

and the demolition of process equipment and works structures. It also plays an important part in emergency and rescue work. Goggles with shade #5 Noviweld lens are provided and their use is required. At the larger plants men with an average service credit of six years spend about three-fourths of their working time on cutting or burning operations (about half their time is given to "burning steel" for new construction). The amount of dust produced is usually greater than that caused by oxy-acetylene welding.

DUST PRODUCED BY OXY-ACETYLENE BURNING

Material Being Burned	Tip Used	Particles per cu. ft.	Characteristics of Dust Particles (Sizes and Percentages Estimated)
Burning 6" Flues (1-1/2" thick) Out of Shell Still.	Oxweld #2	1,869,120	About 75% round black, 2 microns or less in size; 20% slightly angular, crystalline, 2 microns or less; 5% opaque, scale-like, various sizes.
1/2" Boiler Plate (soft steel)	Oxweld #4	2,718,720	About 90% semi-opaque, black, 2 microns or less 10% round, dark grey, over 5 microns in size.

2. WITH NATURAL GAS: A large part of the burning or cutting at one of the larger southern refineries is done with oxygen and natural gas (60 pounds per square inch pressure). A special torch with a 1/16" x 5/16" tip made in the refinery shops is used. Two men with an average service of thirteen years spend a major portion of their working time on this natural gas. They wear goggles with #5 shade Noviweld lens. Samples taken while burning holes in 3" standard pipe in the yard outside of welding shop with oxygen and natural gas had a concentration of 471,811 particles, ten microns or less in size, per cubic foot. About 75% of these particles were slightly angular crystalline in appearance under the Konimeter microscope, and were five microns or less in size; 25% were rough scale-like, opaque, ten microns or less in size. There were also many minute particles.

- HEALTH HAZARDS PRODUCED BY WELDING AND BURNING OPERATIONS: Although our study was confined to the fumes or dust produced by Welding and Cutting operation the possibility of lead poisoning from welding or cutting iron plates that have been previously coated with red lead should be pointed out. Lead poisoning from this source is rather common, especially in cutting up old scrap, bridges, tanks, and other iron structures that have through many years of use received protective coatings of red lead. The action of the flame volatilizes this lead material and creates a smoke that is poisonous. The same hazard exists in cutting out rivets in new structures.

It should also be pointed out that some of the welding rods contain manganese which is very poisonous when taken into the body. There is an apparent hazard from volatilizing this material, or rather changing it to the oxide of manganese, and breathing the fumes produced. There are further dangers from carbon monoxide and oxygen deficiency owing to the use of gas-cutting or welding flames inside small tanks or similar confined spaces.

It is becoming more and more recognized that persons engaged in cutting and welding operations, either by arc or flame, should have respiratory protection, in all work where there is a possibility of the workmen breathing fumes and dusts created.