Safety Science

HOW DOES AUGMENTED REALITY HEAD-MOUNTED DISPLAY IMPACT THE ABILITY TO DETECT CHANGES WHILE PERFORMING PIPING ASSEMBLY?

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Abstract:	Augmented Reality (AR) Head Mounted Displays Devices (HMDDs) have the potential to revolutionize information delivery during the construction phase. However, concerns remain about whether AR HMDDs impact workers' ability to detect changes in their surroundings, which could pose safety risks. In this controlled experiment, one hundred industry craft workers participated in an assembly task on a full-scale MEP model using three information formats: traditional 2D isometric paper drawings and two AR models at levels of detail 300 and 400. A change scenario was introduced, and the response time to detect the change was recorded. Findings revealed a significant difference in response times, with non-AR HMDD users detecting changes more quickly than AR HMDD users. Further investigation examined the correlation between workers' age, spatial cognition, and response time to detect changes. This study is one of the first to introduce hazards as changes and to examine the effect of AR HMDDs on individuals' ability to detect them.