MSIAC Munitions Safety Information Analysis Center
Supporting Member Nations in the Enhancement of their Munitions Life Cycle Safety

Bulletin

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THE PM'S PERSPECTIVE

This has been an exciting quarter for MSIAC; the announcement of the next Project Manager (PM), the arrival of our new Energetic Materials Technical Specialist Officer (TSO), attendance by MSIAC staff at several interesting and relevant symposia, the receipt of a new National Insensitive Munitions (IM) policy, and the official request from a Nation to join MSIAC – to be number 14!

For those that have watched our public website (www.MSIAC.NATO.INT) you will have learned that the PM position was advertised late last year. The results:

Dr. Michael Sharp the current Munitions Systems TSO was selected to become the new PM effective 6 Oct 2013, just in time for the 15-16 October 2013 Steering Committee Meeting.

For those that don't know Michael, he was the Energetic Material TSO back in the NIMIC days, then the Munitions Systems TSO for the last 3 years, and now the to-be PM.

We said goodbye to Dr. Ernst-Christian Koch at the end of June and welcomed Dr. Matthew Andrews. Ernst-Christian was well known in our communities for his expertise in energetic materials and especially in pyrotechnics.
In May, he provided the welcoming address at the 39th International Pyrotechnics Seminar in Spain and gave a key note address in the session focused on Military Pyrotechnics.

We thank him for his valuable support and wish him, his wife and daughter success and good luck for the future.

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We look forward to Matthew's future accomplishments as he takes on the Energetic Materials TSO post in late July.

In May, Emmanuel Schultz, our Propulsion TSO, participated in the NATO Science & Technology Organization (STO) Advance Vehicle Technology (AVT) Panel Meeting in Sweden.

AVT is where munitions technology issues are addressed by STO. Emmanuel participated in and presented briefings to AVT-212 (Integrated Health Monitoring of Munitions) and AVT-197 (Munitions Environmental concerns).
He will be helping coordinate the planned AVT-212 demonstration of IHMOM technologies at NATO in Oct 2014. It's still a year off, but watch for the event, as health monitoring technologies are starting to be integrated in new munitions.

South Africa which is not a MSIAC Member, but still expresses interest in joining, just published their new Insensitive Munitions (IM) policy, and provided us a copy.

Probably most important and exciting is that the Republic of Korea has officially requested to join MSIAC. In May, MSIAC staff hosted and briefed COL Choi, the Chief of their Ministry of National Defense Ammunition Division. And, this month we received their official letter requesting Membership.
Our Steering Committee Chair, GPCAPT Wade Evans, replied to their letter noting "I look forward to the Republic of Korea's full participation in the very near future".

We wish all readers a relaxing summer holiday time period.

Your PM, **Roger L. Swanson**

BELGIAN Country VISIT

The MSIAC Team was requested to visit both the Belgian Ministry of Defense offices, Directorate General for Material Resources (DMGR), located in Evere and their Military Academy in Etterbeek on 10, 11 June 2013.

The purpose of the visit was twofold: one for the team to introduce themselves to the audience and secondly to lead a discussion in the areas of interest to Belgium.

The first day was dedicated to DGMR Systems Division personnel located in Evere. Two sessions were planned; one in the morning for senior level managers, and one afternoon session for junior officers.

Major General Thys, Director DGMR Systems Division, welcomed the MSIAC staff and spoke of the value MSIAC membership can have to an organization that is suffering from the loss of experienced personnel due to financial cuts in military defense. General Thys challenged the audience to be engaged in discussions, and to learn how best MSIAC can help them.

An MSIAC overarching presentation followed the welcoming comments. The MSIAC Project Manager, Mr. Roger Swanson, provided a brief history why MSIAC exists, how the team has assisted MSIAC Member Nations in the past, and how the Team can help members in the future. Mr. Swanson introduced the MSIAC Team of Technical Specialists and staff and briefly highlighted the various areas of technical knowledge and expertise of each staff member combined with their years of experience.

LtKol Filip Martel also welcomed MSIAC and briefly explained his role as the National Focal Point Officer (NFPO) for Belgium. The following MSIAC presentations given were tailored specifically for the audience to encourage discussion at the request of LtKol Martel:

- MSIAC Website (including WEBLINK and Communities of Interest
- Safety Assessment Software Online (SASO)
- In-Service Surveillance with feedback from the use of Data Loggers on Operations
- Aging and Life Extension Challenges
- US Army Surveillance Program
- New Ammunition and updates to NATO Inventories

The afternoon session was divided in two rooms to give the audience an opportunity to choose the topics that most interest them. While the standard presentations above were given in Room A, a user friendly presentation how to manipulate MSIAC's Information search tool WEBLINK and a demonstration how to use SASO were given in Room B.

The second day, 11 June 2013 was at the Military Academy in Etterbeek.

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The topics of interest were different from that given at the Systems Divison and all presentations were specifically selected by the Belgian Academy Coordinator, Major Gunnar Plovie. Once again the day had a break-out session specifically tailored for a different audience. The following MSIAC presentations were given in one room while others elected to learn and participate in a demonstration of WEBLINK and SASO in another room.

- Review of the various MSIAC web based tools
- EMC, Energetic Materials Compendium
- New Insensitive Munitions
- IM State of the Art
- Aging Munitions and Life Extension
- Training, Fellowships and Thesis Opportunities at MSIAC

The country visit was considered a success by both MSIAC and the Belgian NFPO. The two-day event was well orchestrated thanks to Filip and Gunar. A total of approximately 30 personnel from the MOD DGMR and the Military Academy participated in the discussions.

Many thanks were heard throughout the course of the day from both sides and (4) four new Technical Questions for MSIAC to answer have been added to our database.

SPALLING – A SPECIAL STORAGE CONSIDERATION

"No items vulnerable to spall."

Users of the NATO guidelines for ammunition and explosives storage will recognize the previous quote that is repeated (63 times) throughout the Quantity Distance tables in section II of AASTP-1.[1]

One must first understand spalling in order to determine what ammunition must be excluded from storage to then meet the standard.

Spalling may be an intended effect in anti-tank warfare using high explosive shells which may not be powerful enough to pierce the armor of a target. The relatively soft warhead flattens against the armor plating on tanks and explodes, creating a shock wave that travels through the armor as a compression wave and is reflected at the surface as a wave breaking the metal on the inside. The resulting spall is dangerous to a crew and equipment, and may result in a partial or complete disablement of a vehicle and/or its crew. [2]

The concept is the same, but we are referring to ammunition that is vulnerable to the spalling effects of concrete. Concrete spalling is a physical process that breaks down surface layers of concrete which then crumbles them into small pebble-like pieces.

Spalling of concrete is usually caused by corrosion of the steel reinforcement bars embedded in the concrete matrix, as seen in the photograph below, but can be caused by other ferrous elements either fully or partially embedded in the structure.

Although this type of spalling is noteworthy for the structure to maintain its' integrity, for the purpose of this article we are addressing those small pebble-like pieces that are generated from an explosive event and immediately projected at other explosive storage sites.

These pebbles and any other debris from reinforced masonry become secondary fragments and could have sufficient energy to penetrate an Exposed Site (ES) and initiate munitions that are considered vulnerable. [3][4]

Based on that information, it would then appear logical that all Exposed Sites in Tables 1A, 1B and 1C of Section II to AnnexI-A that have reinforced concrete at either the Potential Explosion Site (PES) or ES would include the vulnerable to spall quote.

"An Exposed Site containing ammunition vulnerable to attack by heavy spalling (e.g. missile warheads filled with relatively sensitive high explosives) requires special consideration."

What is the meaning of "special consideration" in paragraph 1.3.5.3 of Part I to AASTP-1?

Ammunition storage buildings are to provide full protection against projections of any kind, such as fragments, structural debris, lobbed ammunition and spalling according to paragraph 2.5.1.3 of Part II of AASTP-1. Spalling effects are not to be expected with earth-covered buildings because the earth cover will reduce the air blast loads considerably acting upon the external parts of the structures (soil berm shielding effect) thus the probability of spalling at the inside surface of the walls is reduced.[1].

The design measures to be taken according to chapter 5 of Part II applies primarily to buildings which are not earth-covered. The QD tables exclude the remark "No items vulnerable to spall" for exposed sites of standard NATO (7-Bar) and 3-Bar igloos, but perhaps the remark should be removed from all side and rear exposures of

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any igloo/earth covered structures. Special consideration appears to have been met if the munitions are stored in an earth covered structure.

In conclusion, ***spalling can cause crumbling and destruction of a structure, but can also project debris from the structure that can initiate thin skinned warheads containing sensitive high explosives. The standard as written appears to be inconsistently incorporated in the tables, but until corrections are made, the user and/or storage planner should note that thin skinned HD 1.1 munitions are at risk to spall if a non earth covered surface of reinforced concrete stands between the donor/PES and the acceptor/ES.***

This subject will be addressed further within the NATO AC/326 community, and a subsequent article will follow in the next newsletter.

[1] AASTP-1, Allied Ammunition Storage Publication 1, Parts I and II, April 2010
[2] Definition, Spall/Spalling, Anti-Tank Warfare Wikepedia last modified date 18 June 2013.
[3] Article, Concrete Spalling, Bob Mitchell of Pioneer Masonry Restoration Co, Inc.
[4] Article, Spalling of Concrete, Cathleen E. Corbitt-Dipierro, Fire Investigation Mythunderstandings,

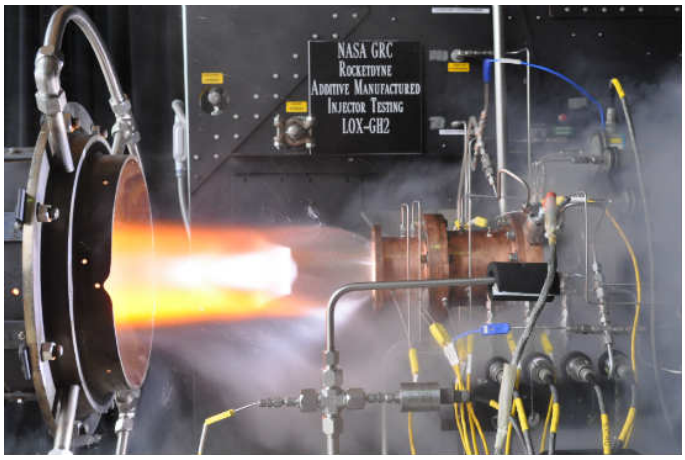
INDUSTRY & TECHNOLOGY PRESS REVIEW

If you have information you consider of relevance to this section , please do not hesitate to contact MSIAC at info@msiac.nato.int

You can find all Articles on Industry &Technology via this hyperlink.

In this edition, under Technology and Procurement, we highlight a number of articles on advances in 3D printing. The technology has advanced rapidly and is manufacturing items not dreamed possible in the recent past.

The lead articles present production of rocket components that were 3D printed by Aeroject Rocketdyne and NASA engineers. Another article presents accomplishments by engine maker CFM International, a joint venture between GE Aviation and the French company Snecma. There is link to an interesting CNN interview on the future of 3D printing and digital fabrication with MIT's Neil Gershenfeld. (Note the interesting discussion on 3-D printed handgun at 6 min point)
http://edition.cnn.com/video/?/video/bestoftv/2013/07/17/exp-gps-gershenfeld-3d-printing.cnn#/video/bestoftv/2013/07/17/exp-gps-gershenfeld-3d-printing.cnn



This technology is actually enabling manufactures to create designs that wouldn't physically be possible to make with standard conventional machining, and often taking designs to production quicker. 3d printing, together with additive manufacturing, is a technology we will all hear lots more about in the near future.

In addition there are articles and links to some weapon related technology advances for robotics (including the X-47B UCAS landing and taking off from a carrier and NATO robots), advances on weapons programs such as LRASM, LRLAP, MEADS, Excalibur, Paveway IV, the French Naval Cruise Missile and a number of technology announcements from during the Paris Air Show.

In Industry and National News section, we present some of the recent announcements effecting MSIAC nations from their Industry and National perspectives. Cost cutting and business unit consolidations in the US and UK by General Dynamics, as well as a new facility and new business sharing model called GDNexus, are provided.

An article from a Land Forces Event, hosted by Roke and Chemring EOD, discuss the UK Army's Future Capabilities, another article discusses the EU Commission recommendations to improve Europe's fragmented and cash-strapped defense industry. We include news on munition systems included in the Poland Navy Modernization Program and the recent Australian recognition of 60 years of BAE

In the procurements section we highlight a number of the more significant munition contracts awarded or announced recently, including those involving Australia, France, Germany, US, UK, Republic of Korea, and others.

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WELCOME TO DR. MATTHEW ANDREWS!

Technical Specialist Officer, Energetic Materials

Matt recently joined MSIAC on July 23rd 2013.

He has spent the last 11 years of his career at Cranfield University located at the Defence Academy of the United Kingdom.

He completed his PhD, and a year's post-doctoral research position, in the field of detection and analysis of secondary organic explosives.

Matt subsequently moved into the Formulations Research Group and has been involved with the research and development of booster and main charge formulations. More recent research has focused on particle morphology and characterization of secondary explosives materials.

Alongside his research he has been involved in lecturing at the Defence Academy supporting several MSc courses. These have included managing modules on Testing and Evaluation of Explosives and Forensic Investigation of Explosives.

He has also delivered a range of lecture materials on testing, manufacturing, formulations, and detection of explosives to (UK) MOD and industrial clients.

Join us in welcoming Matt to MSIAC and wishing him well in his new job!

You can access all ***REPORTED ACCIDENTS*** *via Ctrl +* **hyperlink!** *(Re-printed on our Website with the permission of ility engineering)*

All PUBLICATIONS*, can be found in the Technical Reports section on our website via this* **Hyperlink!**

You can find the ***LATEST PATENT OF INTEREST*** *on our MSIAC Website via this* ***hyperlink!***

Did you know that…

- … the **CYPRUS ex-Minister Papacostas was found guilty of manslaughter** over the deadly munitions blast that killed 13 in 2011? Read more here:
  http://www.bbc.co.uk/news/world-europe-18862581
  http://www.bbc.co.uk/news/world-europe-23245704#story_continues_1
- **...**the **deadline for the MS Award** nominations has been set? Make sure your nominations are entered before **August 15th, 2013** so your nominee can be part of the selection process!
- ...we have a **new job opening** here at MSIAC? To find out more about our vacancy as **Technical Specialist Officer Munitions Systems**, check out our website or the HR section of the NATO website !!

  http://www.nato.int/wcm-asp/recruit-wide.asp
- ...our **new Online Technical Questions form** and the **Access Request form for MSIAC member nations** are now up and running? Check out our website for more information! Do not hesitate to contact us if you have any further questions though.