder tread, from the base floor surface, then add a top rail of equal distance, up to 42 inches, from the top rail of the existing guardrail. Then place another mid rail between the new top rail and the old top rail.
- You can also take the measure distance and add railings at 21-inch increments until the top of the last railing exceeds the additional number of inches from the new elevated work surface.
- Vertical support posts may need to be extended for landings and leading-edge work. The strength of the vertical posts should also be assessed, as workers working from elevated platforms may generate a greater fall force since they are falling from a higher origin point.

SUBCONTRACTORS

Keep in mind that anyone on your job-site should be responsible for maintaining the same level of guardrail safety that you do. When you are working with subcontractors, be sure to consider the following:

- Any work done with framers should begin with a conversation about guardrail safety, which may include offering a brief baseline training for either employees or subcontractors.
- Any contractor who uses a subcontractor that removes guardrails as part of their work, such as drywall installation, should make it clear that reinstallation of proper guardrails is a requirement prior to leaving the jobsite.
- Stating these guardrail requirements in the bid specification process and contracts can help add clarification and remove confusion on the job-site.

ADDITIONAL EQUIPMENT

In addition to a standard guardrail, there are other pieces of equipment that can help ensure safety on the job-site. Here are a few things to consider when you put up a guardrail:

- Non-penetrating guardrails that can clamp on to the edge of a concrete slab or staircase
- Tall-guardrail braces that ensure safety for workers at heights
- Stair rail clamps that help create compliant stair rail systems on commercial or multi-family job-sites
- Guardrail clamps that can be utilized on both horizontal and odd-angle structures

Learn more about these types of products and more from our partners at Safety Maker, Inc.

While guardrails are installed to prevent sudden falls, there are many things to consider when installing them to ensure your job-site is safe. By installing them properly, and checking all the boxes, you ensure that everyone who enters your job-site is safe with every step they take.

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