

# Protect Your Head!



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Cat. No.: HS4-12/2004  
ISBN: 0-662-68247-5

Printed in Canada

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## —— Protect Your Head!

Pouring your heart into your work is fine, but using your head at work is even better. The head is the most complex system of the human body, but it is also the most fragile and most delicate. You can generally continue living if you lose a part of your body, but not if you lose your head!

There are many causes of head injuries. In several work places, workers are exposed to falling objects, walk under boards or pipes hanging at the end of a rope, have to crouch down under machines, work under vehicles, etc.

## —— What are the main types of head injuries?

When people talk about head injuries, we immediately think of skull fractures or concussions caused by violent blows. We would be right to do so because these are the two most serious injuries. However, there are other types of injuries that we often forget to take into consideration:

- bruises and cuts from impacts against physical objects in the work place;
- heat stroke caused by excessive exposure to the sun's ultraviolet rays;
- burns due to contact with molten metal: welding arcs, oxyacetylene cutting, metal manufacturing;
- chilblains and hypothermia caused by intense or prolonged cold;
- burns caused by fire;
- burns, electric shock and electrocution caused by contact with



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active conductors or electrical loads;

- crushing between two pieces of rolling equipment, for instance, when hair is caught in a moving part or when hands are caught in a drive belt.

In all of these cases, you must protect your head and select the type of protection that is suitable for both the work being done and the existing risks.

### — **Protecting yourself against falling objects and other violent impacts to the head**

The impact of an object and violent blows to the head can cause contusions and lacerations to the scalp and can sometimes cause a concussion or skull fracture.

Concussions are caused by a violent and sudden displacement of the brain within the skull. On the side of the head receiving the blow, the brain hits the side of the skull, while on the opposite side of the blow, the brain moves away from the skull. Harmful shear stresses are then developed in the brain as well as the brain stem, that is, where the brain is attached to the spinal cord. Depending on the intensity of the blow, the victim can feel a simple passing discomfort (dizziness, sudden blindness), a temporary injury (confusion, disorientation, unconsciousness) or permanent damages: loss of certain neurological functions (amnesia, paralysis). In serious cases, the victim can lapse into a coma and die.

A skull fracture is not dramatic in itself. The skull is made up of a group of bones able to repair themselves like all other bones. However, if bone splinters enter the skull cavity during the fracture, they can injure the brain and cause serious permanent damage. Generally speaking, the risk of disastrous consequences increases as the intensity of the impact increases and as the pressure exerted on the skull is localized over a small surface.

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**Hard hats** are the only piece of equipment that can protect you against these risks. Hard hats are designed to reduce the intensity of impacts to the head and distribute the pressure of the blow over a larger part of the skull. First, hard hats have a rigid one-piece shell that resists shocks and punctures and distributes



the intensity of the blow over the entire skull. Second, hard hats come with a type of suspension system, a headband, that absorbs the blow through its elasticity and maintains a space between the head and the shell: the greater the space, the more energy is absorbed.

Hard hats are not all created equal. The Canadian Standards Association (CSA) prepared a series of tests to classify them according to their level of protection. There are three levels:

**G – general usage**

**E – electrical trades**

**C – conducting headwear**

If you only need to protect yourself against impacts and blows, class G and C hard hats are enough. Hard hat shells are made of fiberglass, phenolic resin, polyester, polycarbonate, textile laminates or even aluminum (class C only). They resist impacts and punctures. Class G hard hats also resist voltages of 2,200 volts. Class G is recommended because in almost every work place, workers encounter low-voltage electrical devices.

***A few helpful hints***

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- Preferably select a smooth shell because objects glance off them more easily. This is indispensable when there is a risk of side impacts. If the shell has ridges, they could act as support for the horizontal part of the impact and the hat could be knocked off.
  - If there is a risk of side impact, select a shell offering increased lateral elastic rigidity.
  - For heavy work, select shells having a thickness of at least 2 mm. They are more durable.
  - For protection against impacts from projectiles with a high penetrating power, use thermoplastic shells: polycarbonate, ABS, mix of polycarbonate and fiberglass... They are more resistant to punctures.
  - Add an adjustable fastener under your chin if the hat risks falling off when you move.
  - Never modify your hat. For instance, if there is a hard hat available on the market that comes with welding goggles, it is safer to buy this type of hat than it is to try to make one in your garage.



### — **Protecting yourself against bumps on fixed objects in the work place**

Sometimes certain tasks must be carried out in tight spaces where the risk of accidentally bumping fixed objects in the work place is



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frequent. Examples of this type of work include working under machinery, repairing a vehicle or a piece of equipment, doing maintenance work, driving a heavy vehicle or inspecting meters.

When bumping against these objects, the impact is never as violent as receiving a hammer on the head. Results generally include lesions to the scalp: light contusions, moderate cuts if the element is sharp-edged, tears, scratches, hair pulling, scrapes...

If the risks we described in the previous section do not exist, then it is probably not necessary to use a hard hat. Wearing a rigid plastic bump cap, aerated or not, with or without suspension, can very well do the trick. Be careful, however; these caps are not CSA approved. They do not offer much protection against impacts from flying or falling objects and even less against punctures.

### — **Physical and electrical shocks**

Class E hard hats are not only designed to resist impacts and penetration but also to provide some protection against electrical shocks from accidental contact with high-voltage electrical conductors. Experimentally, these hats can resist 20,000 volts (ground connection). The shell is often made of high-density polyethylene or polycarbonate and has no holes and no fasteners. All of the components that make up the suspension system provide electrical resistance (vinyl, leather, nylon) and the entire hat contains no metal parts.



Class E hard hats are suitable for linemen, miners, forestry, industry and construction workers, for manufacturing plants and public services; in short, anywhere where there is a risk of exposure to active conductors or to high-voltage electrical loads.

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### ***A few helpful hints***

- Always use original parts to replace broken parts.
- Carefully inspect your hat before use because any cracked or punctured shell loses resistance to the passage of electrical current.
- Never repaint the shell with a paint that conducts electricity.
- Never place a metallic logo or sticker on the hat.
- The electrical protection is not valid if the shell is humid or if it is soiled from oil, grease or any other conducting chemical.
- Winter head covering must not have any metallic accessories nor contain materials that conduct electricity.

### **The sun**

It is not recommended going bare-headed in the sun for a long period of time because with the sun also comes the risk for heatstroke, heat cramps and sunstroke.

The most serious case of this type of injury is sunstroke, characterized by headaches, dizziness, fatigue, warm, dry and red skin, an elevated heart rate and rapid breathing. Severe exposure leads to confusion and even attacks, convulsions and coma.



When wearing a hard hat is not mandatory, a simple cap made of light material or a straw hat will do.

If wearing a hard hat is mandatory, select a hard hat equipped with a large brim around the entire shell. You can also equip the hat with a headband and a sweatband. If electrical protection is not necessary, you can wear a Class C hat equipped with side ventilation holes.

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### ***A few helpful hints***



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- Select a hard hat that comes with a visor in the front.
  - Attach a havelock to your cloth cap or to the back of your hat to protect your neck.
  - Use hats with large brims to protect your neck, shoulders and face as much as possible.
  - The best hard hats are those that passed the ageing test. They resist the impact test after 400 hours of exposure to a 450-watt xenon lamp.

## **The cold**

A variety of hats exist to protect you from the cold, such as the tuque, the fur hat (with or without ear flaps), mufflers and the balaclava.

If you must wear a hard hat, there are several liner models that you can add to your hat to protect yourself in winter. Head bands fit over the hat and keep the cold and the wind from entering between the inner head band and the shell. Winter liners can be worn directly on the head under the head band. If you want, you can find liners available on the market that also protect the neck, the nape of the neck, the cheeks, part of the face, the upper shoulders or all of these at once. There are no specific rules to help you with your selection.



## ***A few helpful hints***

- You must use a liner made of dielectric material for Class G and E hats in order to preserve their level of electrical protection.
  - Certain liners are fire resistant. They are generally made out of Nomex or Kevlar.
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- In mid-season, it often becomes necessary to wear waterproof liners for protection against the rain.
  - Liners destabilize hats. Adjust the headband properly before beginning to work.



### — Other hats

It's up to you to select the right hat. Properly identify the risks and purchase the hat that will protect you best. For instance, when risks of impact and bumping are minimal and risks of sparks and dust are high, you can wear a skull cap or a cloth or leather cap. We often see these caps in garages and mechanical maintenance services, on welders and during blow-torch cutting.



If the only risk is one related to hair getting caught in moving parts, falling into food or

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This image shows a blank sheet of white paper designed for taking notes. At the top left, there is a red rectangular header area. Inside this header, the word "Notes" is written in a bold, black, sans-serif font. Below the header, the rest of the page is filled with horizontal blue lines, providing space for writing.

## Notes