



South African Navy Prioritizing of Munitions for Insensitive Munitions Characterization

Presented by
Captain N.P.J. (Klaas) Steyn

Inspector Naval Ordnance
South African Navy





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	<i>(0,19)</i>
Use Profile	<i>(0,37)</i>
Severity Of Consequence	<i>(0,31)</i>
Current IM Status	<i>(0,13)</i>





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)

