

DETECTION AND LOCALIZATION OF WARNING SIGNALS IN INDUSTRIAL BACKGROUND NOISE WHEN USING SINGLE AND DOUBLE HEARING PROTECTION DEVICES

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The inability to detect and localize warning signals in industrial background noise can cause occupational accidents. An experimental study was conducted to compare the detection and localization abilities of warning signal (bell) while using single earmuff double earmuff with earplug hearing protection. The study involved 30 adults ages range between 19 to 29 years old who have normal hearing. A 90dBA bell noise was presented from 60°, 120°, 240° and 300° azimuth, three times randomly in 85dBA industrial background noise that was presented simultaneously from 0° and 180° azimuth. Detection and localization scores were measured by the ability to determine the bell accurately for three times from four azimuths. The result revealed that detection score was 100% accurate irrespective of the types of hearing protection used. Besides, localization score was higher, when using single hearing protection compare double hearing protection [F (1, 29) = 60.62, $p < 0.05$ with effect size > 0.14 and power of study $> 80\%$]. However, there is no significant difference in localization score from different, azimuth [F (3, (7) = 1,82, $p > 0.05$ with effect size > 0.14 and power of study $< 80\%$]. Results also showed detection score was higher than localization score using hearing protection [F (1, 29) = 53.075, $p < 0.05$ with effect size > 0.14 and power of study $> 80\%$]. In conclusion, with 5dB bell to industrial noise ratio, single earmuff hearing protection helps to localize better compared to double hearing protection.

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