



South African Navy Prioritizing of Munitions for Insensitive Munitions Characterization

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Need for Prioritization Method

- Department of Defence Policy Guideline
- Limited IM-budget
- Phased approach
- Prioritize munitions
- No methodology - 100⁺ munitions items
- Challenge to differentiate priorities





Development of Methodology

Scheduled specialist workgroup

- 2 days at Rheinmetall Denel Munition
- Goal to prioritize SA Navy's munitions
- No methodology to use at workgroup
 - Brainstorm, subjective argumentation





Development of Methodology

- Challenge of methodology remained
- Spent weeks contemplating
- Realised only objective way was to create a "*Value System*"
- Took Value System to workgroup



Development of Methodology

- About 80% of SA's IM specialist present at workgroup
- Buy-in to idea of Value System
- Value System parameters
 - Identify discriminatory Criteria
 - Preferably four to six criteria only
 - Relative Weighting of criteria
 - Objective scoring method





Acknowledgement

- Mr Cedric Brijraj - co-facilitator
- Participants (20+) of workgroup from
 - Rheinmetall Denel Munition
 - Denel Dynamics
 - PMP
 - Armscor
 - SA Navy
 - SSO Mun



Development Process

- Brainstorm Criteria/Factors
 - 30+ factors identified
- Round Table discussion
 - Individual Input by each participant
 - Grouping of certain criteria
- Reduced list to 10 Criteria
 - Individual prioritization
 - Round table discussion





Development Process

- Individual ranking of Criteria
- Reduced to four main Criteria with two having sub-criteria
- Ranking of selected criteria
 - Each participant indicated suggested weighting per criteria
 - Weighting determined through averaging of individual weighting scores
- Objective scoring value for Criteria





Selected Value System Criteria (Weighting)

Service Life Phase	(0,19)
Use Profile	(0,37)
Severity Of Consequence	(0,31)
Current IM Status	(0,13)





Service Life Phase

Weighting 0,19

Out of Service by 2010	:2
Out of Service by 2012	:5
Out of Service by 2016	:8
In Service beyond 2016	:10

* Calculation Example: Round 76mm HE





Use Profile

Weighting 0,37

Factor of:

Deployment Exposure Risk *(0,5)*

and

Quantity Carried Onboard *(0,5)*





Use Profile: *Sub-criteria 1* Deployment Exposure Risk

Always carried onboard

Always between decks: **8**

Upperdeck routes/stowages: **10**

Only carried onboard during
specific exercises:

Always between decks: **4**

Upperdeck routes/stowages: **6**





Use Profile: *Sub-criteria 2* Quantity Carried Onboard

< 10 items/units	:3
10 - 25 items/units	:5
25 - 75 items/units	:7
> 75 items/units	:10





Severity of Consequence

Weighting 0,31

Factor of:

NATO HD Classification (0,5)

and

Net Explosive Content (0,5)





Consequence: *Sub-criteria 1* NATO HD Classification

- | | |
|------------------------------------|-----|
| 1.1 Mass Explosion | :10 |
| 1.2 Projectiles, mass explosion | :8 |
| 1.3 Flame & Fire, minor projectile | :5 |
| 1.4 No reaction outside packaging | :2 |





Consequence: *Sub-criteria 2* *Net Explosive Content*

< 750g	:1
750g - 5kg	:3
5kg - 12kg	:6
12kg - 100kg	:8
> 100kg	:10





Current IM Status

Weighting 0,13

No THA or IM-testing	:10
THA completed (manual process)	:7
THA completed (Software)	:5
STANAG 4439 tested	:3
THA and STANAG 4439 tested	:1



Calculation Example

Round 76mm HE

Service Life (0,19): Out of Service by 2016 = **8**

Use Profile (0,37):

Exposure Risk: Always between decks = **8**

Qty Onboard: >75 items/units = **10**

$$(8*0,5) + (10*0,5) = \mathbf{9}$$

Severity of Consequence (0,31):

HD Class: 1.1 Projectiles = **10**

NEC: 750g - 5kg = **3**

$$(10*0,5) + (3*0,5) = \mathbf{6.5}$$

IM Status (0,13): THA & IM testing = **1**

Rank Score Calculation (with weighting):

$$8(0,19) + 9(0,37) + 6,5(0,31) + 1(0,13) =$$

6.995



Sample Rankings of Munitions

<i>Rank Score</i>	<i>Ammunition Type</i>	<i>Service Life</i>	<i>Use Profile</i>	<i>Qty</i>	<i>HD</i>	<i>NEC</i>	<i>IM Status</i>
8.605	Round 35mm HEI	2016 >	Upperdeck	> 75	1.2	750g – 5kg	Nil
8.325	Missile SSM	< 2016	Upperdeck	< 10	1.1	> 100kg	Nil
8.140	Round 35mm PracT	2016 >	Upperdeck	> 75	1.3	750g – 5kg	Nil
8.050	Charge Dems 450g	2016 >	Upperdeck	25< >75	1.1	< 750g	Nil
8.005	Missile SAM	2016 >	Inboard	10< >25	1.1	12kg–100kg	THA
7.915	Rnd 20mm HEIT	< 2016	Upperdeck	> 75	1.2	< 750g	Nil
7.855	Fuze Prox 76mm	< 2016	Inboard	> 75	1.1	< 750g	Nil
7.855	Rnd 76mm SUPrac	< 2016	Inboard	> 75	1.2	750g – 5kg	Nil
7.450	Rnd 20mm PracT	< 2016	Upperdeck	> 75	1.3	< 750g	Nil
7.215	Torpedo Combat	< 2016	Spec- Inboard	< 10	1.1	> 100kg	Nil
6.995	Rnd 76mm HE	< 2016	Inboard	> 75	1.1	750g – 5kg	IM-t
6.445	Mine Combat	< 2010	Upperdeck	< 10	1.1	> 100kg	Nil



Conclusion

- Value System proofed very effective
- Other arms of service (Army & Air Force) will adopt and use to prioritize their munitions
- Available for other Armed Forces that may be interested (adopt and adapt)

