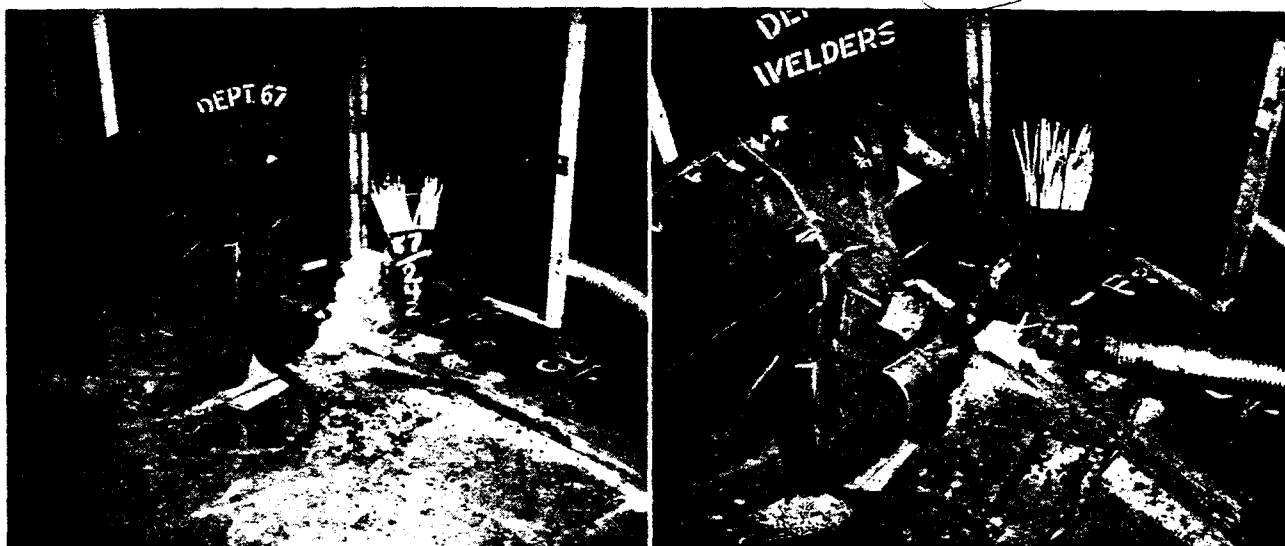




Welder at work: left, without exhaust ventilation; right, with exhaust working.

Fume Control in Shipyards

By WILLIAM E. LAWRENCE

Safety Engineer, New York Shipbuilding Corporation, Camden, N. J.

SAFEGUARDING workers exposed to respiratory hazards resulting from contact with fumes, dusts, vapors, acid gases, and mists ranks among the important safety measures on new construction jobs in shipyards.

Because of the importance of welding operations in shipbuilding, much attention has been paid to the control of hazards and fumes involved. The large number of persons engaged in welding, tacking, burning and heating or straightening has necessitated increased protection against possible fume fever hazards or later complications.

In our plant there are at present some 3600 welders, tackers, burners and heaters whose jobs require special provisions for ventilation, especially in innerbottoms and other small compartments. Every shipyard should know by now that the most satisfactory method of fume control is exhaust ventilation.

Extensive experimentation with different types of equipment during the past decade has proved that the surest method is to remove the

trouble at its source. Accordingly, blowers and exhausting devices have been developed and placed in service with satisfactory results. Respirators fitted with metal fume filters also give protection when fume concentrations are low.

Plant medical staffs are exercising great care in routine re-checks and re-examinations of workers exposed to welding fumes. To the best of our knowledge, we have not had one case of lasting or permanent ill effects to anyone associated with welding, tacking, burning or heating.

Many of the oxides encountered are irritating and tend to aggravate pre-existing conditions. For instance, workers with colds should not be exposed to zinc fumes or, for that matter, to any fumes.

Data accumulated through re-examination and case histories of our welders may be expected to provide a great deal of valuable information for medical study. However, it must also be remembered that a large part of the problem concerns not only the welders but other workers in the vicinity. They must be protected not only from the

fumes but from eye flashes as well.

There is a relatively new development which consists of carbon arc burning in smoothing off large countersunk heads of tap bolts in armor plate decks. These heads are 1 7/8 inches in diameter and were formerly chipped and ground off flush with the deck plates. This was a long, tiresome, rough and costly operation.

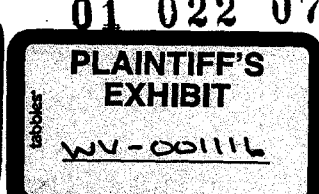
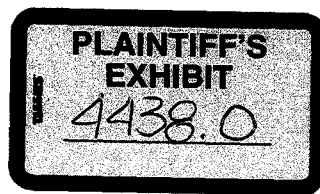
By use of the carbon arc, these heads are burned off so that only a small amount of grinding is necessary, thus cutting time and labor to a minimum.

Of course, the fume and dust hazard had to receive special consideration. This was taken care of by use of a compressed air jet which blows the slag and carbon residue into exhaust funnels located at the ends of two 3-inch metallic flexible tubes with powerful portable exhausters at the outlet ends.

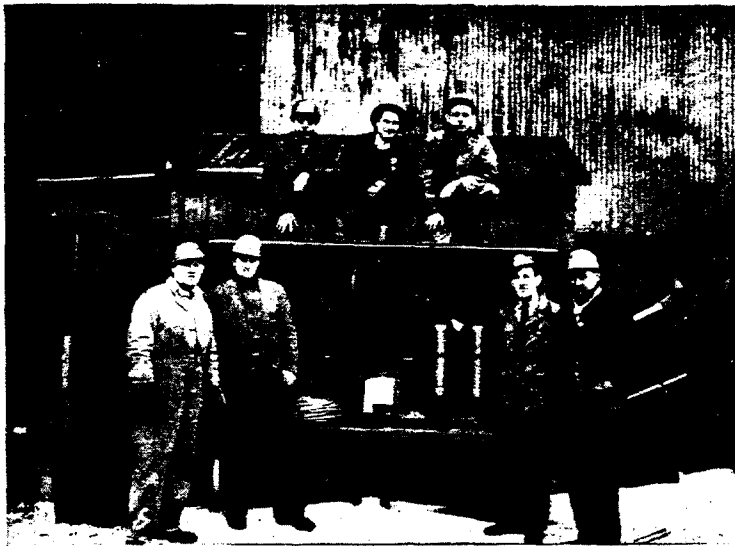
As required, this equipment is skidded easily along the deck and is kept close to the job at all times, even eliminating the necessity for respirators. Protection against heat and glare is, of course, a necessity.

In winter, there is the special

From a paper presented at the Marine Section, 32nd National Safety Congress.



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Fire extinguishers, gas masks, inhalator, portable lights, wrecking tools, etc., are carried on this emergency equipment wagon. It can be hoisted onto ships by cranes.



Men working with water-repellent asbestos insulation are equipped with dust respirators.

hazard of salamanders and other receptacles for fires, which may generate deadly quantities of carbon monoxide gas in addition to causing an oxygen deficiency in a closed space. Also there is the danger of fumes from fires in ships on the ways and in the water after launching. Many of these fires occur because welders, tackers and burners do not observe the rule requiring them to know what is below or above, or on the other side of bulkheads before starting work.

Sparks will often ignite welding leads, portable light wires, air hose and rubbish, especially when house-keeping, or as we call it, shipkeeping, is poor. More than 90 per cent of these fires are caused by failure to observe this important rule.

Although many of the fires may be minor, there is always the possibility of men being trapped by smoke and toxic fumes without possible escape. This is where the trained safety inspector or watch force man comes into the picture. Quickly he must don a mask, hook on a life rope, and go down to make sure everyone has escaped. He must be followed as closely as possible by another worker with a powerful electric lamp. If any deficiency of oxygen is suspected, an oxygen breathing mask must be worn. Ventilation must be provided at once, smoke and fumes exhausted, and a fresh supply of air blown in.

Much could be said about the

maximum allowable concentration for carbon monoxide and carbon dioxide, but the main point to remember is that carbon monoxide is the No. 1 poison killer in both industrial and non-occupational life. Wherever there is smoke, you may suspect carbon monoxide.

Constant alertness on the part of watch force men and safety inspectors is an absolute necessity in combating such hazards. The education of the men by their supervisors and use of warning posters are recommended, but exhaust ventilation and introduction of fresh supplies of air are imperative under such dangerous conditions. A number of almost fatal accidents in shipbuilding can be attributed to carelessness rather than ignorance. Men forget to think.

Use of insulation cement containing toxic solvents, such as carbon tetrachloride, is a menace to workmen unless adequate precautions are taken to safeguard them. A large shipyard recently re-distilled its entire supply of a toxic solvent and substituted a safer one, thus eliminating the hazard without loss of material, but with a tremendous increase in production and safety.

The use of water-repellent asbestos insulation has recently replaced some types of material formerly used in ship work. For protection against dust or possible asbestosis, it is recommended that such mate-

(Continued on page 90)



A shipyard worker wearing oxygen-breathing apparatus. In the background is a display of protective equipment, showing goggles, hard hats and safety shoes.



An all-service gas mask may be used in atmospheres where there is no oxygen deficiency.

Fume Control

(Continued from page 17)

rial be dampened wherever possible, and that dust respirators be worn in addition to the provision of special ventilation. Periodic medical examination of those exposed is also necessary.

Men working with fiberglass or glass wool may not be particularly bothered by fume hazards, but may experience trouble if a toxic solvent is used in the cement. Experiments

have shown, however, that the dust inhaled by men working with fiberglass does not cause damage to the lungs.

Since fiberglass workers may contract dermatitis, especially in hot weather, extra changes of loose coveralls with cheesecloth or soft unbleached muslin worn around the neck are recommended. Eye protection and dust respirators are also provided.

Shot and sand blasting with its silicosis hazards can be done safely if standard sand blast rooms or cab-

inets are provided. Such installations should be approved by a state department inspector, and special ventilation must be provided and frequently inspected. Regular, periodic examinations, including X-rays, are mandatory.

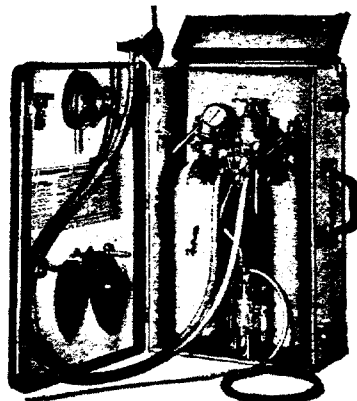
A leaking facepiece can be detected easily by the operator, and should be reported at once to the safety department for immediate correction. If an operator tastes sand, he will realize at once that his equipment is not safe.

Fumes and dust from friction saws in shops are easily removed by proper exhaust ventilation, and should be carried by ducts from the machine to dust collectors, out of the shops if possible.

Plating room fumes with modern ventilating systems now available are no longer a problem in an up-to-date shipyard. A few years ago, however, a different story could have been told.

Recent changes in painting specifications on vessels have provided for the use of zinc chromate which, although perhaps not particularly toxic, must be considered when

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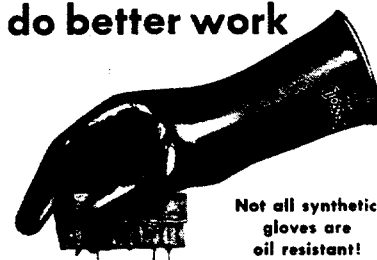
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sprayed in small compartments. Respirators are advocated along with safe ventilation.

When operations take place in big shops where sizable plates are sprayed, the use of air line respirators is recommended since these areas are too great for efficient exhaust ventilation. Crane operators, however, who must handle material in such locations and especially above pickling tanks, should be provided with respirators. Fans may be placed in the crane cabs to blow fumes and vapor away from the

operators.

Protection must be furnished for any job in which dust, fumes or smoke from any substance containing lead is breathed daily. This applies when welding, cutting, burning, shrinking or straightening where material is metal, coated with paint containing lead.

Lacquer spraying, if done in approved booths properly ventilated, presents no great problem. If cleaning compounds are used, chemical cartridge respirators provide necessary protection if the concentrations

are low.

Use of proper extinguishers on different types of fires must be carefully considered. Fumes from combustion gases and extinguishing agents are capable of causing death. Periodic demonstrations should be made for the benefit of firemen, watch force men, and safety inspectors, and the use of instructive posters and bulletins is also recommended.

Fumigation of refrigerator spaces in ships practically ready for delivery is important. Men whose duty it is to open and ventilate such spaces after fumigation must wear all-service gas masks. If a deficiency of oxygen is suspected, oxygen breathing apparatus must be used.

Management must be impressed with the necessity of providing ventilation of ships under construction, as well as the arrangement for permanent installations. Present construction of naval vessels practically prohibits the use of temporary ventilation units in engine and boiler rooms due to their inaccessibility and the difficulty of bringing in fresh air.

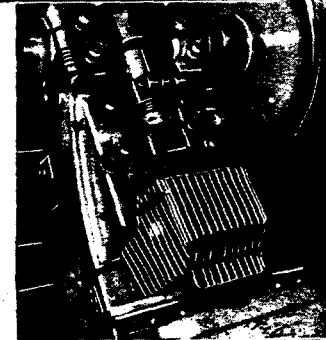
ELIMINATE THOSE HAZARDS!



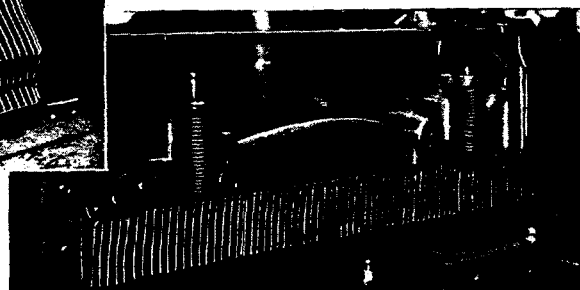
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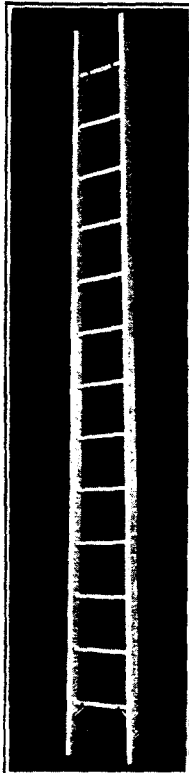
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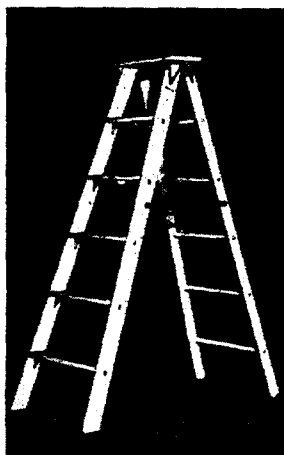


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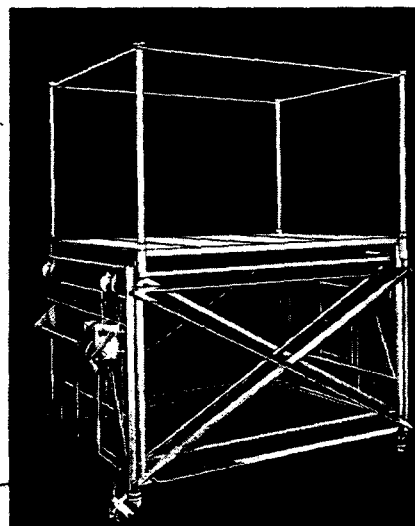
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