SOUTH AFRICA IM OVERVIEW

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IM STATEMENTS

- Successful implementation of IM is incident driven.
- The closer the incident and the more severe, the quicker the response from the decision makers.
- Unfortunately loss of life during an incident enhances the process of IM implementation.
- Loss of life during an incident cancelled the theory of unaffordable.

INCIDENTS IN AFRICA

SOUTH AFRICA – POTCHEFSTROOM, 2000

- Ammo were packed outside Magazine, ready to be collected.
- Field fire outside Ammo Magazine.
- Heat of fire causes Mortar bombs to detonate, resulted in sympathetic detonation of rest of ammo.
- 2 people injured during cleanup operation.

INCIDENTS IN AFRICA

Pyrotechnic projectiles only ammo not detonated

INCIDENTS IN AFRICA

NIGERIA - LAGOS AMMO DEPOT, 2002

- Fire in township next to Depot got out of control.
- Heat of fire causes ammo to detonate, resulted in massive explosion.
- More than 1,000 people killed.
- Buildings and infrastructure destroyed.

INCIDENTS IN AFRICA

Buildings and infrastructure destroyed

INCIDENTS IN AFRICA

MOZAMBIQUE - AMMO DEPOT, 2007

- What really initiate the incident not known yet. The following were reported:
  - Heat wave from environment
  - Fire from nearby township
  - Temper with ammo for scrap metal recovery
  - Human error
- 117 civilians reported killed, several injured.
- 1 South African ammo specialist and 5 Mozambique people killed during cleanup operation.
- Buildings, houses & vehicles destroyed.

INCIDENTS IN AFRICA

Houses and vehicles destroyed

INCIDENTS IN AFRICA

Cleanup Operation
– 6 people killed

IM POLICY

- First IM Defence Policy promulgated in 1999.
- Policy stated that IM are to be introduced "*where it is sensible, practicable and cost effective to do so*".
- Policy was largely ignored. All three services had made minimal progress to introduce IM.
- No Cost Benefit tool or Threat Hazard Assessment procedure was available to assist with the assessment of whether "*it is sensible, practicable and cost effective to introduce IM".*

IM POLICY

- Policy recently updated and replaced by Department of Defence Instruction (DODI Log No. 00053/2005, dated 19 September 2006) and Joint Defence Publication (JDP Log No. 00018/2005, dated 19 September 2006).

- Update of IM Policy executed by an IM Workgroup comprising of members of the SA Navy, SA Army, SA Air Force, Log Support Formation, Log Division, and DOD Pol & Plan Division under the Chairmanship of Armscor.

IM POLICY

- Policy states that IM **MUST BE APPLICABLE DURING:**
  - Refurbishment of munitions stocks
  - Routine replenishment of munitions stocks
  - Munitions research and development programmes
  - New munitions acquisitions
  - A retrofit approach is not envisaged for existing stock unless it is feasible and cost effective.

IM POLICY

DOD IM PROCESS

- IM characterisation must be executed on existing stock according to a priority list. Target date end 2008.
- All munitions in the DOD must comply with IM requirements or exemption (waiver) not later than December 2016.
- For non-compliant munitions the IPT must submit a request for exemption or deviation, including the associated risks and implications from the full requirement to the DOD Explosives Board.

IM POLICY

DOD IM PROCESS

- The Board's decision and recommendations, with risks and implications, must be submitted to the Sec Def for ratification.

CURRENT IM INTERNATIONAL MEMBERSHIP STATUS

- Applied for MSIAC Membership.
- South Africa was invited to attend future IM Steering Committee meetings as an observer nation until membership application is approved.
- Recently approved to join Group AC/326 as an observer Nation.

IM TECHNOLOGY PROJECTS

Current IM Technology Projects:

- Gun Propellant Technology
  - New insensitive energetic materials
  - Small-scale IM testing
  - Full-scale IM characterisation
  - Propellant Processing and Evaluation
  - Dynamic testing in Weapon Systems

IM TECHNOLOGY PROJECTS

Bullet Attack Test

IM TECHNOLOGY PROJECTS

Test Results

IM TECHNOLOGY PROJECTS

Current IM Technology Projects:

- Explosives Technology for High Setback Forces and Spinned Projectiles
  - Manufacture and characterisation of RDX - and HMX based PBX's
  - Small-scale and Full-scale IM Tests
  - Different IM booster charge designs
  - Packaging designs
  - Ageing tests on IM formulations (samples subjected to 70 °C for 12 months)

IM TECHNOLOGY PROJECTS

Bullet Attack Test

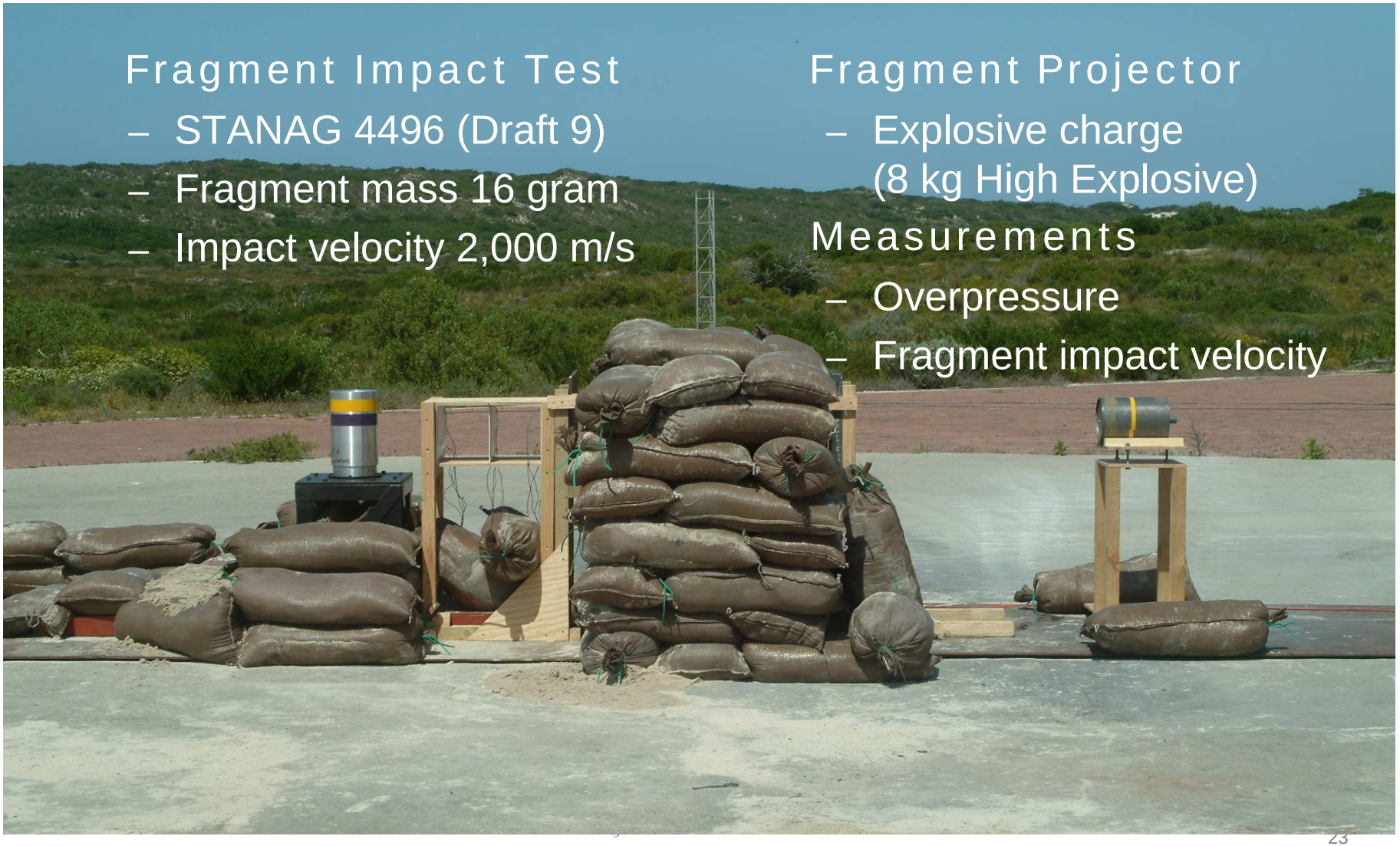
IM TECHNOLOGY PROJECTS

Current IM Technology Projects:

- Explosives Technology for Missile Applications
  - IM High Explosives
    - Binders with plasticiser in combination with HMX
    - Binders with no plasticiser in combination with HMX
    - Booster formulations for IM main charges
  - Enhanced blast High explosives
  - Characterisation technology
  - New energetic materials

IM TECHNOLOGY PROJECTS

High Explosive for Fragmentation Warheads



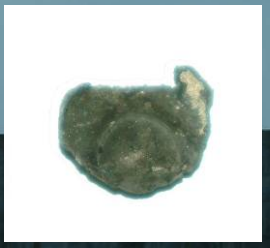
IM TECHNOLOGY PROJECTS

High Explosive for Fragmentation Warheads

Test reaction
- No reaction of explosive

Debris
- No casing exit hole
- Test fragment recovered

Reaction Classification
- No Reaction



IM TECHNOLOGY PROJECTS

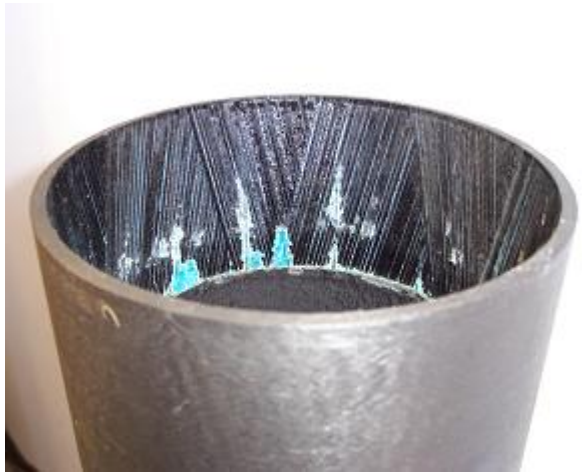
Current IM Technology Projects:

- IM Technologies for Tactical Rocket Propulsion
  - Less sensitive propellant formulations
  - System design and analysis
  - Passive mitigation
  - Active mitigation
    - Controlled auto-initiation of thermally sensitive propellants
    - Thermally-initiated active case venting
  - Evaluation
    - Small-scale testing
    - Full-scale characterisation

IM TECHNOLOGY PROJECTS

Composite Casing Technology

Laminated end rings with reduced structural integrity of bondline interface at elevated temperatures

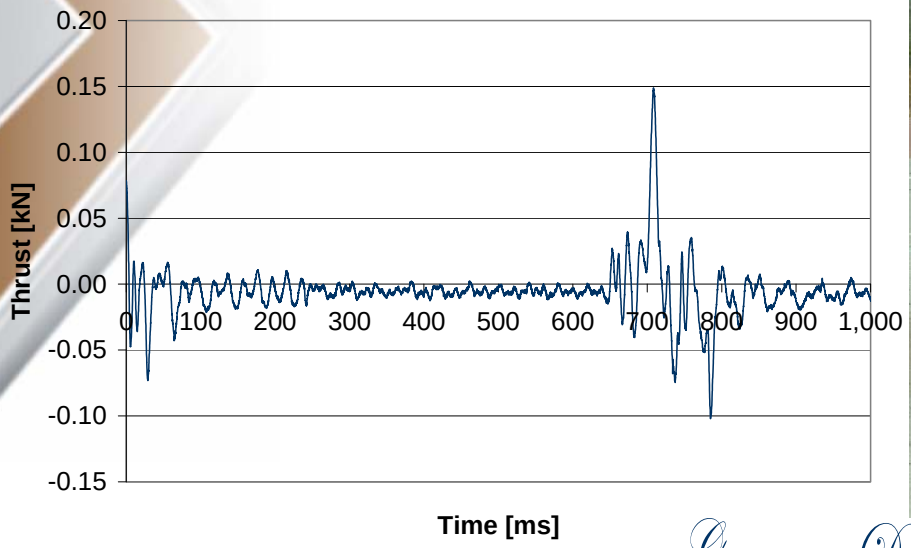


Hybrid laminate to reduce confinement of slender motors at elevated temperatures

IM TECHNOLOGY PROJECTS

Thermally-initiated Active Mitigation (Slow Heating Test)

- Reaction
  - Initiation at 140 ºC
  - Casing vented
  - No significant impulse
  - No debris beyond 15 m*
- Classification
  - Type V (burning)



IM TECHNOLOGY PROJECTS

Establishment of a THA Methodology

- Procedure compiled (RSA MIL-PROC-152)
  - Standardised, systematic methodology
  - Step by step instructions for software program
- THA Software Program developed
  - Data basis based
  - Quantitive inputs required
  - Assumptions/analyses reported
  - User friendly, easy to use
- Positive feedback so far from Project Teams

ACQUISITION PROGRAMMES

- Upgrade of 155 mm GV6 Gun and Ammunition
  - Upgrade of Weapon (automatic loading system, 52 calibre barrel and IM compliant ammunition).
  - Target date for implementation 2010.
- Light Artillery Gun and Ammunition
  - Light weight towed system for rapid deployment forces (105mm) and IM compliant ammunition.
  - Target date for implementation 2012.
- Umkhonto – Surface-to-Air Missile
  - Recent success in IM compliant explosives.
  - Target date for qualification 2010.

ACQUISITION PROGRAMMES

- Ingwe – Anti-tank Missile
  - IM compliant shaped charge concepts demonstrated with success.
  - Target date for qualification 2009.
- Mokopa – Air-to-Ground Missile
  - IM compliant concept at initial stage.
  - Target date for qualification 2011.
- Assegaai – Short Range Air-to-Air Missile
  - IM technologies demonstrated.
  - Target date for qualification 2012.

CURRENT ACTIVITIES

- IM Steering Committee Meetings
  - Address issues of concern (represented by SA Army, SA Air Force, SA Navy and Industry)
  - Discuss latest international trends
  - 3 Meetings per year
- 2 Yearly IM Feedback Sessions
  - Presentations about the latest progress on IM
  - Inform stakeholders and convince them that funds allocated are well spend
  - MSIAC Project Officer guest speaker at last session
- Project Teams execute THA on existing systems
  - Confirm and determine threats on Weapon Systems

CURRENT ACTIVITIES

- Technology work on characterisation and testing of new IM energetic materials.
- SANDF involved with peace keeping operations in Africa in conjunction with UN.
  - IM compliant systems essential for these operations
- Will participate in future Group AC/326 meetings.

CONCLUSIONS

- Ammunition Depot incident in Mozambique recently (March 2007) a definite indication that South Africa is on the right track regarding our SANDF IM Policy strategy.

- Incident also a wake-up call for the SANDF to dispose of their old obsolete Condition D, non-compliant IM munitions and to focus on new IM compliant munitions for our future Weapon Systems.

CONCLUSIONS

- Due to our revised IM Policy every new Weapon System MUST address IM in the initial stages of the project.
- IM compliant weapon systems essential for future peace keeping operations in Africa.
- IM technologies have been demonstrated and are included in present acquisition programmes.
- Participation with Group AC/326 important for South Africa (to share and obtain information on IM related issues).

CONCLUSIONS

QUESTIONS?