



MSIAC

Munitions Safety Information Analysis Center

Supporting Member Nations in the Enhancement of their Munitions Life Cycle Safety



MSIAC Shaped Charge Jet Workshop

**IMEMTS
Rome, Italy May 2015**

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This presentation will provide an overview of the 2014 MSIAC Shaped Charge Jet Workshop

- Workshop Overview and Structure
- Workshop Objectives
- Final Report Conclusions

The workshop focus was on developing an advanced assessment methodology for determining munition response to Shaped Charge Jet Attack

- To increase participants' scientific understanding, *and*
- To propose improvements to the standard test requirement, STANAG 4526.

ACHIEVED*

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*Documented in MSIAC SC20

- Workshop planning initiated 2012
 - Request for MSAIC support from AC326 SG/B
- SCJ Assessment Workshop 12-15th May 2014
 - ENSTA campus, Brest France
 - 61 participants from 8 Nations
 - 18% of the MSIAC technical output for year 2014*

*Workshop approach based on
whole body of evidence approach*



*2014 MSIAC PM Report.

- MSIAC Open Report O-160
 - IMEMTS Proceedings
- MSIAC Limited Report L-186
 - Comprehensive final report
 - 4 significant report Annexes document the break out groups
 - E - SCJ Mechanisms and Detonics Break out
 - F - Small Scale Tests and Predictors Breakout
 - G - Modelling breakout
 - H - Testing and Test set-up breakout



- Reasoning behind the workshop structure
- Participants and analysis
- Technical synopsis of the Plenary presentations
- Conclusions and Recommendations
 - Record of discussions leading to conclusions
 - Record of future work recommended



The RPG 7 type should be the primary threat defined in the STANAG update.

The Jet characteristics

The Charge characteristics

Best practices

The RPG 7 type should be the primary threat defined in the STANAG

Do NOT recommend including a defined larger or smaller threat in this standard. However, a Procedure II –alternate threat – may be conducted as dictated by THA

Generally agreed the test could be conducted with an actual RPG-7, but it would need to have been characterized and meet the parameters.

Examples of acceptable surrogate charges are to be included in the appendix. Recommended charges from Germany, France, and US, and possibly UK and Australia. Nations are to verify the details proposed for inclusion in the standard do not violate security or confidentiality considerations.

The Jet characteristics

V^2D of the jet tip is insufficient as the sole parameter to adequately identify the SCJ.

V^2D shall be a minimum of $120\text{mm}^3/\mu\text{s}^2$ and a maximum of $140\text{mm}^3/\mu\text{s}^2$

Jet diameter at the target impact position should be: 2.5 - 3.5mm.

Jet measurements should be taken at the target impact point, and after the conditioning plate. A diagram will be included to clarify the location, and reference scale utilized (i.e. for x-rays).

The Charge

The explosive Charge diameter should be larger than 60mm and less than 95mm.

The explosive charge should be at least the performance of COMP B or above (equivalent or higher Gurney energy).

Oxygen free Copper liners with a purity of at least 99.99% required

Best practices

Maintain recommendation in the standard that the test is not always appropriate - if the failure diameter is not significantly larger than the jet diameter predicted to impact the energetic material.

A conditioning plate (or nose probe) shall be used to clean the jet. Effort should be made to limit or eliminate spall generated by whatever process is chosen.

Accumulated mass profile was determined not necessary for inclusion in the standard; but can be provided in the characterization documentation as useful information.

- The V^2D and jet diameter values should be reviewed for accuracy by each of the Nations to determine if they are reasonable and realistic.

- Output from workshop immediately supported SCJ Custodial Working Group (CWG)
 - May 16th 2014 in France
 - Sep 3rd 2014 in Sweden
 - CWG will be meeting 22 May 2015
- CWG and STANAG Progress
 - Reported out at this conference, Session 5A

Thank you for your attention