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Chubb Construction Resource Bulletin

Personal Protective Equipment (PPE)

Introduction to the Construction Resource Bulletin

Chubb Construction is introducing you to the Construction Resource Bulletin. These bulletins are designed to provide you with pertinent information, in an abbreviated guide format, related to construction topics that may directly affect your safety and Risk Management Programs. These Bulletins are not meant to provide you with all available resources and information specific to a topic but rather introduce you to the basic elements we feel are important allowing you to further explore and evaluate what is necessary for your organization.

Personal Protective Equipment

Over the years, Personal Protective Equipment (PPE) has become much more prevalent and accepted in the construction industry. From hard hats to the new safety helmets, from safety glasses and shields to welding helmets, steel and composite footwear, fall arrest, and respiratory protection, it is no longer uncommon to find the majority of companies providing required PPE, and their workers actively utilizing it.

That said, the safety industry continues to evolve its PPE technologies and advances in materials, which provide better protection, more comfortable use, styling and fit. Determining proper PPE for the task, and basic care and maintenance, can still be a problem.

Pre-planning and Hazard Analysis

Most construction projects have a standardized minimum PPE requirement for all workers to follow. This is typically a basic requirement for hard hats or safety helmets, safety glasses, safety boots and potentially gloves and high-visibility clothing. It may also require fall protection at 6ft., so contractors are aware this level of fall protection PPE may be required for their workers.

However, depending on the trade, and their scope of work, the necessary PPE may be far more advanced and require a thorough assessment of the exposure and work areas to determine what will be required of the employer and workers. The assessment may also require the work area to be delineated from the project to prevent those not properly trained and protected from entering the designated work area.

It is recommended that pre-planning, assessment, and training be required of all tasks to ensure that workers are aware of the exposures they will be encountering, that such exposures have been appropriately planned for, and that workers have the necessary equipment and personal protective equipment to safely complete the task.

Types of PPE (Not all inclusive)

Traditional PPE (Hard Hats/Safety Helmets, Safety Glasses, Footwear)

Everyone is familiar with hard hats, safety glasses and steel-toe-boots. In fact, these are likely the first types of PPE to be thought of when this topic comes up. However, advances in materials and impact technology have allowed for the evolution of this equipment, and it is important that employers continuously monitor available products and be open to providing newer PPE types and styles that may better suit the activities and exposures your workers face.

For example, advances in impact technology have driven enhancements and incorporation of safety helmets in the construction industry. Once balked at, safety helmets are now mandated by many of the largest construction firms in the business, and in doing so, has created a trickle-down effect with those subcontractors required to wear them on those projects. In addition, safety helmet design has also advanced, with some having a similar appearance to the traditional hard-hat; making their use more widely accepted.

Advances in footwear have allowed for much more comfortable boots, longer-lasting materials, slip resistance, and steel or composite toes and puncture protection to be implemented. With composite components such as fiberglass and carbon fiber, they can be safely utilized with electrical work and, in temperature extremes, will not transfer hot or cold.

Safety glasses are another area where impact resistance and style have provided alternatives for workers who may not wish to wear them. Safety glasses and face shields are important to protect against projectiles, dust and debris as well as chemical use with many types to choose from depending on the need.

Hand protection has come a long way over the years from heavy leather gloves to high-tech synthetic gloves with built-in impact protection, chemical protection, and cut and abrasion protection, in addition to being able to breathe and stay cool in hot temperatures or provide thermal protection in cold weather. Hand protection is a specialized industry, with gloves made to protect in all types of high-hazard environments, such as general industry, construction, where chemical protection is required, and where electrical safety is required to name a few.

Specialized PPE (Not all inclusive):

Outside of the typical PPE worn normally by all workers, there are specialty types of PPE that may be required. Whether determined through pre-planning and exposure assessments, environmental assessments or required by design and regulation, these specialty types of PPE will require additional selection, training, fit, cleaning, and maintenance requirements.

These types of PPE can include but are not limited to:

Fall Protection:

Personal Fall Arrest System (PFAS) components include full-body harness, connectors, lanyards, and anchor points. Some systems and components can be purchased as designed by the manufacturer for a specific application(s), while others may need to be designed by a third party specific to a activity.

Fall protection takes into account a number of factors, including but not limited to fall distance, weight of the worker, location of anchor point, potential for striking objects below, and emergency rescue. Providing fall protection to workers should be assessed and pre-planned and not simply provided to workers unless they are trained and understand the system being used, its components, and any limitations. PFAS is a last resort as its use implies the worker will be working at a location where the potential to fall exists.

Electrical:
PPE can include items such as rubber gloves and arm protection, face shields, non-conductive footwear, and flame-resistant (FR) rated clothing made of appropriate ARC-rated materials to prevent electrical contact and burns.

Protection is dependent on the electrical system(s) and energy to be worked on, in, or around, and may be required by specific regulations.

Respiratory Protection:
Respiratory protection is a complicated subject, and required equipment cannot be reduced to simply wearing a dust mask or common filtered facepiece.

If required due to known and/or potential worker exposure to respiratory hazards, a formal respiratory protection program — inclusive of medical evaluation and assessment of the workers, exposure assessments of the potential or known contaminant(s), determination of the appropriate level of protection (type of respirator), and fit testing of the worker — will be necessary.

With respiratory protection comes the requirement of fit testing and maintaining a proper seal between the worker's face and the respirator when in use. To achieve this, the worker needs to be clean-shaven. Many times, we see workers using a respirator with a beard or several days' growth, which can allow a path for contaminants to leak into the breathing zone, making the respirator ineffective. Workers required to wear respiratory protection should be monitored for this concern.

Hearing protection:
This is another area of worker protection that can be easily misunderstood, resulting in potential injury due to improper type and protection level of hearing protection.

The most common types of hearing protection include earmuffs, foam-type roll-up ear inserts and pre-formed ear inserts. These are generally found in mass quantities and used for common tasks known to be short in duration or at lower decibel levels. But how do you know if a work area is subjected to unacceptable decibel levels and/or for extended periods of time? During these situations, those small foam ear inserts or muffs may no longer be sufficient in protecting the workers hearing.

As part of the exposure assessment process, you should purchase and utilize a sound level meter (noise dosimeter) or have your workers wear a personal measuring device specific to that worker's activities, especially in confined locations or locations where potentially loud equipment and activities are taking place. This will either validate the level of hearing protection being utilized in that work area or identify activities where a higher level of protection may be required. On your project, the subcontractor should already know the noise exposure level of their workers' tasks and be providing them with the required protection. On site, utilizing a portable noise dosemeter can provide a proactive way to monitor the work areas and spot-check noise levels.

Work Zones:
Whether in an active highway work zone or project site with heavy equipment operating, being seen is the primary focus to avoid being struck. Aside from advanced warning signage and traffic devices, worker visibility is critical and there are many types of high visibility, retro-reflective garments to utilize depending on the task, time of day, and environmental conditions such as fog, weather etc. While many projects require some level of high-visibility clothing to be worn by project workers, work zones require additional measures and a high level of visibility at all times. Clothing can be augmented as well with personal lighting and advanced warnings, such as vibration and sounds.

Other examples:
Depending on your needs, PPE can be found to protect workers against other exposures such as temperature extremes, hazardous chemicals, contaminated soils or materials such as lead, asbestos, battery acid, and cleaning and degreasing solvents, among others.

Wearable Technology

Advances in technology have made it possible to provide wearable devices alone or to augment existing PPE. For example, biometric sensors are available to measure body metrics to prevent heat related illness and dehydration, proximity devices to provide advanced warning in work zones and to prevent struck-by incidents among others.

With advances occurring all the time, as an employer, you should be routinely searching for these technologies to determine if or how they may enhance your current levels of protection.

Right PPE for the job

Based on your assessments and analysis, purchase the correct PPE for the job. There are countless options available with PPE in today's market that provide you with the ability to purchase discriminately and specifically for what you need.

Proper Use and Fit

Sizing (Gender)

PPE should not be treated as one-size fits all when purchasing. While purchasing in large quantities may provide a cost benefit, it may not provide the necessary protection for all workers due to variances in size of PPE for both men and woman.

When providing PPE to your workers, you must provide PPE that not only offers the proper protection but also fits. You will need to assess what sizes to purchase based on what your workers actually need to wear. For many years, women have had to wear PPE specifically designed for men, which may compromise effectiveness. In recent years, however, there are a number of companies that now cater specifically to women or have PPE lines meant specifically for women, to ensure proper protection.

If PPE is too large or too small, it can be loose or too tight, affecting how the user is able to wear it and impacting a worker's ability to utilize it as intended, thus creating a situation where the PPE may not achieve the required level of protection. Improper fit of PPE can also create issues such as exposing unprotected areas of the body, or creating irritation and blistering, not to mention becoming a distraction taking the workers' attentiveness away from the task.

Care and Maintenance

With all PPE comes responsibility to ensure that what you provide to the workers, if reusable, is maintained properly so it is clean, undamaged and continues to function as intended for the expected life of the equipment.

For example, dirty PPE such as a respirator can contaminate a worker's respiratory system, and dirty safety glasses can cause eye irritation or allow foreign objects into

the eye. Damaged respirators will no longer provide proper protection, damaged fall protection equipment may not protect a worker in the event of a fall, and damaged or scratched eye protection can reduce effectiveness in stopping projectiles and limit visibility of the worker.

Workers should be instructed and trained to clean their PPE daily or as required by the manufacturer. All PPE should be inspected daily before use to ensure it is clean, undamaged, and will function as intended. If it is not, it should be replaced.

When working with contaminants such as, but not limited to, lead and asbestos, the PPE being worn should be kept clean with specific procedures for removal (doffing) after use and disposal, so as not to transfer contaminants to clean PPE or clothing. If reusable, contaminated PPE should be properly cleaned and disinfected according to guidelines and instructions to ensure contaminants are removed before reuse. Disposable PPE should be bagged, sealed, marked and disposed of properly.

Washing and changing areas should be provided so workers can immediately wash their hands after removing used PPE and change into clean clothing at the end of the shift. Always remember: NEVER cross-contaminate used PPE with clean clothing and NEVER bring contaminated PPE home to be washed, as it can lead to contamination of the vehicle, household items and clothing of family members including those of children.

Heat-Related Illness and Dehydration

Wearing Personal Protective Equipment (PPE) may cause an increase in body temperature and sweating, which can lead to heat illness and dehydration risk. Employers should ensure that when workers are required to wear PPE, especially garments or clothing in warm, humid, or enclosed environments, they are provided with training, ventilation, breaks in cool shaded locations, ample water and electrolyte drinks to replace fluids, and are monitored for signs of heat illness. Symptoms can include fatigue, dark colored urine, headache, dizziness, muscle cramps and nausea.

In addition to the above, prevention practices can include medical review of the activities, employee fitness evaluations to ensure they are capable of performing their tasks under the anticipated conditions, and acclimatizing workers to the task.

Training

Regardless of the simplicity or common use of any type of PPE, workers must always be trained in the PPE they are required to utilize. This includes the purpose of the PPE being provided, how to properly don (put on) and doff (take off), proper fit, care and maintenance.

Conclusion

PPE is necessary to protect workers from known exposures in the work area as well as to protect the worker in the event an incident occurs. Appropriate PPE should be provided for the task and should fit the worker as intended. The PPE should be maintained, cleaned, and inspected before each use or replaced.

PPE is not the end all - it is recommended that hazard assessment and pre-planning be completed for all tasks and activities, with safe work practices identified and implemented to proactively prevent an incident from occurring or to minimize the time and opportunity a worker is put in close contact with a known exposure.

4/2026