The Effects of Wearing Respirators on Human Fine Motor, Visual, and Cognitive Performance

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ABSTRACT

When selecting a respirator, it is important to understand how employees’ motor, visual, and cognitive abilities are impacted by the personal protective equipment (PPE). This study compares dust, powered-air purifying, and full-facepiece respirators. Thirty participants performed three varied tasks. Each participant performed each task without a respirator and then while wearing the three respirator types. The tasks included a hand tool dexterity test, the Motor-Free Visual Perception Test (MVPT-3), and the Serial Seven Test to evaluate fine motor, visual, and cognitive performance, respectively. The time required for task completion and the errors made were measured. Analysis showed no significant effect due to respirator use on the task completion time. A significant increase was found in the error rate when participants performed the cognitive test wearing the full-facepiece respirator. Participants had varying respirator preferences. They indicated a potential for full-facepiece respirators to negatively affect jobs demanding high cognitive skills such as problem solving and decision making.