

Innovation in PPE in the Construction Industry



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Innovation in PPE in the Construction Industry

Did you know about [50% of those who die on construction](#) job sites come from small companies with ten or fewer employees or among those who are self-employed? And a good number of these deaths are caused by a lack of appropriate safety measures and equipment like harnesses.

This statistic shows the importance of using personal protective equipment (PPE) when working on construction projects. That's why in this article, we're going to introduce you to PPE and explore the factors fueling the innovation of PPE products to keep workers safe.

What is PPE in the Construction Sector?

Personal protective equipment (PPE) refers to protective clothing and equipment that help keep people safe and secure on a construction site. This type of equipment helps to prevent or lessen the severity of injuries when accidents occur.

Examples of PPEs commonly found on construction sites include:

- ◆ Full-body suits
- ◆ Gloves
- ◆ Hard hats
- ◆ Earplugs/ muffs
- ◆ Safety goggles
- ◆ Face shields
- ◆ Face masks
- ◆ And more.

Construction sites have a high risk of injuries, infections, and fatalities. Therefore, if you own a construction company or are a contractor, you must ensure all your employees are well-equipped with the necessary PPE to ensure their safety while on the job.

Personal Protective Equipment Market Size

The United States is the largest market for PPE products worldwide, with 2021's market estimates at \$23.6 billion.

Data from [Grand View Research](#) shows this was a decrease from 2020's PPE market estimates which stood at \$24.4 billion. The shrinking of the PPE market in the United States is also expected to continue in 2022.

However, as activities in the construction and manufacturing industries pick up, PPE will expand at a compounded annual growth rate (CAGR) of about 6.7% from 2022 to 2030.

Due to the COVID-19 pandemic, the healthcare industry dominated the PPE

market in 2020 and 2021. But as things start to return to normal and activities in the construction industry resume, you should expect an increase in PPE sales. In addition, we can expect a return of the construction industry's dominance in the PPE market.

Another thing to note is that in the product segment of the PPE market, hand protection, especially gloves, dominates the market.

In 2021, the revenue share of hand protection products stood at 32.3%. This product segment was followed closely by respiratory protection (largely influenced by the wide-scale use of facemasks). Following that was protective clothing, footwear, head protection, fall protection, hearing protection, and face protection.

On the global market, the United States and Canada contributed 31% of the revenue share collected in 2021. China, India, Australia, Japan, and New Zealand were identified as the fastest-growing markets of personal protective equipment.

Construction Safety Innovation in PPE

The history of PPE in the construction sector can trace its roots to about 50-80 years ago. During this time, the construction industry started paying close attention to the safety of workers.

Since then, we've seen the quality of PPE products continue to improve and evolve due to continuous innovations. Below, we'll explore the main factors driving this innovation.

1. The OSHA Act of 1970

Today, contractors and construction companies follow a set of health and safety standards found in the legal framework

commonly referred to as the Occupational Safety and Health Administration (OSHA).

Originally, the **OSHA Act became law in 1970**. It mandated employers to provide their employees with safe working conditions - including PPE.

Encouraged by the OSHA regulations, stakeholders in the construction sector started working towards employee safety. As a result, the industry started adopting new technologies in employee equipment and construction tools that greatly improved worker safety.

Even today, the influence of the OSHA Act in promoting innovation in PPE products is ongoing. PPE suppliers are actively working to develop new products that'll better ensure the safety of construction workers.

2. Designing Products Based on Customer Feedback

In today's world, customer feedback is crucial, especially for manufacturers of products meant to save and protect lives. That's why PPE manufacturers have to live in the details.

Customer feedback allows the research and development teams to gain in-depth knowledge and understanding of construction site hazards. This enables them to design better-performing PPE.

Feedback also allows PPE users to become product co-designers indirectly. PPE manufacturers use this approach to produce quality solutions and products that go beyond user expectations.

As a result, it ensures the PPE products hitting the market include safety products designed with materials and features you and your employees wish to see and use.

3. Integrating Technology into PPE Products

At the heart of recent innovation in construction PPE is technology. Integrating new technologies in PPE products is the most effective way of providing workers with the best and safest working conditions.

Currently, wearable technology is becoming an important tool in the construction industry. It helps improve safety by monitoring construction workers' vital signs (like heart rate and body temperature) and providing alerts of potential hazards.

This construction gear comes equipped with sensors that sense, monitor, and alert you on problems like gas leaks, excessive heat, sound pollution, monitor chemicals, and so on. As a result, construction teams can address issues quickly.

An excellent example of wearable technology that's shaping the future of PPEs is exoskeletons. Exoskeletons are wearable machines that enable construction workers to evenly distribute their weight and provide lift support thus reducing your employees' risk of long-term injuries.

4. Developing PPE Products that Work Better

PPE manufacturers have a huge impact on the lives of construction workers when they develop products that make a real difference. By this, we don't mean developing solutions that only provide safety. We're talking about products that improve the user's quality of life.

For example, most fall protection equipment comes with safety harnesses to ensure you don't fall down. However, they also have other features like the cushion bag seat belt that keep you comfortable when using fall protection equipment.



Developing PPE products that work better is important because it ensures healthy competition among PPE manufacturers. Thus, it increases the industry's innovation rate and helps to meet the demand for effective safety measures.

Conclusion

The importance of ensuring the safety of the construction workers on your construction project can't be understated. And with the innovations and advancements in PPE, construction teams are able to take safety to the next level.

SkillSignal is also here to help improve safety measures and safety requirements for all your construction activities. With our app, you can create safety and compliance rules that everyone on your construction site can access and follow.



Innovation in Wearable Safety in the Construction Industry

Although construction employees are only 6% of the US workforce, they make up an estimated [20% of workplace deaths](#). Working in the construction industry comes with unique risks. So keeping construction employees safe is of paramount importance.

Luckily, innovative technological advancements are being made to the safety garments worn by construction workers every day. These could help reduce the risk of injury and help construction companies uphold better safety standards.

Below, we have put together the latest innovative wearable devices and equipment in the construction sector. This will give you an idea of how technology can help keep your construction workers safe, happy, and healthy.

What is Wearable Safety?

Working in the construction industry comes with various risks. Employees are exposed to environmental and physiological risks. This includes things like fatigue, heavy lifting, working at a very high height, working with heavy-duty machinery and equipment, slipping, and more.

Over time, safety practices, personal protective equipment (PPE), and tools emerged to mitigate these risks. These work toward creating the safest possible construction work environment.

Wearable safety refers to the devices construction employees have on their person. In other words, they wear these safety devices.

Innovation in Wearable Safety in Construction

Wearable safety is nothing new. For example, construction helmets have been used for a very long time. However, recently there has been a surge in innovations in the world of wearable safety.

The beauty of new wearable safety is that it applies major technological advancements to the world of construction safety.

Recent innovations have made construction sites much safer places to be for all. Reducing workplace fatalities and injuries, they are an incredible tool to promote employee health and wellness.

They not only increase safety but will also improve productivity and reduce costs. Wearable technology and devices might be a bit pricey to acquire initially, However,

they pay off in the long run with their safety benefits.

You will save on costs associated with worker injuries, fatalities, accidents, and missed work days. In addition, some wearable technology can even enhance the efficiency of work.

The Latest Wearable Technologies on the Market to Improve Worker Safety

Augmented Reality Glasses

Safety glasses or goggles have been a popular tool to protect construction employees for many years. Historically, they have been used only to protect the eyes.

Now, augmented reality glasses do so much more. These smart glasses lay computer-generated images over your actual physical surroundings. As a result, you will be able to see both at the same time.

The computer-generated imagery can provide construction workers with critical safety information in real time.

For example, smart glasses could identify and notify wearers of any leading edges that are nearby. They could also display information about any relevant safety protocols in real time.

Some companies that are at the forefront of augmented reality glasses for construction are [Akular AR](#), [Arvizio](#), and [Gamma AR](#).

Smart Watch

Many individuals use smartwatches in their everyday life and these devices have been in the consumer market for years.

These watches can pick up on important biometric data and have a wide range of functionality. This makes them an incredible tool to use in construction safety. With the right applications and software on these smart watches, they can help monitor activity and identify safety hazards.

For example, a smartwatch could monitor vital signs like step counts and heart rate to warn the wearer of potential overexertion.

It could also detect when the wearer falls, automatically notifying an emergency medical response team.

Smartwatches are also incredible tools for communication. They allow hands-free communication wherever you are.

Brands like [Garmin](#) and [Amazfit](#) have durable smartwatches suitable for construction workers.

It's also worth noting that smartwatches can contribute to the wellness of construction employees by tracking their moods. For example, the [Moonbeam](#) helps the wearer track their sleep and mood. This way, it helps to identify any potential mental and physical health concerns.

Smartwatches like these are a great addition to efforts made to [improve mental health in construction](#).

Smart Boot

Companies like [SolePower](#) are creating smart boots. Their vision is to transform your standard construction boot into a sophisticated and powerful wearable safety tool.

Smart boots can detect the pressure on the sole. This allows the boot to detect any potential falls or shocks experienced by the wearer. Once detected, the smart boot can send out an alert, allowing help to come as soon as possible.

Smart boots can also track the wearer's location. Their location software is typically more sophisticated than your typical GPS. Moreover, the fact that you are wearing the location tracker means that it will always be accurate.

By accurately tracking its wearer's location, the smart boot can improve the safety of lone construction workers.

Smart Helmet

Nothing screams workplace safety like the traditional hard hat or helmet. Hard hats have been around for years, protecting workers from falling debris and other dangerous things.

However, companies like [WakeCap](#) and [SmartCap](#) are now investing in adding sophisticated technological features to their hard hats.

By adding a sensory band to the hard hat, the smart helmet can track its wearer's vital signs.

Like the smartwatch, this allows it to identify potential fatigue and over-exertion, signaling to its wearer when it's time to take a break. The sensory band could even detect micro-sleep and respond with a noise alert aimed at waking up the wearer.

Hard hats could even come equipped with proximity sensors. These sensors would identify when something is too close to the wearer, preventing collisions.

Smart Vests

Safety vests (like those offered by [Elekon](#)) are another traditional wearable safety garment that is seeing technological improvements.

Smart vests are made from sophisticated e-textiles embedded with sensors. These



can monitor the wearer's biometrics, like their blood pressure, muscle strain, body temp, and heart rate. Some can even pick up on heat-stress conditions.

Like other wearable tech, smart vests can send out alerts when they pick up concerning biometric data.

They are also able to send the wearer's current biometrics to connected devices such as a phone or laptop. This allows site managers to track worker data in real time.

Final Thoughts

Although [some may be resistant to new technologies](#), embracing new innovations is one of the best things construction firms can do for the safety of construction workers.

Alongside standard safety equipment and wearable tech, mobile apps like [SkillSignal](#) are also changing safety in construction. SkillSignal is an all-in-one mobile platform. It boosts safety by providing convenient access to safety resources, incident reporting, site observations, safety alerts, and more.



Types of Construction Work Wear

In the construction industry, it's important that workers wear the right attire and personal protective equipment to keep them safe while they work.

There are many different potential hazards to be cautious of in construction as well as many different tasks that require protective attire. As such, there are several different types of construction workwear and new **innovations in wearable safety** are constantly being developed to enhance safety as much as possible.

6 Types of Construction Work Wear

It's standard that construction worker attire is safe, comfortable, and functional. However, there are various categories of construction workwear that serve different purposes:

Eye Protection

Eye protection equipment protects workers' eyes from injuries caused by hazardous chemicals, flying debris, dust, and blinding light.

- ◆ **Welding Helmets.** A helmet with dark lenses that is commonly used by welders to protect their eyes from blinding light and sparks.
- ◆ **Safety Glasses.** These are glasses made with impact-resistant lenses. They protect your eyes from minor injuries caused by flying debris and dust.
- ◆ **Face Shield.** Durable plastic shields you wear over your face. They protect your face and eyes from corrosive chemicals and flying debris.
- ◆ **Safety Goggles.** Specialized eyewear with enclosed sides to create an airtight seal. This provides protection from dangerous chemicals, flying debris, dust, and other hazards.
- ◆ **Smart Glasses.** A new innovation in construction workwear that combines safety with technology. It enables wearers to access hands-free data and use voice commands to control certain tools. They also raise situational awareness to boost safety.

Foot Protection

Effective work boots protect your workers from foot injury caused by electric shock, slippery surfaces, sharp objects, falling objects, and other hazards.

- ◆ **Protective Leggings.** Common in construction sites, they're worn over regular shoes to protect your ankles and feet from falling objects.
- ◆ **Safety Shoes.** Equipped with slip-resistant soles and protective toe caps, these shoes offer slip protection and protect workers from falling objects.

- ◆ **Steel-Toed Boots.** These durable boots have a steel plate covering the toe area to protect feet from impact.
- ◆ **Electrical Hazard Boots.** These are equipped with special soles to protect workers from electric shocks. They also offer slip protection.

Ear Protection

Ear protection equipment is an important part of construction site outfits, especially when working on noisy construction projects. However, it isn't uncommon to find construction managers not equipping their workers with ear protection equipment.

Below are the two types of ear protection equipment you should invest in.

- ◆ **Earplugs.** These are small, insertable devices that fit right into your ear canal and block out noises. Because they're portable and lightweight, earplugs are best for workers who need to use them for long periods.
- ◆ **Ear Muffs.** Larger than earplugs, ear muffs cover your ears and need an adjustable headband to hold them in place. While ear muffs offer better protection from loud noises than earplugs, they're not convenient to use for long periods.

Head Protection

In most cases, death during construction jobs occurs after a fall. Therefore, the best way to reduce fatal injury rates is to equip your workers with the right head protection gear.

- ◆ **Safety Helmets.** These are the improved version of hard hats. They fit more closely to your head, offering better protection to your side, top, and back of your head. Safety helmets protect you from serious trauma caused by falling debris or other hard knocks.

- ◆ **Helmet Liner.** This is a liner made from plastic or fabric that fits under a safety helmet. It provides additional head protection from head knocks, extreme heat, and cold.

Hand Protection

Hand injuries **cost between \$540 and \$26,000 to treat**. So, to protect your workers and save costs, equip your construction workers with hand gear. This will help protect them from chemical spills, cuts, abrasions, sprains, and more.

- ◆ **Gloves.** Depending on the material (leather gloves, fabric gloves, rubber gloves, etc.), gloves protect you from chemical splashes, burns, cuts, cuts, and many more injuries.
- ◆ **Hand Guards.** These are made of impact-resistant material, like metal or plastic, to protect your wrists and hands from the impact of using hand tools like hammers.
- ◆ **Hand Pads.** Worn over the palms of the back of your hands, hand pads protect your hands from calluses and abrasions caused by the repetitive use of hand tools and the lifting of heavy machinery.

Vests and Clothing

High-visibility vests and other clothing are also important items of construction safety workwear.

Every worker should wear a hi-vis vest (reflective safety vest) and so should the construction site manager. These vests help to increase visibility on-site and enable managers to identify workers easily. They're also convenient for construction workers because they have pockets to hold tools and other items.

Another important example of construction work clothes is work pants. Different types of construction work pants include:

- ◆ cargo work pants
- ◆ khaki work pants
- ◆ double-knee work pants
- ◆ flex work pants
- ◆ canvas work pants
- ◆ insulated pants
- ◆ gusseted crotch pants
- ◆ work pants with knee pads

The durable material used to make work pants protects workers from extreme cold and heat.

In winter, construction worker clothing often includes a neck gaiter and beanie to keep them warm while they work.

Evolution & Innovation in Construction Work Wear

Did you know the construction industry accounts for **20% of work-related injuries in the private sector**? Considering construction contractors account for only 5% of the private sector workers, that's a large number of work-related injuries.

These statistics show the need for continuous improvement in safety and safety-related equipment and workwear.

Fortunately, in the past few years, we've seen significant evolution in construction site attire and personal protective equipment (PPE). Manufacturers continue to innovate and develop new products to meet construction workers' changing needs and demands.

One crucial area of innovation in construction site attire is the integration of new technologies and materials.

Some of the latest innovations in wearable safety include items such as smart watches, smart boots, smart helmets, and smart vests. These innovations help prevent injuries and enable construction managers to uphold better safety standards on their construction sites.

Customers are also demanding construction work clothes to be comfortable and functional. Therefore, manufacturers are now using new materials to meet these demands including:

- ◆ light-weight materials
- ◆ reflective materials
- ◆ heavier fabrics for better protection and durability
- ◆ breathable fabrics
- ◆ and flame-resistant materials

Conclusion

Investing in construction workwear is one of the best ways to improve safety standards on construction sites. Keeping up with new digital safety technologies is also key.

To ensure your workers follow your new safety regulations, check out **SkillSignal**. With our app, you can better manage and eliminate hazard risks in real time. You can also improve employee morale, manage compliance with safety regulations, and improve your profit margins overall.





Fall Protection Equipment: Stats, Latest Improvements, and More

Fall protection equipment refers to systems or devices that are used to protect workers from the dangers of falling while they are performing their duties. This equipment also helps mitigate the effects of a fall, preventing injuries.

An Overview of Fall Protection Equipment in the Construction Industry

Statistics show that falls are the leading cause of fatalities in the construction industry. They account for **36.4% of all fatalities**. In 2020, the construction industry accounted for 46.1% of all fatal falls, trips, and slips.

Based on these facts, it is clear that employers must provide all employees with adequate personal fall protection systems.

OSHA guidelines stipulate that when workers are working at a height of 6 feet or more above a vertical distance, they require fall protection equipment.

Aside from protecting workers from falling from heights, fall protection equipment protects workers against:

- ◆ falling objects
- ◆ dangerous equipment (regardless of the height)
- ◆ falling through holes

The law requires employers to check the strength and structural integrity of all walking and working surfaces to determine if they're safe for workers to use.

You have to mark and barricade any area that poses a potential risk of falling and provide effective protection to employees who work in these areas. Additionally, you must ensure that all employee fall protection equipment meets the OSHA fall protection method criteria.

Avoid adopting a one-size-fits-all approach when choosing fall protection equipment. Make sure that you choose personal protective equipment that is suitable for each job. It should also meet local, state, and federal performance requirements.

Types of Fall Protection Equipment

There are many types of fall protection equipment including the following:

Fall Prevention Equipment

This protection form creates a barrier between the worker and the hazard. Examples of fall prevention equipment include:

- ◆ **Guardrails.** Putting guardrails around unprotected edges and inclined roofs is one of the best ways to prevent falls. Guardrails should be at least 42" high and must not be able to be penetrated or climbed over easily.
- ◆ **Lifeline.** A vertical lifeline is most suitable for working from great heights that can't utilize guardrails or other fall prevention equipment. A horizontal lifeline on the other hand is used when a connection to anchorages is unavailable for employees' tie-off.
- ◆ **Hole covers.** One of OSHA's requirements is that employers should cover platform holes to prevent workers and objects from falling through them. Ensure that you label all hole covers to prevent workers from weakening them by unknowingly stepping on them.

Fall Restraint Equipment

These are personal fall protection systems that make it impossible for the worker to reach a hazard. They include:

- ◆ **Body harness.** This is the most commonly used form of personal fall protection. A harness is designed to fit snugly around the torso. It should have a body harness attachment point for comfort and post-fall suspension in case of unconsciousness.
- ◆ **Body belt.** Body belts restrain people working at heights and enable them to perform their tasks without moving too far away from a vertical plane. Ensure that every body belt meets the latest safety standards. They should be adequately padded, and able to fit around the worker's midsection snugly.

Fall Arrest Systems

Fall arrest systems prevent impact, injury, or death in case of a fall and include:

- ◆ **Shock-absorbing lanyards.** A lanyard is used in conjunction with a harness to limit the distance that a worker can fall. It has a connector at the end that links to a body belt, harness, or deceleration device.

Shock-absorbing lanyards absorb the shock from a fall and prevent ground impact. Lanyards should be the right length to ensure that a worker can reach their work area without extending too far.

Important Statistics About Fall Protection Equipment

What are the latest statistics about fall protection equipment? Here are some of the most important facts and figures:

- ◆ Most workplace falls are preventable. Most falls result from unsafe conditions, unsafe acts by employees, or a combination of both. Having a safety program reduces injuries and injury- and illness-related costs **by up to 40%**.
- ◆ Training employees to use personal fall protection systems such as a body belt **reduces the occurrence of the types of injuries** targeted by the training by 19.6%.
- ◆ Transportation caused the most fatal injuries in 2019. **1481 fatal injuries in 2019** occurred during material moving. Travel restraint lines and travel restraint systems are vital in preventing falls caused by transportation and material moving.
- ◆ Falls are the leading cause of fatal injuries. Falls account for **33.5% of all fatal injuries** while strikes from moving objects account for 11.1% of fatal injuries.

Latest Improvements and Innovations in Fall Protection Equipment

Technological advancements are vital in reducing and eliminating the risks of falls from height. Here are some of the most recent improvements and innovations in personal fall protection equipment:

Full Body Harnesses with Back Pads

These provide enhanced comfort for workers, as well as improved shock-absorbing capabilities during a fall.

Many manufacturers have also started making harnesses out of lightweight materials, such as nylon and Kevlar, for improved maneuverability.

Fall Prevention Training Apps

Training apps are designed to help workers understand how to use equipment such as a vertical lifeline, horizontal lifeline, body belt, and other personal fall protection systems and when they should be deployed.

Some apps provide a gamified experience to help train workers on safety procedures. Others use augmented reality to simulate hazardous conditions. This helps to educate workers on how to respond with arrest protection equipment.

Safety and Compliance Platforms

Safety platforms such as **SkillSignal** are a centralized, comprehensive source of fall prevention tools and resources. This unique all-in-one mobile platform creates a collaborative network and keeps everyone on-site connected to your safety goals.



With this app, you can easily assess the safety and compliance of personal fall arrest systems as well as implement risk control.

Wearable Devices

Wearable safety devices that warn workers of impending falls, such as the Apple Watch Series 4 and 5, are also on the rise.

These devices measure the worker's motions. They alert them if they are at risk of falling or if they are not wearing their arrest protection equipment correctly.

Self-retracting Lifelines

Vertical lifelines and horizontal lifelines are vital in ensuring the safety of workers. The latest retractable lifelines are equipped with integrated energy absorbers. These shock-absorbing lanyards help reduce fall arrest forces to safe levels and minimize injury risk.

Conclusion

Personal fall protection equipment is essential for any worker who works at height and puts their safety at risk. Investing in the latest advances in fall protection technology will not only reduce the risk of falls but also save you injury- and illness-related costs.

Ensure that all employees are properly trained in using personal fall protection systems. In addition, always adhere to the latest safety standards for maximum protection.



Innovation in Exoskeletons (History, Latest Updates, & Best Products)

Exoskeletons are a huge asset for the construction industry. They improve human performance by supporting body parts such as the legs and back when performing physically demanding tasks.

Adopting wearable exoskeletons is the way to go for contractors who want to help workers decrease fatigue and load to the spine and improve posture.

Let's explore the history, latest updates, and best exoskeletons on the market.

What are Exoskeletons?

Companies in the USA pay **over \$1 billion weekly** in injury costs as compensation for disabling and non-fatal injuries. That's a huge cost, right?

While there are OSHA guidelines to help prevent these injuries, they haven't been 100% successful,

especially in construction. In fact, the rate of injuries in construction increased to **2.3 per 100 workers** in 2021 from 2.2 in 2020. What can contractors do to prevent these injuries?

Enter Exoskeletons

Exoskeletons are wearable upper-body machine suits designed to reduce the strain caused by manual labor. They provide extreme support and mobility to the human body. This helps reduce fatigue and discomfort caused by repetitive tasks and motion.

Also known as exosuits, exoskeletons are either powered by human motion or electricity. These devices don't do all the work for construction workers. Instead, they make a load lighter or easier to carry. This reduces musculoskeletal strain and, in turn, helps prevent injuries.

Types of Exoskeletons

Several types of exoskeletons are used in the construction industry. These exoskeletons can be as small as a single limb to as big as a whole body suit. They all provide support and protection to the human body in different ways.

Here's a list of the most common exoskeletons in construction.

- ◆ **Passive exoskeletons.** Their main goal is to provide stability and increase strength for users, but they don't have a power source.
- ◆ **Powered exoskeletons.** Also known as robotic exoskeletons. They require energy to power sensors, motors, and other components.
- ◆ **Lower body exoskeletons.** They mostly support the lower part of the body where most construction tasks are performed. For example, lifting and carrying heavy objects.

- ◆ **Upper body exoskeletons.** These exoskeletons reduce strain on upper body parts like arms, shoulders, and neck by providing extra support.
- ◆ **Full-body exoskeletons.** These provide complete movement assistance and protection to the entire body, allowing workers to perform difficult tasks easily.

The History & Evolution of Exoskeletons

In 1965, the US Army and Navy sponsored the development of the first exosuit "Hardiman," by General Electric. The vision was to have a full-body exoskeleton that augmented the users' strength and helped them lift heavy objects.

The end product was an exoskeleton made of two suits: An external one and one that was attached to the user's body. This exoskeleton weighed over 1500 pounds, making it impossible to be used in the field.

The outcome of Hardiman led to a stall in exoskeleton projects until the end of the 1960s. At this time, another exoskeleton for gait assistance was developed at the Mihajlo Pupin Institute in Belgrade. This project started the research and development of exoskeletons for medical use.

The University of Wisconsin would soon follow in 1971 with Hydraulic-Pneumatic Artificial Muscle (HPAM). This was the first exoskeleton to feature a power source.

Exoskeletons in the 20th century had many technological limitations due to a lack of knowledge and experience. However, by the end of the 20th century, research on industrial exoskeletons increased, and companies like Cyberdyne and Ekso Bionics started investing in this market.

In 2000, Sarcos Research Center developed a powered exoskeleton that assisted workers in lifting heavy objects while performing tasks. This was a major breakthrough because it had the potential to reduce human errors and increase the productivity of users.

Exoskeletons entered the market in the early 2000s as more research led to more technologically mature innovations. Most of these exosuits were used in healthcare. It wasn't until around 2015 that industrial exoskeletons were adopted for the construction and manufacturing industries.

Latest Innovations in Exoskeletons

According to the CDC, **work-related musculoskeletal disorders** are 16% higher in construction than in any other industry. Exosuits and other **wearable technology** are pivotal in promoting the safety of construction workers.

With the rise in technology, exoskeletons are becoming more advanced and efficient.

Soft Exoskeletons

In the past, exoskeletons were made of metallic objects. Today, most manufacturers are leaning away from these rigid types. New exoskeletons are made of fabric and have flexible artificial muscles. This makes it easy for workers to move around while wearing them.

Wireless Operation

Exoskeletons today can be operated without any wires. With the help of sensors, workers can control their exosuits with gestures and movements. This gives them more freedom and reduces the risk of any accidents or mishaps.

AI and Smart Sensors

Some wearable technology has smart sensors. These gather data on the user's physical state, interpret it, then use these interpretations to optimize performance.

In addition, artificially intelligent exosuits can adjust one's posture based on metabolic data, helping reduce strain during repetitive tasks.

In the future, we expect to see more light and long-lasting wearable technology, with reliable and portable power sources, to increase utility.

Best Exoskeletons on the Market

Exoskeletons reduce the risk of injury for industrial workers by ensuring proper posture and weight distribution, reducing muscle fatigue. Let's look at the best exoskeletons on the market.

EVO by Ekso Bionics

EVO's system and ergonomics aim to give an exceptional experience to users of all types and sizes. This vest boosts occupational safety by reducing strain on arms, shoulders, and neck muscles during heavy lifting.

EVO is lightweight and has minimal touch points, which helps workers keep cool while lifting heavy loads.

Sarcos Guardian XO

Guardian XO is a full-body and battery-operated logistics machine. This full-body exosuit is used in many industrial worksites to reduce strain and fatigue. It supports heavy lifting tasks, allowing workers to lift up to 200 pounds.



Hilti EXO-01 Overhead Exoskeleton

EXO-01 Overhead Exoskeleton is designed to reduce strain on arms and back while performing overhead tasks. It uses cutting-edge technology and patented force-sensing to assist workers in completing manual tasks with less effort.

Conclusion

Exoskeleton technology improves the quality of life of construction workers. It reduces the risk of injury and improves ergonomics and efficiency on the job site.

Coupled with other **protective equipment**, exosuits can significantly increase workers' safety and reduce injury costs for contractors. Additionally, they can help enhance accuracy during overhead work and increase productivity. Because of these benefits, exoskeletons are becoming valuable and promising safety tools in construction.



Innovation Around Protective Eyewear

Protective eyewear is an essential part of ensuring industrial safety for construction workers. With many job hazards on site, there is a constant danger for workers.

From dust and larger debris to sharp equipment and tools, their eyes (a sensitive part of the body) can face harm at any point. With protective equipment like safety glasses, you can reduce occupational eye injuries, offer adequate eye protection, and shield eyes from impact.

This blog will outline the history of vision protection and preventative eye safety equipment and spotlight the latest innovations in the prevention of eye injuries.

Types of Protection Eyewear

There are several kinds of protective eyewear available today including:

- ◆ Prescription safety glasses
- ◆ Over glasses worn over glasses with prescription lenses
- ◆ Standard safety spectacles

- ◆ Safety goggles
- ◆ Helmets for extra protection
- ◆ Anti-fog gels, wipes, and sprays
- ◆ Hand shields
- ◆ Face shields
- ◆ Hoods
- ◆ Respirator facepieces

These exist in numerous variations, including different materials, densities and weights, shapes, and more. Each serves a distinct function to be used for specific tasks around the construction site.

The History & Evolution of Eye Protection

As with all inventions, protective eyewear did not always exist as we know it today. Let's take a look at the historical perspective of construction eye protection.

The first patent for an "eye protector" was first granted to an African American innovator known as P. Johnson. This was the initial iteration of eye safety equipment and was intended to keep safe the eyes of firemen, metalworkers, and furnace workers. Johnson's invention did not, however, provide even low-impact eye protection or the risk of eye injuries. They were mainly lenses against light or bright lights.

Edouard Benedictus, a French scientist, was the next to contribute significantly to the creation of protective wear. Through an accident that damaged a glass flask with cellulose nitrate, the scientist discovered that cellulose nitrate could form a thin coating over the glass. This was how he came to experiment with and create safety

glass. This form of glass coating has since been replaced by more durable, anti-fog materials with mechanical impact protection like polycarbonate.

Another of these key interventions was from Julius King who has come to be known as the United States' "first teacher of optics". He established the Julius King Optical Company with eye protection programs that later produced the first safety goggles known as SANIGLAS in 1909.

In 1914, however, was when protective eyewear as we understand it today came to be. Garrett Morgan gained a patent to include safety glass in his gas mask. The invention became popularly used during the First World War and evolved to auto-making where the idea came into use as car windshields.

It was in this period, between the 1910s and 1940s, that mandatory eye protection had various industrial applications including for machine and woodworkers, furnace operators, and more.

Material History of Occupational Eye Protection

In the initial stages of these eyewear developments, glass was the primary material used. This was used together with tough resins. Even with this combination, though, the glass presents its own danger to workers.

It could not resist impact sufficiently. If it shattered, it could lead to minor injuries. It could also result in severe ones like adnexal injury, corneal lacerations, retinal detachment, facial injuries, blunt trauma, visual impairment, brain injury, and other occupational injuries.

Polycarbonate grew popular as an alternative to hardened glass in the 80s as it was highly durable and increased the level of protection. It also resulted in thinner and lighter yet resistant lenses.

Over time, modern safety eyewear manufacturers found that coating it with anti-fog solutions, chemical splashes, and hard coatings produced the best form of protective eyewear. This is the material that meets the current standards for construction safety glasses today.

Latest Innovations in Protective Eyewear

Much of the **innovation in protective wear** and designs for eye protection has been around comfort and functionality. Major changes have focused on functionality detail to ensure that each piece serves as it should for the task at hand. This includes prioritizing varying materials depending on the use case and environment.

It also emphasizes comfortable wear. This is because ill-fitting eyewear can compromise physical safety, impair vision, and lead to mistakes and injury.

Prevention of eye injuries in construction has also benefited from general developments in technology. Industrial applications of augmented reality and sensor technology have boosted modern safety eyewear capabilities.

Although eye safety gear has primarily been used for eye protection, augmented reality eye gear can do a lot more. Google created the first **smart AR glasses in 2011**.

AR glasses can project information and computer-generated visuals like safety maps over what the wearer sees physically. This can be a useful tool in reiterating safety protocol and identifying potential job hazards.

While these glasses have yet to go mainstream, their market size is expected to reach **\$184.61 billion by 2030**.

Best Protective Eyewear Products on the Market

When browsing for a new pair of construction safety glasses, there are several factors you should consider. Primarily, of course, you should think about ocular protection.

Are the glasses for construction workers impact-resistant? What level of protection do they have- frontal protection as well as peripheral protection? And do they offer UV protection for outdoor use and general visibility and clarity?

You also want to factor in durability, particularly for construction work. You don't want a pair that will shatter easily. Opt for durable lenses made from polycarbonate, so they don't scratch easily and hamper visibility and tough hard nylon frames.

Finally, you may want to see if your selection has certifications from respected boards, forums, international standards, or organizations. For example, the American National Standards Institute (ANSI) sets the eye safety standard for modern safety eyewear.

These are our top choices with guaranteed effectiveness of eye protection while retaining your ease and comfort as you work.

- ◆ DEWALT DPG82-21 Anti-Fog Dual Mold Safety Glasses
- ◆ NoCry Safety Glasses
- ◆ 3M Safety Glasses, Virtua CCS
- ◆ 3M Pentax ZT200



- ◆ Oakley Men's OO9213 Ballistic M Frame
- ◆ Titmus SW09R Livewire
- ◆ Sellstrom Cutting Odyssey II
- ◆ KleenGuard V30 Nemesis
- ◆ UVEX Stealth OTG Safety Glasses
- ◆ ANSI Z87.1 Safety Glasses
- ◆ Global Vision RX-Z CL Safety Glasses

Conclusion

On-site safety is a full-body exercise that requires the consideration of all parts of construction workers in the environment. Even a part as small as the eye requires protection for optimum performance and worker safety.

In safety terms, proper safety eyewear for construction workers is no fashion accessory. They are a necessity!



Innovation Around Hard Hats in Construction

Hard hats, or helmets, are protective equipment required in the construction industry to prevent head injuries.

These helmets are made from high-density polyethylene (HDPE), a nonconductor of electricity. They also have foam lining and suspension systems made of vinyl, nylon, or molded HDPE. This cushions workers against electric shocks and acts as a shock absorber.

The History of the Hard Hat

Shipbuilding industry workers wore the first documented hard hats. These industry workers would cover their hats with tar and cure them in the sun. The hats protected their heads from objects dropped into the ship decks.

Edward W. Bullard invented the first commercially available hard hat in 1919. Edward Bullard was a graduate of the University of California and the son of a mining equipment seller (Edward Dickinson Bullard).

Upon completing his university degree, he returned home to work in E.D Bullard Co., his father's company, which sold mining equipment such as carbide lamps to gold and copper miners. During this time, he noticed a need for protective headgear and created a prototype.

He made his first design inspired by the doughboy helmet he wore when he served in the army during WWI. Edward made the "hard-boiled hat" with steamed canvas, cork, and glue.

This model quickly became popular with miners and spread the **safety culture** to other industries as it protected workers from falling debris. The US Navy adopted the model for their deck workers that same year.

Edward Bullard would later make and patent several improvements to his original prototype, such as an adjustable suspension system to make his hat more effective.

The Evolution of Hard Hats

Since the invention of the hard hat, several innovations in safety helmets have occurred over the years.

- ◆ **1930:** Mine Safety Appliances (MSA) introduced Skullguard, a non-conductive thermoplastic hard hat for metal industry workers that could withstand temperatures up to 350.
- ◆ **1931:** Six Companies mandated using construction safety helmets for the Hoover Dam project.

- ◆ **1933:** Joseph Strauss asks Bullard to create safety helmets to protect the Golden Gate Bridge construction workers who performed sandblasting.
- ◆ **The 1940s:** Fiberglass shell helmets began to replace the traditional aluminum and steel hard hats.
- ◆ **The 1950s:** Thermoplastics began to replace fiberglass as the material of choice for hard hats due to its durability and cost-effectiveness.
- ◆ **The 1960s:** The Occupational Safety and Health Act (OSH act) was introduced, causing companies to pay more attention to safety protocols in the workplace and increasing the demand for hard hats.
- ◆ **1961:** MSA developed the first polycarbonate hard hat, the Topguard helmet.
- ◆ **1962:** The V-Guard helmet (the most common hard hat in the US) was introduced, with a patented shock-absorbing liner.
- ◆ **1977:** ANSI gives the green light for developing ventilated safety helmets to keep workers cool.
- ◆ **The 1980s:** Bullard adds a nonslip ratchet system to their helmets, increasing the comfort and fit of the hard hats. The front brim was added to helmets to help shield workers from the sun.

The Latest Trends & Research

Advanced Technologies

Today, safety helmet accessories are more sophisticated and include advanced technologies such as augmented reality glasses, ear muffs, and air filtration systems.

Most recent advances in technology in safety helmets include smart hard hats with IoT devices. These smart helmets are ideal for **lone workers** as they have sensors that relay information about a worker's location and a microphone and camera for voice and video call capabilities.

Color Coding

Helmets also come in an assortment of colors. These color codes help to identify the user's rank and help with workplace organization. For instance, the color for road construction workers' helmets is orange, while supervisors, foremen, and engineers wear white.

Safety Helmet Material

In 2021, the **global safety helmet market** was worth an estimated \$3.9 billion. Most construction safety helmets on the market are made from polyethylene as it is cheap and provides better head protection even against the shock of blows from falling objects.

Research

In terms of research, scientists are working on developing new materials that will be lighter yet more durable than current hard hats. These materials include polyurethanes that are able to dissipate energy.

The Best Hard Hats on the Market

Head and brain injuries are among the **most common injuries** in the construction industry. **According to OSHA**, construction workers must wear hard hats if there's a risk of electrical shocks, objects falling from

above, or other objects that workers may bump into.

There are five main types of hard hats on the market as classified by ANSI standards:

- ◆ **Type 1 hard hats:** They protect from top impact hazards.
- ◆ **Type 2 hard hats:** They protect both top and lateral impact hazards.
- ◆ **Class G hard hats:** These are the most common of all hard hats. They protect against impact and electrical shocks up to 2200 volts.
- ◆ **Class E hard hats:** Protect from electrical shock hazards while providing head protection.
- ◆ **Class C hard hats:** Protect against minor splashes and sprays of liquids and dust.

If you're looking for the best hard hats on the market, here's a list to help you out:

- ◆ The **Milwaukee 6-Point Suspension Type 1 Full Brim Hard Hat** is one of the lightest hard hats you'll find on the market. It has a large ratchet range compared to other hats. This means that it can fit most head sizes.
- ◆ The **3M H-700 series** is lightweight yet durable and has a sweatband for added comfort. It also features a suspension system that self-adjusts to the wearer when the ratchet is tightened and has air ventilation channels.
- ◆ **Klein Tools 60347** is a class C Type 1 hard hat that features a six-point suspension system for better comfort and a sweatband to absorb moisture. It also has a rain trough to help keep the wearer's face dry in wet conditions.
- ◆ **Pyramex Ridgeline XR7** is an ANSI Type 1 Class E-rated hard hat with a six-point ratchet suspension system and a removable, washable brow pad. It also has shock absorption and electrical insulation properties.



- ◆ **Bullard Cen10 Type 1 Safety Helmet** has a foam insert instead of a suspension system, making it lightweight and comfortable. It also features an adjustable ratchet-style headband and vents to keep the wearer cool. However, it doesn't have a brim.

Conclusion

As hard hats technology continues to advance, it's important for contractors to ensure that their workers are protected with the best safety helmets available. Familiarize yourself with the local occupational health and safety regulations so that you can remain compliant when it comes to hard hats in construction.



Innovation Around "Lone Worker Protection"

Lone workers are employees who complete their work in isolation, without a team or direct supervision. Although they may have means to communicate with their colleagues or get virtual support if needed, they are often on their own.

This isolation can present various challenges to their work and safety as they do not have the immediate support required in an emergency. If your construction company utilizes lone work, it is necessary to set up structures and policies that can support employees.

Lone Working Staff Protection in Construction

Construction workers already encounter high safety risks as it is a work type that can involve heavy and dangerous sites, hazardous equipment, and other threats. These safety obstacles become compounded when dealing with mobile workers.

Operating without additional staff nearby means the individual has no backup. They have no one to ask for help in the event of a medical emergency, injury, or any other emergency situation.

Implementing safety policies and tools to assist lone workers in critical situations is the best approach to lone worker protection in construction. This includes researching, observing, and identifying possible safety hazards. Use this analysis to counter the risks presented and establish safe working environments.

With regards to safety for employees working alone in confined or isolated locations, OSHA states that the employer must remain accountable for each worker at:

- ◆ Regular intervals throughout the lone working staff's shift to ensure their wellbeing
- ◆ The close of the work assignment
- ◆ The end of the employee's shift
- ◆ As well as, through visual (observing the employee by sight or through visual evidence) or verbal communication

These are the basic types of lone working staff protection methods as prescribed by OSHA. These highlight a need for various policy aspects including a communication plan, emergency action plan, emergency response plan, and more to equip staff adequately.

Picking the Best Lone Worker Safety Solution

With these policy features and the OSHA-compliant protection types in mind, you can select protection tools that work and improve conditions for employees.

Three of our must-have features for lone-worker solutions are:

Communication

The primary difference between lone work and team or in-office work is access to support. It also presents the biggest challenge in work-alone situations where the employee needs help but does not have the means to communicate with their team.

To ensure your workers always have support, you have to provide them with a system that enables and empowers field communication. Your solution must operate on multiple devices and support connection even with no wi-fi.

Prioritize instant messaging features and real-time updates so you can engage with workers instantly. Your chosen channel should also allow workers to file on-site safety observations with visual evidence for you to examine remotely in real-time.

With these features, you have an on-hand support system that can help tackle and address safety issues. They can also contact you conveniently in the event of an incident.

Employee Tracking

Real-time access is one way to facilitate employee tracking. Communication from your lone worker becomes a means to monitor their job progress and well-being. However, you can also use instant messaging to foster regular check-ins throughout the work shift.

Demarcate set check-in times for employees to give you a heads up on their progress and safety. Use a lone worker safety solution that gives check-in reminders and provides you with a monitoring center for all employees and jobs.

You can also leverage technologies like biometrics, modems, satellite devices, sensors, and wearable gear to detect and alert you to unusual employee activity.

Lone Worker Training & Support

The third essential lone worker protection feature is education and training support. Ensure you provide adequate training for how workers should navigate risk assessments, common hazards, and safety in the field. Beyond that, make this training a constant part of lone employees' workflow and safety action plans.

For example, your chosen safety tool should include resource access to safety videos and information on how to ensure job site safety. It should serve as an in-pocket reminder of your safety policy, including documents that workers can access to help them address a range of situations.

Best Lone Worker Safety Products

The market for usable and effective lone-worker safety gear has grown speedily and continues to do so with various tech innovations. This gives construction managers and safety personnel a range of options to choose from when trying to decide on protective equipment for their team.

A safety app like **SkillSignal** is a great way to cater to the vital features above. It can facilitate instant communications, enable employee tracking and monitoring, and support education, training, info exchange, and more.

When accompanied by other worker safety devices and protective equipment, it can become one of many reasonable steps to reduce the risk of injury.

Lone worker safety equipment can include wearable devices like fall detection watches and wristbands. Worn by workers, these note when a fall occurs and send out an alert to you or headquarters.

The **Apple Watch** is a good product for this. It includes features such as fall detection, heart rate monitoring, and Emergency SOS).

The **Samsung Galaxy Watch 4** is another option with fall detection and Emergency SOS functionality.

Alert, panic buttons, or man-down alarms can also feature as wearable equipment, making it easy for employees to get help quickly in an emergency. Some of the best products in this category include:

- ◆ **SureSafeGO** (mobile personal alarm with fall detection and GPS tracking)
- ◆ **SABRE Personal Alarms** (emits a loud noise to alert nearby workers)

Innovation in Lone Worker Protection

Artificial intelligence (AI) and sensors have become key tools for construction employee safety structures. With the right equipment, this can and is extending to lone worker safety protection.

AI programs can gather and analyze extensive site data through sensors and other computational programming. Sensors can include temperature and weather sensors, identifying hazards close to workers, movement detection, and more. These can alert workers in advance to avoid accidental injury and other incidents.

While augmented reality goggles have been available **since 2013** with the release of the first Google Glass, they are growing popular in lone-work construction. They

make safety and training accessible without necessarily needing the worker to engage physically with equipment. This, along with wearable technology and personal alarms, can help keep workers safe.

Conclusion

For work-alone safety on a daily basis, the duty of care lies with you and your organization. It remains your job to keep people safe and to give support and care to staff for any individual situations that arise on-site.

With a dedicated lone worker safety program, communication and action plan policies, and a robust solution like ours, you treat your staff like the valuable assets they are.





Innovation in Personal Safety Sensors in Construction

Improving safety is a key goal in the field of construction and there are many new technologies and innovations that can help with this. One of these includes personal safety sensors.

There are many different types of sensors that have safety use cases in construction. As such, they can be a valuable tool in improving overall safety.

To learn more about personal safety sensors and their role in saving you thousands of dollars (cost of construction injuries), keep reading.

What are Personal Safety Sensors?

Personal safety sensors are devices that monitor your workers' status and alert them to danger and potential safety issues. They are a part of protective equipment that you can accessorize or attach to your clothing so that workers can have them on their person.

These sensors provide real-time information on your team's safety and well-being so that you can immediately tell when something is wrong. With this advanced technology, you can better monitor occupational health and safety risk factors commonly found on a construction site.

Types of Safety Sensors in Construction

The wearable sensor industry is rapidly expanding. And we're now seeing an increase in the research and development of sensor technology for construction teams.

Below is a list of different sensor types and their applications in construction safety.

Pressure Sensors

Pressure sensors are electronic devices that sense changes in pressure and convert these changes into electrical signals. They measure blood pressure and foot pressure and monitor pulse rates.

Changes recorded on pressure sensors provide information on the vital signs, emotional state, cardiovascular health, and other human physiology changes of your construction workers. This ensures you can rely on pressure sensors to monitor and predict potential health risks your workers may suffer.

Some pressure sensors can measure altitude changes. So, you can use them to enhance safety precautions, especially in a construction site where falls are highly likely. This safety feature allows you to respond rapidly when a worker falls, increasing your chances of providing potential life-saving medical care.

Temperature Sensors

Wearable temperature sensors rely on increasing and decreasing skin temperature to monitor the health of your construction workers. The biggest advantage of monitoring your workers' temperature levels is it helps you protect them from suffering from extreme temperature conditions.

Some other temperature sensors can monitor local air temperature. As such, you can monitor the weather conditions your workers operate in and take the necessary precautions in extreme conditions.

Location Sensors

Location sensors rely on sensor-based location technologies like GPS (global positioning system), RFID (radio frequency identification), WLAN (wireless local area network), UWB (ultra-wideband), and Zigbee to help you track the location of your workers.

So, whether your workers on construction sites are indoors or outdoors, you can easily track where they are. Your improved tracking ability means you can easily locate a worker in case they get lost or trapped.

Air Quality Sensors

Air quality sensors provide real-time information on air quality whether you're working indoors or outdoors.

Construction workers are regularly exposed to air pollutants such as dust, chemicals found in paints, glues, and thinners, and gasses like carbon dioxide, hydrocarbons, nitrogen oxides, and carbon monoxide.

Now, wearable air quality sensors make it easier to notify workers on construction sites of the immediate need to leave areas with unsafe air pollution conditions.

Motion Sensors

Motion detector sensors rely on activity pattern recognition algorithms to provide the quality, type, and quantity of your workers' mobility-related activities.

Data on walking distance, duration, speed, smoothness of movements, stride duration, stride count, and gait asymmetry help provide a detailed analysis of workers' activities.

Other Types of Sensor Technology

- ◆ **Gas sensor:** This alerts construction workers to dangerous levels of gas in the air.
- ◆ **Fall sensor:** These types of sensors use accelerometers to track the movements of the wearer. Thus, they can detect when a fall takes place and send an alert.

How are Personal Safety Sensors Changing the Construction Industry?

Sensor technology is revolutionizing safety processes in construction work by increasing reliability, efficiency, and lower error rates. The following details the different ways construction industry experts use safety sensors.

Increased Data Visibility

There's no denying that personal safety sensors play an important role in avoiding potential safety hazards. However, in an unpredictable construction environment, they also act as your eyes and ears.

Safety sensors increase your construction teams' ability to communicate and

collaborate thanks to their wireless capabilities, smartphone or tablet companion apps, easy data-sharing capabilities, and detailed dashboards. And that's made possible by the real-time data they provide on your workers' locations, health status, and environmental conditions.

Managing Labor Shortages

One of the many hardships the construction industry faces is losing skilled workers due to accidents, injuries, and deaths. Construction firms now have to deal with labor shortages as the demand for skilled workers increases.

Luckily, with the latest advancements in personal safety technology, real-time safety monitoring is now possible. With this, comes the improvement of worker safety.

Data collected helps workers better track their health and physical conditions. It also helps contractors and building owners react promptly during emergencies and set up the proper safety mitigations regarding dangerous exposure.

Best Safety Sensor Products on the Market

The current safety sensor market has many products with varying features, specifications, and performances. Below is a list of some of the top safety sensors on the market:

- ◆ **Omron's HeartGuide:** It tracks your blood pressure, EKG, and heart health according to your daily activities.
- ◆ **Spot-r by Triax:** The Spot-r Clip enables workers to report injuries, safety incidents, and hazards with just a push of a button.



- ◆ **Hexoskin Smart Shirt:** Monitors data on your sleeping patterns, activity, respiratory, and cardiac parameters.
- ◆ **Oura Ring:** Monitors your heart rate, body movement, temperature, and sleep quality.

Conclusion

Improving and protecting your employees' health, safety, and productivity is vital in the construction industry. That's why you need a trusted partner who'll help you digitize all your work processes on a single platform.

SkillSignal eases the process of educating and connecting your workers to your safety goals. This lets you eliminate and control potential risks in real-time, giving you peace of mind.



Innovation Around Protective Gloves

Gloves protect construction workers from a wide range of hand and finger on-site injuries. Without protective gloves, workers might be exposed to thermal or chemical burns, electrical shocks, cuts, bruises, abrasions, or harmful substances that can cause serious hand and finger injuries.

When choosing protective gloves for construction work, you need to consider the type of work and the hazard level for your particular environment. Some factors to consider are dexterity, cut resistance, and impact resistance. For instance, workers using sharp tools require

cut-resistant gloves. Those exposed to hazardous substances need chemical-resistant gloves.

Industry leaders continue to innovate in this space and develop cutting-edge protective gloves for construction work.

The History of Protective Gloves

Gloves have been worn throughout history for various purposes, including protection during work and as a fashion statement. Glove-wearing has been traced back to the Ice Age, as cave paintings show people wearing mittens.

One of the **oldest gloves** was found in King Tut's tomb. It's believed he wore them while riding his chariot.

According to Homer's *The Odyssey*, Greeks wore gloves to protect their hands while gardening. The Romans are also believed to have worn gloves for war, while the Persians wore them to protect their hands from the cold.

The Middle Ages

Leather gloves were prevalent during the Middle Ages. In fact, in the mid-1500s, William Shakespeare's father, **John Shakespeare**, was one of Stratford's 22 fine leather glove makers.

During the middle ages, blacksmiths wore sheepskin gloves to protect their hands from molten burns. Knights also wore them for protection during jousting tournaments.

The Industrial Revolution saw a massive increase in the use of gloves for **protection against harsh working conditions**.

The Late Modern Period

D.F. Morgan patented the first modern work gloves in 1896. His improvements created an affordable and comfortable work glove for rail workers and laborers.

Several patents would later follow with improvements such as a general work glove and a washable gauntlet glove.

These improvements made way for more specialized gloves for different industries.

The Evolution of Protective Gloves in Construction

The **Occupational Safety and Health Act of 1970** made it mandatory for construction workers to wear protective gloves when handling hazardous materials. Gloves for construction are now heavily regulated. They must meet certain standards in order to be approved by OSHA.

Up until this time, leather, jersey, and cotton were primarily used to make safety gloves. However, materials like leather made it challenging to hold a firm grip. This actually increased the chances of accidents.

Thus, OSHA mandated that safety gloves be specific to certain tasks and materials. Consequently, leather was replaced by synthetic fabrics such as nylon and Kevlar. These materials keep workers comfortable and have high abrasion, cut, and puncture resistance.

The Latest Trends & Research

Innovations in protective gloves have been driven by the need for greater efficiency when working with specific materials or in hazardous environments.

Cut-resistant Fibers

More and more manufacturers are making gloves from cut-resistant materials. Gloves that have steel or fiberglass in their fibers can prevent extreme cut hazards and cover all cut levels up to **ANSI Cut Level A4+**.

Some fibers can protect from cut levels above ANSI Cut Level 2. These include:

- ◆ ultrahigh molecular weight polyethylene
- ◆ high-performance polyethylene
- ◆ aramid

Glove Shell Materials

Glove shell materials determine the strength and safety of gloves. Most glove materials are designed to offer balance, precision, and comfort.

Many manufacturers use materials such as high-performance polyethylene, nylon, Kevlar, and neoprene to create lightweight but strong gloves. These materials have excellent tactile sensitivity. Thus, you can easily grip small objects without losing protection.

Kevlar fibers, for instance, are abrasion resistant, durable, and offer heat protection, keeping hands cool.

Glove Coating

Most construction gloves have a coating that makes them waterproof and chemical-resistant. This protects workers' hands from harsh chemicals that can cause irritation or skin damage.

A game-changer in glove coating is the double-dip. This allows for enhanced fingertip grip in wet and dry conditions. The process involves dipping the glove into a liquid-applied polymer twice. Doing so creates an extremely strong layer that can also provide insulation from electricity.

Nitrile-based glove coatings and latex-coated gloves are popular for construction gloves. They provide an effective grip, flexibility, and durability. Nitrile has the highest puncture and abrasion resistance among glove coatings. Its tough coating

stands up well to oils and is often used by those working with hazardous materials.

Coreless Yarns

Cut-resistant yarns, such as nylon, are reinforced with inner core materials such as fiberglass. The outer yarn wrap might last years, and it's easy to tell when it breaks down. However, it's not easy to tell when core materials start to wear down.

Innovations in yarn technology have led to different methods of yarn wrapping, including coreless yarns. These yarns are ideal for workers with sensitive skin and those prone to contact dermatitis. This is because they don't contain any core materials that can irritate the skin.

Coreless yarns also provide excellent grip and are more pliable since they don't have an inner core making them less likely to tear.

The Best Protective Gloves on the Market

If you're looking for the best safety gloves on the market, here's a list to help you out:

Kimtech Prizm Xtra

These multi-layered neoprene nitrile gloves have a double-dipped coating, which ensures a better wet and dry grip. **Kimtech Prizm Xtra** gloves are made from a combination of polymers, enabling them to protect against a wide range of chemicals. They provide improved comfort and protection with excellent tactile sensitivity.

Ironclad

Ironclad durable and lightweight gloves are designed to resist heat, oils, and stains while



providing a superior grip on wet or dry surfaces. **Ironclad** gloves have a three-layer construction that protects against cuts, punctures, and abrasions.

CLC Custom Leathercraft 160L

CLC Custom Leathercraft 160L are heavy-duty, thicker gloves designed to resist abrasion. They have reinforced seams on the palms and fingertips and extra padding on the knuckles for extra protection. The gloves are also machine washable and offer excellent dexterity. This makes them perfect for workers that require precise movements.

Conclusion

Innovations in protective gloves have made them safer, more comfortable, and more effective at protecting workers against hazardous environments.

From cut-resistant yarns to double dip coatings, the advancements in glove technology have revolutionized **safety equipment for work environments**.



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100%

Compliance rate for SST, OSHA and internal worker inspections.
No fines. No stop work orders.

1.1 HRS/WORKER

Saving 1.1 hour/worker by shifting from paper to mobile worker orientation.

11.8 HRS/WEEK

Saving 11.8 hours/week on paperwork, payroll and admin processes.

22X MORE DATA

Capturing 22x more data, used in compliance dashboards and jobsite reports.

22%

Automating 22% of daily safety and compliance processes.

100%

100% paperless jobsite.



SkillSignal is the fastest growing safety & compliance platform in Construction, trusted by thousands of users every day. Our 1-stop solution supports jobsite safety and simplifies compliance across the country for small, medium and large contractors. Our mission is to use mobile technology and data to improve the safety and lives of the men and women who build our beautiful cities.