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Title: Methodology to Assess the Effects of Explosives Ageing on the IM Response of Munitions.

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Insensitive Munition (IM) performance is an important factor in weapon design, and only limited testing has been done to demonstrate the effects of the product lifecycle on IM response. This paper reviews the outputs from an expert working group set up under the auspices of the Insensitive Munitions European Manufacturers Group (IMEMG), to assess the likely effects of explosives ageing on the response of munitions to IM threats. The methodology developed to analyse the potential effects of ageing and review appropriate test data was a Logic Tree format of the type used in Fault Tree Analysis, which illustrates links between changes in energetic material properties and IM response, and correlates ageing failure modes with applicable tests. Results from small scale, charge scale and munition scale testing were reviewed and assigned to the logic tree to draw some initial conclusions based on available evidence. The assessment also identified which tests offer the most value in terms of applicability, and highlighted testing capability gaps in typical explosive Qualification, munition surveillance and life extension test programmes. The fully populated logic diagram provides a tool which could also be used to assess the potential for a change in IM response due to other factors such as changes in explosives ingredients, manufacturing process or location.

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