

The potential to use radio frequencies to emulate blast effects

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The issue addressed is to identify a safe method of emulating blast effects; a method that demonstrates the distances at which injury and structural damage occurs without causing those effects. Safe indication of blast effects in a 'real time' and 'real world' environment will enhance training and safety.

The use of actual explosive charge weights in proximity to participants is not feasible as it results in an unsafe environment.

Currently participants rely on 'non-direct' methods to indicate potential blast effects including: blast modelling, evacuation distance and 'rule of thumb'.

The concept is to use an electromagnetic signal to indicate blast effects. Specific electromagnetic transmissions meet many of the identified requirements of blast emulation.

Through selection of appropriate frequency and strength, a signal can pass through thin materials, be reflected by solid ones and reflect around corners in a manner not dissimilar to some elements of blast. The signal from a transmitter (Tx) can be scaled using frequency, power or software to provide indication at receivers (Rx). It was considered feasible to relate the transmissions to selected explosive charge weights and have these trigger Rx at predetermined distances.

A concept demonstrator was constructed. A Tx released a signal which could be received by Rx and indicated a point at which selected pressures would be exceeded. The system was trialled using peak pressures relating to nominated explosive charge weights.

Field tests demonstrated that electromagnetic forces can be used to emulate blast effects to a degree of accuracy suitable to enable safe training by indicating injury and structural damage at the required distances.

Recognising electromagnetic transmissions and the hydro-dynamic effects of blast are different forms of physics, the paper addresses the differences and discusses their applicability to the emulation of blast effects.

It was not intended that the system be an analysis tool; rather, it is a training system that provides an indication of damage over distance from blast effects, in a safe manner.

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