

able where a vendor comes into the plant with a trailer completely equipped and stocked to fit and sell safety shoes. These shoes are normally offered at an industrial price.

It is difficult to determine when management should pay the cost of personal protective equipment and when workers should. Factors are the probability and expected severity of injury, the willingness of workers to wear the equipment, its length of life, and the degree to which it may be depreciated by nonoccupational use.

For example, the welder's helmet is almost universally supplied by management, for the job could not be performed at all without it. Work gloves sometimes must be purchased by the user. On the other hand, welder's or other special purpose gloves are usually considered as being a necessary part of the job work tools and are issued free.

No matter what decision is made, it remains management's responsibility to develop and enforce the program. This is one of the main themes in the first eight chapters of this Manual.

Head Protection

Although every worker should be encouraged to use his head to absorb knowledge—he should not use it to absorb blows. Men exposed to head hazards must be provided with head protection.

Safety hats

Safety hats (or helmets) are rigid headgear of varying materials designed to protect the workman's head—not only from impact but from flying particles and electric shock or any combination of the three.

Helmets (see Fig. 38-2) have been classified into two types: (a) full brimmed, and (b) brimless with peak. The types have been further broken down into four classes: Class A, limited voltage resistance for general service; Class B, high voltage resistance; Class C, no voltage protection (metallic helmets); Class D, limited protection for fire fighters service.

All helmets that meet American Standards Z89, *Standard for Industrial Protective Helmet*, shall be identified on the inside of the helmet shell with the manufacturer's name, American Standard designation, and class (A,

B, C, or D).

Materials used in the construction of Class A and B helmet shells should be water resistant and slow burning. Materials in Class D helmets shall be fire resistant (self-extinguishing when tested in accordance with ASTM Standard D-635), and nonconductors of electricity.

Class B (utility service) headgear do not have holes in the shell or any metal parts at all.

The headpieces designed for use around electrical hazards meet voltage tests of 20,000 volts AC (rms), 60 cps, for three minutes and leakage currents not exceeding nine ma.

The other classes have a less strict requirement: 2200 volts AC (rms), at 60 cps for one minute with no more than 9 milliamperes leakage.

The breakdown threshold for all helmets is the same: 30,000 volts.

The thinnest section of Class A and B helmet shells will not burn at a rate greater than 3 in. per minute. After a 24-hr immersion test, water absorption of the shell will be no more than 5.0 per cent (by weight) for Classes A and D, and 0.5 per cent for Class B.

All helmets are designed to transmit a maximum average force of not more than 850 lb when tested in accordance with American Standard 89. No individual helmet shall transmit a force of more than 1000 lb.

When used properly, these hats will greatly reduce injury from falling objects as well as exposure to electric burns. See Edison Electric Institute publication AP-1-1961, *Specifications for Electrical Workers Insulating Safety Headgear*.

Metal helmets do not afford the high impact resistance of plastic ones, but because of their lighter weight, they are preferred by some workers. Metal helmets should never be used where electrical hazards or substances corrosive to aluminum are present (see American Standard Z89).

Weight and shape of hat. American Standard Z89 specifies the weight for Class A and C helmets shall not exceed 15 oz, including suspension but excluding winter liner and chin strap. Class B helmets can go as heavy as 15½ oz.

A brim all around the helmet (Fig. 38-2d) provides the most complete protection for