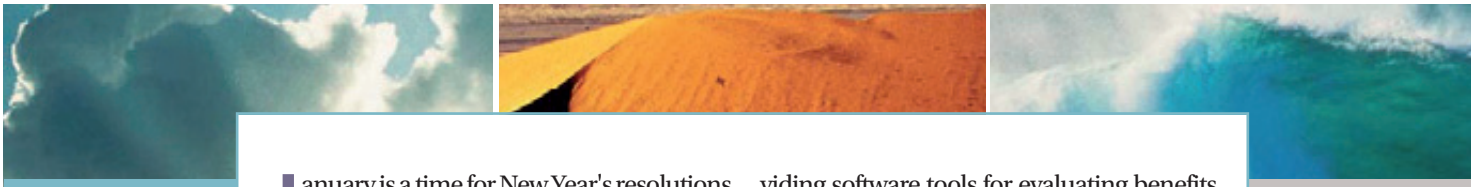
IMEMG'snews

INSENSITIVE MUNITIONS EUROPEAN MANUFACTURERS GROUP



EDITORIAL

Pierre Olivier Vignaud
President

January is a time for New Year's resolutions and new beginnings and so it is with the IMEMG newsletter. First of all, I would like to thank Dr Paul Wanninger for the work he put in as president of our association, a task which I now have the honour of fulfilling.

Seven years after its creation, IMEMG is now a truly European organisation with 20 member-companies and six countries represented. Our ambition is to become an incontestable industry partner for the official stakeholders in the munitions safety sector. To accomplish this, we have developed a new strategy based on producing more concrete work and coming closer to other actors (governments, EDA, NATO, UN…). Five new Experts' Working Groups have been assigned tasks such as following the evolution of regulations and measuring the consequences, studying the effect of ageing on insensitive munitions (IM), providing software tools for evaluating benefits of IM, defining computer models to assist in the design of IM, proposing alternatives to jet fuel in the Fast Cook Off test.

Making things is essential. Letting people know about it is primordial. This is precisely the purpose of our Newsletter. We want to regularly report on our work and communicate our views to our fellow partners in the field of munitions safety.

Every issue will interview someone closely involved with insensitive munitions: in this issue, it is Yves Guengant on behalf of EURENCO. We will then broach a technical subject: this time, we look at whether insensitive munitions should benefit from specific standards and discuss what benefits could be achieved with specific regulations. Then, our "gossip" page will tell you about who in IMEMG is doing what.

Enjoy!

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CONTENT

Is water explosive?

Here is a simple physics problem: what non-explosive product, when heated in an enclosed space, can send a 2.5kg weight propelled 22 metres away and thus qualifies as being hazardous?

Would you believe: water? It is the basic principle of a pressure cooker from which the lid was taken off before all the steam was out.

Using this principle tested in 2009 by SME, it was demonstrated that a few litres of water added into an ordinary steel barrel which was then heated, would blow the barrel's 2.5kg lid off to a distance of 22m. And that thus, according to the United Nation's safety regulation, water should be classified as having a missile effect. More precisely, it would meet the criteria in the UN's Hazard Division 1.2 that encompasses anything which can generate fragments further than 15m.

Picture caption: UN External Fire propelled lid in the upper right corner

Through this test, IMEMG wanted to demonstrate to the IM community that safety standards for explosive items could sometimes be too strict. Indeed, some insensitive explosives may be considered, in terms of danger, as being not very far removed from water.

Yves Guengant talks about regulations

Yves Guengant,
Hazard Assessment and Classification Expert Working Group chairman

IMEMG: What are the reference documents defining Insensitive Munitions?

YVES GUENGANT: Insensitive Munitions (I.M) are defined in NATO STANAG 4439, the policy document that covers the introduction and assessment of IM. Its supporting document is AOP 39.

IMEMG: Are Insensitive Munitions only defined by NATO?

YG: Actually, no. The United Nations' recommendations on the transport and storage of dangerous goods, which covers the civilian field, also address I.M.

IMEMG: Could you be more specific about the organisations responsible for establishing regulations concerning the transport and storage of dangerous goods?

YG: There are two. The United Nations as well as NATO specify recommendations to be implemented in each country. The UN's Orange Book, which is actually orange, is the Manual of Tests and Criteria that defines the different classes of dangerous goods. In this document, "Class 1" includes everything that is liable to explode. It is subdivided into six Hazard Divisions (HD). UN recommendations are adapted by the relevant competent bodies for each transport category: i.e. road, rail, inland waterways, sea, and air. In Europe, road transport regulations are governed by the European Commission for the 27 member countries. Air transport of dangerous goods is ruled by the ICAO (International Civil Aviation Organisation) and, maritime transport by the IMDG (International Maritime Dangerous Goods Code). Regarding storage, it is up to national civilian authorities to decide the applicable regulation in each country (safety distances, quantities allowed…).

However, none of these regulations are directly applicable to the military which have their own model established by NATO in the Allied Ammunition Storage and Transport Publication (AASTP).

IMEMG: What about the transport and storage of Insensitive Munitions (IM) in that case?

YG: Insensitive Munitions are ruled by both NATO standard HD1.2.3 and UN standard HD1.6, depending on whether a ship or a depot is civil or military and is used during peacetime or wartime.

IMEMG: What are the benefits of these two classifications?

YG: As a key improvement to the HD1.1 usual rule, both regulations allow to safely transport or store four to six times more explosive items in the same space. However, it is somehow difficult to materialize these advantages because of the dual NATO/UN regulation system *[See page 3].*

« Hazard Divisions? »

HD1.1 concerns ordinary explosives **and munitions generating mass explosion**; HD1.2 refers to anything that generates fragments without mass explosion; HD1.3 addresses anything which burns making very strong flames; HD1.4 for articles generating moderate danger i.e. fireworks, 1.5 for insensitive explosives mainly for civilian use, 1.6 for insensitive munitions.

In order to qualify as an Insensitive Munition under the UN rules, there are several tests on both energetic materials and on munitions which need to be passed, e.g. Fast Heating and Bullet attack which are very similar to the NATO tests.

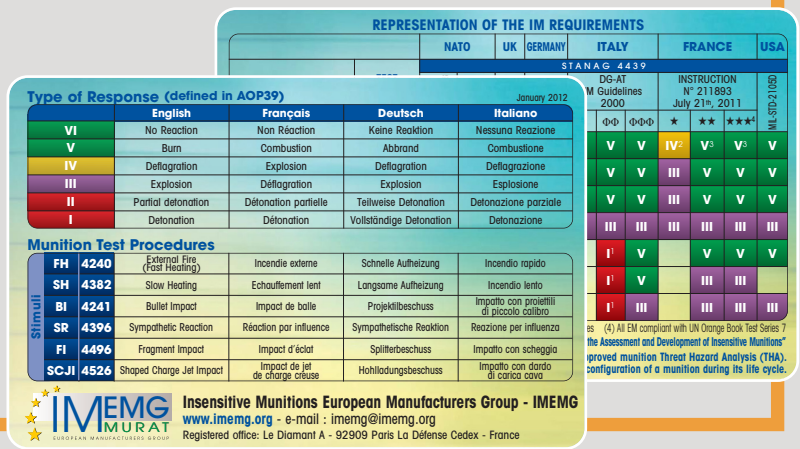
More information on next page

The last version of the IM card

NEW

French IM Policy release

The purple October 2010 IM card was widely distributed at the IMEMTS in Munich. But, in the meantime, France has just issued its IM/MURAT domestic policy. Indeed, the "INSTRUCTION MINISTERIELLE N°211893" prepared by DGA /IPE and signed by the French Ministry of Defence stands as the implementing document of STANAG 4439 (signed and ratified by France). It replaces the Doctrine MURAT released in 1993. From the former document, we could note that MURAT Labels are still in force. There are slight changes to be coherent with NATO SSD 1.2.3 (for Label 2*) and UN HD 1.6 (for Label 3*). It is mandatory that new munitions abide by MURAT requirements. The IM signature of in-service munitions has to be determined. New IM card available early January.



STANAGs vs UN Orange Book

Continuing with our issue's theme of testing and standards, we take a closer look at some of the discussions that took place in Munich at the IMEMTS in 2010 on these subjects.

As explained on page 2, NATO STANAGs lay out the regulations for military explosives and the UN Orange Book the civil regulations for transport of dangerous goods in general. Even though the IM definition is now the same for NATO and UN, which is a significant step forward, UN Hazard Division (HD) 1.6 (described on page 2) is not fully harmonised with STANAG 4439. For example, the ruling procedures in the STANAG differ from those in the UN Orange Book on things such as the nature of a combustible for Fast Heating.

This leads to a duplication of tests in various countries and therefore a waste of money. Each national authority can choose what type of STANAG test procedure to use. The test set up is not specified in sufficient detail, with the stimulus not always well defined and the result subject to interpretation. This means that some significant differences for undertaking vulnerability tests have appeared in different test centres and that in France and the UK for example, munitions responses can be demonstrated through small-scale tests and simulations while in others full scale trials are required.

Another concern for IM stakeholders is that so far the lack of accuracy in

« No common assessment »

test procedures described by STANAG 4439 means there is no common assessment and it is impossible to benchmark the precise IM signature of various munitions.

IMEMG suggests that stimuli must be defined in order to avoid different procedures in different countries to test identical munitions. Costly, unrealistic

« What is a true IM? »

or unnecessary stimuli should be avoided.

IMEMG finds that the architecture of the munitions is not clearly taken into account for IM assessment. For example, fragmentation analysis is defined only for steel cases. What of aluminium or composite cases? IMEMG also suggests the test arrangement should be described precisely in the test report to avoid results being misinterpreted.

In addition, it is feared that some unrealistic criteria which have been introduced would end up eliminating some real IM from the benefits of UN HD1.6 (e.g. the new Fragment Impact - 18.6g @ 2530 m/s with a Type V reaction – is far too stringent, particularly when compared to Sympathetic Reaction where only a type III reaction is required).

At the IMEMTS' 2006 IMEMG presented a paper focusing on the need for a clear link to be established between the definition of an IM and the response levels to the various threats. This would put an end to the confusion on what is a true IM. That still stands today, five years later.

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Working Groups Deliver

All three IMEMG Technical Working Groups delivered their outputs in the form of presentations to the recent IMEMTS conference in Munich. The Test Procedures Working Group and a joint paper on behalf of the Hazard Assessment and Classification and the Cost Benefit Analysis Working Groups.

'Are There Different Test Methods for IM based on STANAG 4439?'. National variances were explored in the application and interpretation of the STANAG test procedures and criteria. The conclusion was that there were differences that could affect the 'cross-border' transfer of data, which is undesirable. Recommendations were made that there should be a coordinated effort to share test procedures and in resolving the differences in procedures. An effort that IMEMG would be well positioned to support.

'How to get Insensitive Munitions Benefits according to Hazard Classification?'. The presentation identified opportunities to derive benefits through the classification of munitions in SSD 1.2.3 and HD 1.6. The changes to the classification requirements for HD 1.6 and the continuing problems with classification into HD1.6 were explored. The paper also looked at the use of the IMEMG Cost Benefit Tool as a route to the quantification of the 'cradle to grave' financial advantages of IM products.

These presentations represent a significant output from the Working Groups. Their quality and associated papers reflect not just on the presenters but on all of the individuals and companies that have contributed to them, the Working Groups. Copies of the presentations are available on: **www.imemg.org**

news

IM Awards at IMEMTS' 10

IMEMG Award

During the IMEMTS Conference in Munich, Germany, the IMEMG Board took the opportunity to recognise the significant contribution of Dr Christian Spyckerelle of Eurenco , France to the development of Insensitive Munitions and in particular the development of reduced sensitivity explosives.

The award was presented by Roger Swanson to NAMMO, Norway and GD-OTS, USA for the 120mm IM HE-T tank round

MSIAC Technical Award

The award was presented by Roger Swanson to NAMMO, Norway and GD-OTS, USA for the 120mm IM HE-T tank round.

The 120 mm IM HE-T round includes a new insensitive melt cast explosive utilising a mixture of DNAN, NTO and HMX, and a LOVA propellant. The munitions IM signature has also been reduced by the incorporation of a plastic liner between the fuse and the warhead nose to reduce the confinement of the high explosive in an accidental, and a container with plastic windows to vent the propellant in case of an unplanned ignition inside the container.

IMEMG Membership continues to grow

OTO MELARA SpA, based in La Spezia, Italy joined IMEMG last year.

The company is active in naval, land and air weapon systems with state-of-the-art technologies.

Oto Melara has production and R&D capabilities ranging from turret weapon systems and naval guns to missile launchers, from conventional to guided ammunition, and from combat vehicles and artillery to antiaircraft systems and UGVs.

OTO MELARA
Una Società Finmeccanica

BAYERN-CHEMIE GmbH a member of the MBDA group also joined IMEMG last year. Since early 1990, BAYERN-CHEMIE has been involved in the Insensitive Munitions requirements through several programmes.

Taking into account threat and hazard analysis, we concentrate on a global approach of Insensitive Munitions assessment.

Starting from energetic material behaviour in small scale testing, we emphasise the role of internal arrangement and then identify the response protocol for each type of stimulus.

Numerical analyses and statistical approaches have been developed through correlation of small scale and full scale testing.

This allows simulation and prediction of solid rocket motor IM characteristics.

Different techniques, such as mitigation, passive or active venting are extended to the development of a totally new successful rocket motor internal arrangement.

MBDA
MISSILE SYSTEMS
BAYERN CHEMIE

Saab Dynamics AB is the 20th company to join the organisation.

Saab is a significant supplier of airborne missile systems with striking power and precision. The group's offer include, for instance, Beyond Visual Range Air-to-Air Missiles, Anti-Ship Missile Systems and Ground-Based Air Defence Missile Systems.

SAAB

As a result of the recent acquisition of SEI SpA by Rheinmetall GmbH, SEI SpA name has changed into RWM Italia SpA. The new company concentrates on the defence business only.

RWM ITALIA S.p.A.

NEW! Expert Working Groups

Five working groups which bring together experts from the member companies, are now working on specific issues, such as:

- Harmonisation and improvements to the test procedure for Fast Cook-Off (STANAG 4240 FCO)
- The effects of Ageing on IM Response or on the properties of energetic materials which could influence IM response
- Cost & Benefit Analysis, to offer a support in the building phase of an IM signature specification.
- Hazard Assessment and Classification - Harmonisation of Gap Test criteria for hazard classification of rocket propellants - Harmonisation of international test procedures and acceptance criteria for Shaped Charge Jet Attack.
- A review of computer models to aid the design and assessment of IM performance

More about these issues in the next newsletter.

IMEMGnews
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