RESULTS OF VAPOR BLAST'S RESEARCH

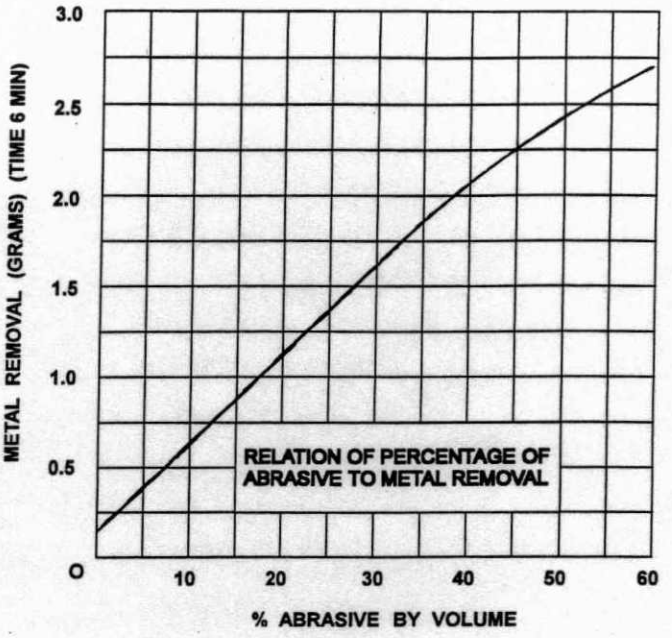
RELATION OF PERCENTAGE OF ABRASIVE TO METAL REMOVAL

Conditions: Duration of blasting, 6 min.; angle of impingement, 90 deg.; work-to-gun distance, 2 in.; material used, SAE 1010; air pressure 80 psi; type of gun used VB angle gun; diameter of nozzle 1/2 in.; diameter of air jet 1/4 in.

Conclusions: An increase in the volume of abrasive, in the water-abrasive mixture, increases the cutting action of the blast.

A 68%-by-volume mixture was obtained before excessive settling occurred. This was decided to be the stopping point from the practical standpoint of using field equipment.

The data obtained shows a straight line relation between the amount of metal removed and the percentage of abrasive used up to 43% abrasive by volume. Any further increase in the amount of abrasive used causes the slope of the curve to decrease. This flattening of the curve could be credited to the settling of the abrasive. At these high percentages, the total amount of abrasive in the machine was not circulating properly.

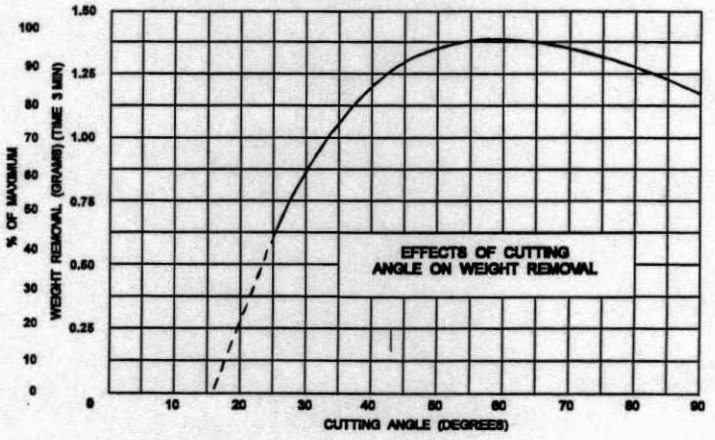


EFFECT OF CUTTING ANGLE ON WEIGHT REMOVAL

Conditions: Duration of blasting, 3 min.; angle of impingement, 90 deg.; work-to-gun distance, 2 in.; material treated, SAE 1010; air pressure 85 psi; type of gun used VB angle gun; diameter of nozzle 1/2 in.; diameter of air jet 1/4 in.

Conclusions: Cutting action increases gradually as the cutting angle decreases from 90 to 60 degrees.

This increase can probably be accounted for by two facts: 1) the rebound effect is reduced as the cutting angle approaches 60 degrees; or 2) there is more scouring and less peening action as the angle is decreased to 60 degrees. Angles more acute than 60 degrees gave a decided decrease in cutting, and the slope of the curve at angles less than 60 degrees is great. at these lower angles, the blast has a wearing action which is much slower in metal removal rates than the cutting or scouring-type action obtained near 60 degrees.

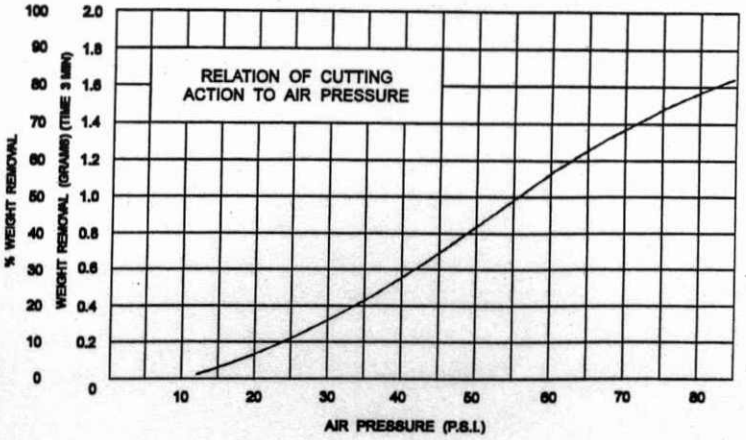


RESULTS OF VAPOR BLAST'S RESEARCH

RELATION OF CUTTING ACTION TO AIR PRESSURE

Conditions: Duration of blasting, 3 min.; angle of impingement, 90 deg.; work-to-gun distance, 2 in.; material treated, SAE 1010; air pressure 85 psi; type of gun used VB angle gun; diameter of nozzle 1/2 in.; diameter of air jet 1/4 in.

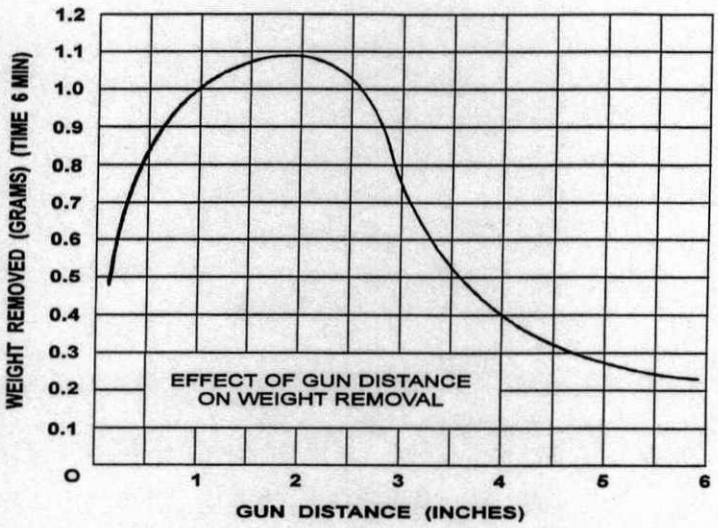
Conclusions: Between 30 and 75 psi the cutting action is almost directly proportional to air pressure. At low pressure, the kinetic energy of the particles is not sufficient to stress the surface of the steel beyond the failure point; hence, the action is more wearing than cutting. Above 75 psi, a slight tapering off in the increase in cutting action was noted.



EFFECT OF GUN DISTANCE ON WEIGHT REMOVAL

Conditions: Duration of blasting, 6 min.; angle of impingement, 90 deg.; material treated, SAE 1010; air pressure 85 psi; type of gun used brass angle gun; diameter of nozzle 1/2 in.; diameter of air jet 1/4 in.

Conclusions: No cutting action exists at distances less than 3/32 in. Optimum gun distance from the work is from 1.2 to 2.5 in. At distances closer than 3/32 in., the back pressure reflected from the plate to the gun is sufficient to restrict flow of slurry. this rebound effect causes a rapid decrease in cutting action as the distance decreases. The cutting action falls off rapidly as the distance is increased beyond 2 in., but not proportionally to the square of the distance. The graph would, of course, vary with changes in nozzle design. Experiments have been performed only with a standard B-20 type brass angle gun.



AIR REQUIRED FOR VARIOUS AIR JET DIAMETERS AT DIFFERENT PRESSURES

Conditions: Type of gun used VB gun; abrasive use 140 mesh, 40% by volume; air-measuring device Fischer & Porter flowmeters; readings taken with slurry running through gun.

Conclusions: Air flow required is dependent on the abrasive flow, especially when the abrasive is under pressure greater than 3 psi.