Appendix D

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Maintaining and Inspecting Your Hardhat

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Perhaps no single item of personal protective equipment is as widely used in natural resources work as the hardhat. Nearly every outdoor activity we perform—from trail maintenance to fire fighting, tree marking to surveying, inventorying cultural sites to maintaining campgrounds—requires workers to wear an approved hardhat to protect against impact and penetration injuries.

Components

The hardhat consists of two parts, the shell and the suspension system, which together protect the worker.

The shell is the rigid outer portion of the hardhat. It is commonly made from thermoplastics such as polycarbonate or polyphthalate, or thermoset materials such as fiberglass. Its main function is to protect against penetration or impact. Although it does offer some protection, the shell was not designed to protect the wearer from radiated heat, nor will it retain its original shape when exposed to temperatures above 300°F.

The suspension system fastens to the inside of the shell and is designed to help absorb the impact of a blow.

Inspection

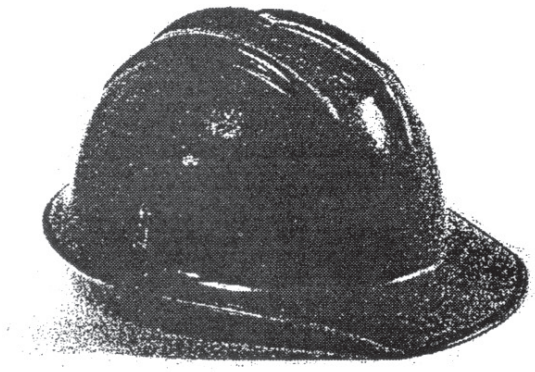
To insure the protection of workers, it is essential that both the shell and the suspension system are inspected frequently for signs of wear and degradation.

Inspect the shell for dents, cracks, nicks, gouges, and any damage from impact, penetration, abrasion, rough handling, or wear.

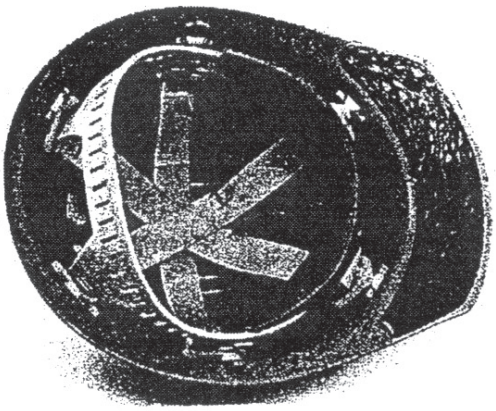
Replace any hardhat that shows signs of wear or damage.

Never drill holes in a hardhat for any reason.

Never use shells with metal parts or clips. They do not meet the electrical conductivity requirements of *ANSI Z-89.1 for Class B Hardhats.*



Hardhat shell.



Hardhat suspension system.

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Examine the suspension system closely for cracks, frayed or cut shell straps, torn headband or size adjustment slots, loss of pliability, or other signs of wear. Normal wear, hair and skin oils, and sweat all degrade the suspension system.

Remove and replace any suspension system that is worn or damaged.

Maintenance

Hardhats do not have a clearly defined service life. The conditions of use dictate when a hardhat must be replaced. Exposure to temperature extremes, sunlight, or chemicals like fire retardant or tree marking paint, shorten useful life. Hardhats subjected to such exposures should be thoroughly and frequently inspected.

Following these practices will help protect your hardhat and extend its service life:

Never store a hardhat in direct sunlight.

Never carry a hardhat in a pickup hat rack if this might expose it to direct sunlight for prolonged periods.

Never sit on a hardhat.

Never carry anything inside the hardhat while you are wearing it. For the hardhat to offer maximum protection, you must maintain clearance between the shell and your head.

Always replace any hardhat shell or suspension system that has been struck by a blow of any magnitude, even if there is no visible damage.

To remove dirt and stains from the shell or suspension system:

Scrub with a mild detergent.

Rinse thoroughly with warm (not hot water).

Wipe dry and carefully inspect shell and suspension system for signs of wear and damage.

Here are two additional sources of information for caring for your hardhat:

An information sheet, *Industrial Head Protection—User Information Guide*, is available from the E.D. Bullard Co., Cythania, Kentucky, (800) 227-0423.

Proper Care and Use of MSA Protective Helmets is a video produced by Mine Safety Appliances (MSA) (412) 967-3139.

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NATIONAL WILDFIRE COORDINATING GROUP

June 28, 1993

Memorandum

To: NWCG Members

From: Chair, NWCG

Subject: Protective Headgear (Hard Hats)

It has come to our attention that misunderstanding between some of our member agencies may exist about approved/recommended protective headgear. Some agencies (or regions within agencies) have adopted and fully implemented the current ANSI standards, while others may have adopted the standard but not fully implemented same due to procurement/fiscal timeframes. This has led, at least in one instance, to one agency's refusal of assistance by a cooperating agency resource, though both agencies met their own personal protective equipment policies which had been mutually agreed upon previously.

To mitigate future such misunderstandings, NWCG has agreed upon the following position regarding procurement and issuance of protective headgear. This will also help clarify concerns regarding penetration, deformation and/or melting of hardhats in wildland fire suppression activities.

The General Services Administration (GSA) catalog carries two distinctly different types of plastic hard hats on schedule. One is designated "Safety Helmet", and is intended to be worn by construction workers on construction sites in a normal temperature situation. The other is designated "Helmet, Safety, Wildfire", and is intended specifically for wildland fire suppression duty. It is required to withstand a temperature of at least 350 degrees F, far in excess of the 140 degrees at which human skin burns. This temperature requirement provides ample head protection to our employees any time they are exposed to excessive heat, whether directly or indirectly. The "Safety Helmet" does not meet the 350 degree requirement.

Additionally, both helmets must meet the ANSI Z89.1-1986 standard for the drop protection penetration test, while the "Helmet, Safety, Wildfire" must also meet the 20,000 volt electric nonconductor test (the construction type "Safety Helmet" does not). This ANSI standard precludes the use of the typical aluminum "ball cap" hardhats that have been in common use by our members.

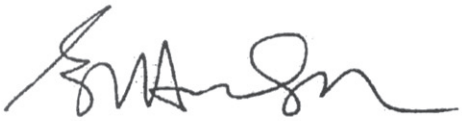
For these reasons, the only protective headgear on GSA schedule acceptable for NWCG fire suppression duty use (within the timeframes below indicated) is the Safety Wildfire Helmet, or equivalent. It is listed in the GSA "Wildfire Protection Equipment and Supplies Catalog" as Number 8415-01-055-2265, and is yellow in color. A non-inclusive list of other helmets which meet the requirements include Bullard's Models FH911C, FH911CR, FH911H, and FH911HR, and MSA's Model 490-377 in various colors. Generally yellow is the preferred color, for easy visibility and conformity, but is not mandated.

NWCG agencies should phase out the use of all previously used hard hats (if they've not already done so), and replace them as soon as is financially practical. The effective life of a hard hat has been determined to be three years, so a

complete stock replacement should be phased in and completed by October 1, 1995, ensuring that construction-type or metal hard hats are no longer available for issue to employees.

If an agency, or region(s) within an agency, complies with this standard sooner, then it must provide approved "Safety Wildfire Helmets" to responding cooperating agency personnel who have not yet implemented this standard, prior to assignment to wildland fire incidents; or accept the lesser standard of the cooperating agency.

This NWCG position will assist in ensuring that our employees have the best available protective headgear, making it impossible to mistake construction type helmets for approved fire fighting helmets or take inappropriate headgear into fire suppression situations.



American National Standard for Personnel Protection
Protective Headwear for Industrial Workers-Requirements
ANSI Z89.1-1986

Appendix B
Recommendations and Precautions Concerning Helmet Use, Maintenance, and Testing

B1. Laces

Laces, if any, should always be tied securely with a square knot.

B2. Cleaning

Shells should be scrubbed with a mild detergent and rinsed in clear water approximately 60 degrees Celsius (140 degrees Fahrenheit). After rinsing, the shell should be carefully inspected for any signs of damage.

Removal of tar, paints, oils, and other materials may require the use of a solvent. Since solvents may attack and damage the shell, the manufacturer should be consulted with regard to an acceptable solvent.

B3. Painting

Caution should be exercised if shells are to be painted, since some paints and thinners may attack and damage the shell and reduce protection. The manufacturer should be consulted with regard to paints or cleaning materials.

B4. Periodic Inspection

All components, shells, suspensions, headbands, sweatbands, and accessories, if any, should be visually inspected daily for signs of dents, cracks, penetration, and any damage due to impact, rough treatment, or wear that might reduce the degree of safety originally provided. Any industrial helmet that requires replacement or the replacement of any worn, damaged, or defective part should be removed from service until the condition of wear or damage has been corrected.

B5. Limitation of Protection

Industrial protective helmets meeting the requirements of ANSI Z89.1-1986 are designed to provide optimum protection under average conditions. Users are cautioned that if unusual conditions prevail (for example, higher or lower extremes of temperature than those prescribed), or if there are signs of abuse or mutilation of the helmet or of any component, the margin of safety may be reduced.

Note: All items constructed of polymeric materials are susceptible to damage from ultraviolet light and chemical degradation, and safety helmets are no exception. Periodic examination should be made of all safety helmets and in particular those worn or stored in areas exposed to sunlight for long periods. Ultraviolet degradation will first manifest itself in a loss of surface gloss, called chalking. Upon further degradation the surface will craze or flake away, or both. At the first appearance of either or both of the latter two phenomena the shell should be replaced immediately for maximum safety.

B6. Sizes

Provisions should be made by the manufacturer of industrial protective helmets for testing large and small sizes as appropriate.

B7. Precautions

Because helmets can be damaged, they should not be abused. They should be kept free from abrasions, scrapes, and nicks and should not be dropped, thrown, or used as supports. This applies especially to helmets that are intended to afford protection against electrical hazards.

Industrial protective helmets should not be stored or carried on the rear-window shelf of an automobile, since sunlight and extreme heat may cause degradation that will adversely affect the degree of protection they provide. Also, in the case of an emergency stop or accident, the helmet might become a hazardous missile.

The addition of accessories to the helmet may adversely affect the original degree of protection. When precautions or limitations are indicated by the manufacturer, they should be transmitted to the wearer and care taken to see that such precautions and limitations are strictly observed.

B8. Safe Condition

Neither the impact resistance requirements (see 7.2) nor the electrical insulation requirement (see 7.1) should be construed to indicate the safe impact level or safe voltage to which the industrial worker may be subjected. The maximum voltage against which insulating safety headgear will protect the wearer depends on a number of variable factors, such as the characteristics of the electrical circuit and the equipment involved, the care exercised in maintenance of equipment, and weather conditions. Therefore, the safe and proper local use of insulating safety headgear is beyond the scope of ANSI Z89.1-1986.

WARNING: In addition to an inspection and maintenance program, employers should review with their employees some precautions concerning hard hat use and treatment. The following are some warnings that should be discussed:

- If the hard hat has been struck by a forcible blow of any magnitude, both the hard hat shell and suspension should be replaced immediately, even if no damage is visible.
- A conventional hard hat provides limited protection by reducing the force of falling objects striking the top of the shell. Protection from side impact and penetration is limited.
- The hard hat shell or suspension should never be altered or modified. Drilling holes in the shell for ventilation purposes must be prohibited at all times.
- Avoid contact of the hard hat with electrical wires.
- Hard hats should not be carried on the rear window shelf of an automobile or stored in direct sunlight. Exposure to extreme sunlight over time may cause degradation which can affect the degree of protection originally provided.
- Because hard hats can be damaged, they should not be abused. They should be kept free of abrasions, scrapes, and nicks and should not be dropped, thrown, or used as supports. Do not sit on a hard hat.
- Wearers should never carry or wear anything inside their hard hat. A clearance must be maintained between the shell and head for the protection system to work properly.
- Do not paint a hard hat prior to consultation with the manufacturer. Some paints and solvents may attack and damage the shell and reduce the degree of protection originally provided.
- As a general guideline, all new employees should be provided with a new unused, and unexposed hard hat. The practice of reissuing cleaned hard hats must be avoided. The cost of a hard hat is negligible when the potential for injury, lost time, health care cost, and liability are considered.

Industrial Head Protection User Information Guide

Hard Hats: Maintenance, Inspection, and Precautions

The hard hat is one of the most important pieces of equipment worn in the industrial workplace. Many workers have been saved from serious injury or even death because they were wearing a hard hat. To assist in your organization's head protection program, E.D. Bullard Company would like to share some observations on proper maintenance and inspection of industrial hard hats, as well as a few precautions. These comments apply to hard hats made by all manufacturers, not just Bullard.

A conventional hard hat consists of two components-the shell and the suspension-which work together as a system. Both components require periodic inspection and maintenance. It is recommended that employers conduct a regular head protection inspection, maintenance, and replacement program. Each program will vary according to the work environment at each job site location.

Hard Hat Shell

Thermoplastics (polyethylene, polycaronate, and polyphthalate carbonate (P.P.C.) Lexan) and thermoset materials (fiberglass and phenoli-impregnated textiles) are commonly used to mold the shells of industrial hard hats. These materials have proven to be durable, reliable, lightweight, and provide effective protection. Given proper care and normal workplace conditions, a hard hat will have a reasonable service life.

The shell should be inspected routinely for dents, cracks, nicks, gouges, and any damage due to impact, penetration, abrasions, rough treatment, or wear that might reduce the degree of protection originally provided. Any hard hat that shows signs of worn or damaged parts should be removed from service immediately and replaced.

Although Bullard adds an ultraviolet inhibitor to hard hat shells, all hard hats are susceptible to damage from ultraviolet light, temperature extremes, and chemical degradation. Thus, users who work in environments with high degrees of exposure to sunlight, heat, cold, or chemicals should replace their hard hats more frequently than workers in other environments.

Degradation of thermoplastic material may be apparent when the shell becomes stiff, brittle, faded, dull in color, or exhibits a chalky appearance. With further degradation the shell surface may craze, flake, or delaminate. A hard hat should be replaced immediately at the first sign of any of these conditions.

> The following is a simple field test that can be performed by an employee or supervisor to determine possible degradation of polyethylene shells:
>
> > Compress the shell inward from the sides about 1" with both hands and then release the pressure without dropping the shell. The shell should quickly return to its original shape, exhibiting a degree of elasticity. Compare the elasticity of the sample with that of a new shell. If the sample does not exhibit a similar degree of elasticity to that of a new shell or if it cracks due to embrittlement, it should be replaced immediately.

Hard Hat Suspension

The hard hat suspension system is just as important as the shell. Its main purpose is to help absorb the shock of a blow. Therefore, it must be in good condition at all times.

Like the shell, the suspension must also be inspected and replaced periodically. Over a period of time, the suspension will become worn and may become damaged.

Suspensions should be inspected closely for cracks, frayed, or cut shell straps, torn headband, or size adjustment slots, loss of pliability, or other signs of wear. These conditions can be caused by perspiration, hair oils, or normal wear.

Any suspension that is damaged must be removed from service and replaced immediately.

Cleaning

Hard hat service life can be extended by cleaning both the shell and the suspension. This should be part of the inspection and maintenance program. Scrub the shell and suspension with a mild detergent to remove dirt and stains. Rinse thoroughly with clean, warm water approximately 60 degrees Celsius (140 degrees Fahrenheit). After rinsing, wipe dry and carefully inspect once again for any signs of damage.

What is the useful life of a Hard Hat?

Users of industrial head protection devices must realize that these products do not have an indefinite useful life. E.D. Bullard Company recommends that a regular head protection replacement program be conducted by employers as a responsive solution to the task of addressing useful service life of hard hats.

Since the details of such a program must be developed based on work conditions at each job site, it is impossible to provide a specific time frame for hard hat replacement. As a general guideline many large corporations replace all employees' hard hats every five years, regardless of the hard hat's outward appearance.

Where user environments are known to include higher exposure to temperature extremes, sunlight, or chemicals, hard hats should be replaced automatically after two years use. This is based on information and hard hat samples returned to E.D. Bullard after being exposed to such conditions. It may be that in certain rare instances a hard hat should be replaced within less than two years.

The employer should have a policy of immediately replacing a hard hat if the employee (wearer) feels it is necessary.