

EDITORIAL



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President

WHAT'S ON FOR THE FUTURE OF INSENSITIVE MUNITIONS?

In sensitive Munitions have reached maturity on numerous angles, most of the European countries have now set regulations for Insensitive Munitions and some have adopted stringent requirements to supply Forces with them. The number of Insensitive Munitions compliance awards as well as the manufacturer's efforts undertaken for mass-producing is increasing, as this Newsletter illustrates it through describing another two member companies' plants.

This maturity is also underlined by the NATO CNAD Ammunition Safety Group through initiating a working programme on the surveillance of in service munitions; AC326 Chairman presents this concern in "How does the IM level of Munitions evolve during service life?"

Every Vulnerability Test Procedure STANAG is available, the AOP 39 edition 2 has been issued and the STANAG 4439 edition 2 is currently under ratification process. Nevertheless, technical refinements appear to be necessary for National Experts involved in writing the current AOP39 & Test Procedure STANAGs. This is why an action plan for edition 3 is already under preparation for improvements concerning reaction level protocols, response descriptors, IM design guidance, ...

What should be the Industry's next step for the future of Insensitive Munitions?

- Anticipate additional requirements for industry and Insensitive Munitions design: these could be brought out from AC326 works about potential involvement of IMness during service life.

- Support National Experts with our knowledge of Insensitive Munitions behaviour for future editions of AOP 39 and Test Procedure STANAGs, this seems to be a particularly relevant task for our Test Procedures Expert Working Group.
- Anticipate potential evolution of IM threats definition as presented in O-97 MSIAC document: Will Insensitive Munitions pass these new requirements? What response mitigation would be designated as a priority? ...
- Get benefits back from risks reduction through using less sensitive Energetic Materials for Insensitive Munitions manufacturing, i.e. two PBXs workshops are operated under 1.3 HD rules. Quantity / Distances Expert Working Group intends to combine arguments and efforts to lobby the domestic authorities for introducing specific rules for Insensitive Munitions and their insensitive charges within national regulations.
- Provide customers with some relevant Cost Benefit Analysis aiming at defining optimum IMness levels according to munitions life from cradle to grave. Benefits include preserved funds in case of dreaded events but also reduction of costs and constraints during deployment or operations. Cost Benefit Analysis Expert Working Group is evaluating ACB software (issued by former Club MURAT); and is ready to collaborate with MSIAC on the subject.

Thus, IMEMG members contribute widely to the future of Insensitive Munitions, as designer, as producer, as vulnerability specialist for munitions and platforms.

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CONTENT

PAGE 2

NATO AC/326
The CNAD Ammunition Safety Group

Why did Nammo Raufoss join the organisation?

PAGE 3

NEXTER melt-cast explosive exceeds STANAG 4439 requirements

Cast PBX bi-component process for mass production in France

A certification for the SCALP-EG/STORM SHADOW IMness level

PAGE 4

A new version of the IM card

IM torpedo warhead production at SEI, ITALY

How does the IM level of Munitions evolve during service life : A major concern for the NATO CNAD Ammunition Safety Group.



Within NATO, AC/326, the CNAD Ammunition Safety Group is, "on behalf of CNAD, responsible for Ammunition Life Cycle Safety in support of NATO priorities".

Standards prepared by the Group cover:

- Design rules,
- Tools (tests and methodologies) for assessing safety level,

- Commonly agreed safety requirements,
- Common rules for use, handling, transport and storage.

Pillar documents are STANAG 4297 and AOP 15 for assessing the safety and suitability for service, and STANAG 4439 and AOP 39 which is the NATO policy for the development and assessment of IM.



NATO AC/326 The CNAD Ammunition Safety Group

The NATO group AC/326 is one of the CNAD "principle subordinate committee". It was created in 2003 by merging AC/258 (the cadre group on transportation and storage of munitions and explosives) and AC/310 (the cadre group on safety and suitability for service of munitions and explosives).

Its terms of reference - given by CNAD - is "to be responsible for Ammunition Life Cycle Safety, in support of NATO priorities" and its scope of work should cover all safety aspect of ammunition assigned for NATO operations, for their complete life cycle. Its core functions are to develop standards (STANAGs) and guidance (AOPs and AASTPs) and to provide advice and expertise. This work is done within its six Sub-groups on:

- ▶ Energetic materials,
- ▶ Initiation systems,
- ▶ Munitions systems,
- ▶ Transport logistics,
- ▶ Logistic storage and disposal,
- ▶ Operational ammunition safety.

→ (cont'd from page 1)

If the assessment of the effect of ageing on safety and suitability for service is well required for the qualification of explosives (STANAG 4170 and AOP 7), nothing was clearly specified for munitions.

In order to increase the guarantee given to the user on the safety level for the complete life of the munitions, AC/326 has undertaken the preparation of specific documents giving procedures and recommendations for assessing the possible evolution of IM characteristics due to ageing and logistical constraints (temperature, vibrations, pressure,...).

An In Service Surveillance (ISS) Expert Working Group was created in July 2007 for the preparation of NATO standard and associated publications covering:

- ▶ General guidance on ISS, including the association between ISS and maintenance, and giving basic guidance regarding the use of data loggers.
- ▶ Sampling and test procedures, indicating where predictive testing shall be required and how the testing requirements can be determined.
- ▶ Condition monitoring, providing standards for the procedures required to assess continued or extended service use of an item, including the essential chemical and mechanical properties to measure and reference to how the data must be collected.

Patrick Lamy

*DGA/Head Munitions Safety Office
Chairman AC/326*

Member companies' news in brief



NAMMO Raufoss, joins IMEMG
The company representative is
M. Vegard Sande (see opposite)



NEXTER Munitions,
The new name for Giat Industries'
munitions departement



Junghans-microtec GmbH,
The new name for Junghans
Feinwerktechnik GmbH

Why did Nammo Raufoss join the organisation?



*Interview with
M. Vegard Sande, M. Sc.
Director of Technology,
Development & Test
Medium & Large Caliber
Division*

"IMEMG is a well recognized organisation with seventeen member companies in total, from 5 different nations. Nammo Raufoss AS see the commercial value of being displayed under the IMEMG umbrella

amongst the sixteen other companies being associated with the IM term.

IMEMG is the arena for discussion and exchange of understandings, opinions and experiences amongst the representatives from the different member companies. It is also an arena for promoting and getting support for our ideas and opinions about national and international IM requirements and specifications. Together under the IMEMG umbrella, we gain greater recognition from national and international bodies and authorities **as regards IM issues**.

We will do our utmost to contribute to the IM community".

Nammo Raufoss AS is a Norwegian defence company producing high performance ammunition products and motors for tactical missiles. The company is a part of the Nordic based Nammo group. More than 80% of the Nammo Raufoss AS turnover are export sales.

NEXTER Munitions melt-cast explosive exceeds STANAG 4439 requirements

Mid-september 2007, NEXTER Munitions demonstrated two different IM tests on their 155mm LU211 IM artillery shells with the melt-cast XF 13 333 (EIDS) explosive.

Taken out from the production line, the NEXTER LU211 IM shells were tested in the presents of several stakeholders and users.

Bullet Impact test: to a 12.7 bullet hit on the NEXTER shell : the response was a NR reaction

Shaped charge jet impact test: to an antitank shaped charge hit (RPG 7 type) : the response was a NR reaction.

Exceeding requirements of STANAG 4439, LU 211 IM offers a high level of user

safety when deploying in storage and transport configuration.



shaped charge jet impact test



...a NR reaction



12.7 bullet impact...a NR reaction

Cast PBX bi-component process for mass production in France

EURENCO's facility uses a new process for continuous mass production of cast PBX charges for artillery, tank and mortar I.M. shells. This unique process is called the "bi-component" process.

With a single loading machine, the "POGS" facility has an annual capacity of over 50,000 155mm shells, or over 100,000 120mm shells, and can simultaneously integrate 200 155mm shells, or 700 120mm shells. The continuous, integrated production line is fully automated, from initial shell casing preparation, to the final X-ray inspection, prior to packaging and storage.

For all applications involving small and medium production runs (up to several thousand units per year), the traditional batch, or "one-shot" production method is well suited to needs, and provides the best combination of performance/vulnerability/cost as demanded by users.



Sorgues. EURENCO's facility

news

French authorities come closer to the British authorities' position on MBDA Storm Shadow/Scalp EG

After the CBEMS insensitive multi-effect penetrating bomb (MURAT ★★ label) and the Apache stand-off missile (MURAT ★ label), the French authority Inspection des Poudres et Explosifs have recently certified a second MBDA cruise missile. Supported by the French DGA, the Scalp/EG Storm Shadow programme was awarded a one star MURAT label on July 19th, 2007.

The French doctrine IPE n° 0260 was implemented to the missile and the reactions to the tests specified by such doctrine lead to the IM award.

Such classification complements the number of IM acknowledged in France in terms of Hazard Division 1.2 Unit Risk (according to IPE note 1358). This award confirms (strengthens) the Anglo-French approach on IM since the Storm Shadow, which -except for the interfaces- is similar to the Scalp/EG and was awarded "Fully IM compliant" and accepted into NATO HD 1.2.3

The characteristics of a One Star Murat (IM) are the following

- 1) The munition does not react violently
 - a. In a rapid or slow heating, nor
 - b. At a bullet impact
- 2) The munition does not pass on the accidental detonation an initial specimen to other munitions when in storage and transport configuration.

It marks a decisive step forward in the reduction of constraints during deployment.



news

A new version of the IM card

IMEMG issued its new card which compares the different national regulations of their member companies and the test requirements for the IM.

Simplified Representation of the IM Requirements	Stimuli	Tests	NATO	UK	ITALY	FRANCE	USA
			STANAG 4439 (Apr. 99)		DG-AT IM Guidelines 2000	DGA MURAT Doctrine Instruction DGMBP 260 July 1 2005	MIL-Std 2105-B 2105-C
Fast Heating	F C O	V	V	V	V	V	V
Slow Heating	S C O	V	V	V	V	V	V
Bullet Impact	B I	V	V	V	V	V	V
Initiation of an adjacent munition	S R	III	III	III	III	III	III
Fragment Impact	F I (light)	V	V	V	V	V	V
Fragment Impact	F I (heavy)	V	V	V	V	V	V
Shaped Charge Jet Impact	S C J I	III	III	III	I	I	III
Free Fall Impact (2m drop)	ESD				NR	NR	NR
Electric / Electro-magnetic Threat	ESD				NR	NR	NR

(1) At ESD Strategic Materials (2) Without proposal (3) Not below 5 meters (4) On or more up per TIA

The above STANAG 4439 tests are subject to Threat Hazard Analysis

Reactions	English	Français	Deutsche	Italiano
N R	No Reaction	Aucune Réaction	Keine Reaktion	Nessuna Reazione
V	Combustion without lethal projections	Combustion sans projections létales	Abbrand	Combustione senza proiezione di frammenti letali
IV	Fast combustion	Combustion rapide	Deflagration	Combustione rapida
III	Explosion	Déflagration	Explosion	Esplosione
II	Partial detonation	Détonation partielle	Teilweise Detonation	Detonazione parziale
I	Detonation	Détonation	Vollständige Detonation	Detonazione

Tests	English	Français	Deutsche	Italiano
FCO	Fast Cook Off	Echauffement rapide	Schnelle Aufheizung	Incendio rapido
SCO	Slow Cook Off	Echauffement lent	Langsame Aufheizung	Incendio lento
BI	Bullet Impact	Impact de balle	Projektilbeschuss	Impatto con proiettili di grosso calibro
SR	Sympathetic Reaction	Réaction par influence	Sympathetische Reaktion	Reazione per influenza
FI	Fragment Impact	Impact par fragment	Splitterbeschuss	Impatto con frammenti sospesi
S C J I	Shaped charge jet impact	Impact par jet de charge	Heißstrahlbeschuss	Impatto con getto di carica calda
Drop	Drop	Chute	Falltest	caduta
ESD	Electrostatic discharges Hazard	Échappées électrostatiques	Elektromagnetische Verträglichkeit	Scariche elettrostatiche
	Electric & electro-magnetic hazards	Rayonnement radioélectrique (CERAM)		Radiatione elettromagnetica

ES tests = Safety & Suitability for Service tests

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IM torpedo warhead production at SEI, ITALY

In September 2007, SEI has completed the first production batch of the production warheads for the Black Shark Heavy Weight torpedo manufactured by WASS (Finmeccanica).

The WASS Black Shark, a new generation of heavy weight torpedo already selected by several Navies, is equipped with an IM warhead designed by SEI with the assistance of the Naval Surface Warfare Center at Indian Head, Yorktown Detachment.

Made of aluminium alloy, the warhead incorporates an innovative SEI patented venting system that activates when a specific temperature is reached in order to pass the IM tests required by STANAG 4439.

Filled with PBXN-111, the warhead gives an excellent IM response and optimal shock and bubble energy, exceeding the performance specification set by WASS. The arming device uses booster pellets made of PBXN-7 pressed under vacuum at the SEI's PBX facility, Domusnovas.



1 800 Lt production mixer



2 50 Lt pilot mixer



3 Domusnovas, SEI plant in Italy. PBX loading device for up to 750 Kgs warheads

newsletter

INSENSITIVE MUNITIONS EUROPEAN MANUFACTURERS GROUP



IMEMG

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