

Abstract for the 17 International Symposium on Military Aspects of Blast and Shock,
June 10-14, 2002, Las Vegas

40 Tonne Donor/Acceptor Trial: Human Vulnerability

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1. Introduction

TNO-Prins Maurits Laboratory and DSTL have participated in an UK/Australian full scale explosion trial with the purpose of validating the current safety distances for inhabited buildings and public roads around ammunition storage sites. On 27 September 1999 462 MK 82 bombs, in total equivalent to 40 tonnes of TNT, stored in a standard ammunition storehouse, were simultaneously exploded at the Woomera test site in South Australia. At several distances around the storehouse target structures were built, e.g. six English brick domestic houses, a typical Norwegian wooden house, three Singapore window structures, an US observation post, trenches and various cars were placed. In the Dutch sector typical Out-Of-Area target structures, such as mobile sleeping accommodations, a mobile fuel tank, and VW vans were placed. In addition, various anthropometric manikins and dummies, dressed in various protective clothing, were placed in different environments and at different distances to assess human vulnerability. This full scale test was aimed at determining the consequences of the accidental initiation of a 40 tonne NEQ stack of hazard division 1.1 ammunition in an explosive storehouse. Consequently, the blast effects and the throw-out of fragments and debris and their impact on the different target structures was investigated. The results will be used to validate the currently used Quantity-Distance relations for the storage of ammunition as described in the AASTP-1 manual, drafted by the NATO AC 258-working group, consisting of international experts on the safety aspects of transportation and storage of military ammunition and explosives. The trial was a joint project involving the United Kingdom, Australia, Norway, United States and Singapore.