

Abstract

**WORK ON THE EDGE: FACTORS AFFECTING RESPIRABLE DUST EXPOSURES
DURING CONCRETE GRINDING**

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This study assessed the effect of work characteristics on dust exposures during concrete grinding activities, with and without local exhaust ventilation (LEV). Particular attention was paid to the differences between work on flat surfaces where the shroud of the LEV system made a good seal, and on the edge where the seal was in partial contact with the surface. Under controlled field conditions, four union apprentices performed surface grinding techniques on concrete walls using LEV and three apprentices performed the techniques without LEV. Fourteen permutations of the four factors (surfaces (flat, right edge, left edge), handle orientation (vertical, right, left), and grinder speed (full and half speed) and LEV) were considered.

Models were developed to best reflect each of these factors. Using the LEV reduced the subject's exposure by 91% ($p < 0.001$). Grinder wheel speed was also important.

Techniques at half speed showed a 35% reduction in respirable dust ($p < 0.001$). Using LEV, exposure when grinding on the right edge was significantly higher ($p = 0.02$) than grinding on the left edge or flat surface. Without LEV, the surface configuration is not significant, exposures from grinding on the right and left edges being almost equal.

Grinding with the handle oriented to the right had a significantly lower exposure ($p = 0.002$) possibly because the handle may actually block some of the dust from reaching the breathing zone. This study found that workers can reduce their dust exposure by using LEV, and grinding at a slower speed on the edge. Orienting the handle to the right or vertically on the right edge with LEV will reduce a workers exposure, as will orienting the handle to the left or vertically on the left edge.