clothing, not coarse-textured or fuzzy clothing They should brush it frequently

3 Goggles or a full fiber helmet with attached plastic face shield should be worn A skull cap may be worn under the helmet Leather gloves with long gauntlets are recommended

4 Machine tools must be sharp and properly ground for magnesium alloys, or they may cause fire from friction

5 Use only neutral mineral oils and greases for cooling and lubrication Animal or vegetable oils, acid-containing mineral oils, or oil-water emulsions can be hazardous

Chipping

Where castings are cleaned or chipped, tables, benches, and jigs or fixtures specifically designed and shaped to hold the particular casting should be provided Screens or partitions should be installed to protect other employees from flying chips These areas should be provided with hoods and exhaust systems to remove dust and workers should wear eye and face protection

Welding

Welding is done in a foundry to a considerable extent in the cleaning or reclaiming of castings The safe practices given in Chapter 31, "Welding and Cutting," should be followed

Sand is plentiful in all foundries and is one of the best noncombustible materials It can be spread on the floor to a depth of 2 in in areas where welding operations are conducted, to help prevent fire

Powder washing, a method in which a stream of powdered iron oxide is introduced into the gas flame to intensify the heat produced, should be done according to the same safe practices as other welding and cutting of carbon steel or cast iron However, when this method is used to clean or cut sprues, gates, and risers from alloyed castings, exhaust ventilation is recommended

Power presses

Power presses have wide application in finishing departments of foundries Sufficient aisle space, good housekeeping, and effective lighting should be provided for safety in power press operation Machines should be fully guarded and maintained in good working order Operators should be carefully selected and should be trained in efficient and safe operation of the machine Mechanical feed and ejection equipment should be used where practical

These topics are fully discussed in Chapter 25, "Cold Forming of Metals"

Nondestructive Testing

Visual observation, even with magnification, cannot locate all small, below-the-surface defects in cast and forged metals Proper nondestructive testing will, however, reveal all such defects positively without damage to the parts being tested Nondestructive testing methods *will locate defects inherent in* the metal (nonmetallic inclusions, shrinkage, porosity), defects that result from processing (high residual stresses, cracks and checks caused by handling, sprung, or grinding of castings and forgings), and in-service defects (sharp changes in section, corrosion, erosion)

The types of testing most commonly used for forged and cast metals are

1 Magnetic particle
2 Penetrant
3 Ultrasonic
4 Triboelectric
5 Electromagnetic
6 Radiographic

These methods, as well as other applicable to nonmetallic substances, are fully discussed in N S C Data Sheet 488, *Nondestructive Testing of Materials*

Recommendations for installation, inspection, and maintenance of the electrical equipment used in many of these testing procedures are given in Chapter 33, "Electrical Hazards"

Magnetic particle methods

Magnetic particle inspection is the most widely used test method It utilizes magnetism to attract and hold very fine magnetic particles right on the part itself If a defect is present, it interrupts the magnetic field and is clearly shown by the pattern made by the particles The part is magnetized in suitable directions by AC line voltages transformed to low-voltage (4 to 18 volts), high-amperage AC, half-wave current, or three-phase full-wave current