

perienced workmen. Crucibles should be supported on foundations or pedestals of firebrick, graphite, or other infusible material.

The removal of heavy crucibles from furnaces calls not only for special skill but also for physical strength. If the men are overstrained, serious accidents are likely to result. Where possible, therefore, a mechanical device should be employed for removing heavy crucibles—those exceeding 100 lb in combined weight of crucible, tongs, and metal (Fig 28-9).

Crucible furnaces

The operation of crucible furnaces is a relatively hazard-free operation if suitable exhaust hoods are installed on all furnaces used for melting metals which give off harmful fumes.

Upright furnaces having crown plates more than 12 in. above the surrounding floor should be equipped with metal platforms having standard rails. Such platforms should extend along the front and sides of the furnace flush with the crown plates and clear of all obstructions. Crucibles containing molten metal should be lowered from these platforms mechanically.

Many crucible furnaces are oil fired, and unless the motors driving the oil pump and the air supply for the furnaces are connected to the same source of power, a considerable quantity of oil may flow onto the floor if the power goes off the air line.

One remedy is to put a gate valve in the oil supply line so that in case of an air failure, oil can be shut off from the entire battery of crucible furnaces in one operation. If the pilot and burner are electrically controlled, this valve can be so arranged that it will be similar to an interlock.

A mechanical shutoff can be made by the installation in the oil line of a gate lever-operated valve which is closed by the release of a weight. Since the weight is held up normally by an air cylinder, the oil supply is stopped at once when the air goes off. A small hole may be drilled in the cylinder so that air in it may be released promptly when the oil pressure goes off.

Ovens

The principal hazards in the construction

and operation of core ovens and mold drying ovens are excess smoke, gases, and fumes given off into the foundry atmosphere. Other unsafe conditions are unprotected firing pits, unguarded vertical sliding doors or their counterweights (which may drop on workers), and flashbacks from fire boxes.

Firing pits into which men may fall should be guarded with substantial railings or with grating covers having trap doors to give access to the steps leading down into the pits.

Safe types of vertical sliding doors should be installed. Cables and chains having a high factor of safety, substantial cable and chain fastenings, large sheaves to prevent undue wear of cables, and guarded counterweights are also necessary. All sliding doors should be thoroughly inspected at frequent intervals. Safety dogs may be used to hold the doors in raised position.

Many vertical core ovens are 60 to 70 ft high and have a driving mechanism located at the top. Some foundries have installed steel stairways with standard treads wherever possible. Where metal ladders must be used, not less than 6 in. of clearance should be maintained from the center of each ladder rung to the side of the oven.

A caution sign should be placed on the wall near core ovens, giving necessary precautions and manufacturer's instructions to be observed when ovens are being lighted.

Gas-fired ovens

Gas-fired ovens should, whenever possible, be located in a room separate from the molding floors and also from the coremaking room by a partition. This measure will help prevent equipment failures caused by sand in the controls.

Blast tip pipe burners should be equipped with baffles to keep sand out of the tip and also to spread the flame. Tips should also be horizontal to protect them from sand.

Safety pilot valves will prevent the flow of unburned gas into the oven combustion chamber should the burner pilot light go out, or should a cock or burner be accidentally opened. A valve of this nature should be installed on every gas-burning furnace or oven.

A bleeder valve in the line between two control valves close to the burner is an additional safety device. The operator can then