

Acoustical Characteristics of an Indoor Firing Range

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ABSTRACT

In the USA, indoor firing ranges are commonly used for small arms training of military and law-enforcement personnel. The ceilings and sidewalls of these indoor ranges are sometimes treated with a special sound-absorbing material selected to withstand the harsh environment in a firing range, including bullet ricochets from mis-aimed weapons. The acoustical benefit of such sound-absorbing treatment is to reduce the reverberant sound field from the gunfire event. The paper describes controlled measurements conducted within indoor firing ranges involving two conditions of surface treatment: a) exposed concrete and, b) a shredded rubber mat having sound-absorbing properties. For both the untreated and treated regions, the initial peak sound pressure received from a gunfire event remained the same; however, its reverberant “tail” was suppressed somewhat. The treated condition also leads to a small improvement in the received noise dose, depending on the selected hearing damage risk criteria. One’s subjective impression is that the treated region is less loud than the untreated region. The acoustical details of the gunfire transient and the reasons for the subjective improvement are discussed.

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