Risk
– Is That Really a Technical Issue?

Fredrik Johnsson¹
Lt. Col. SWEDEC

Bengt Vretblad²
Professor Em., SNDU
Military Utility

Element of Interest
Context
Military Actor
An example

Clearance of shaped charge ammunition - a frequent EOD task
The problem

“When clearing ammunition containing a shaped charge you should:

• consider an extended hazardous area of the jet […]
• increase the depth of walls etc. […]”

No adequate means (tools) for the design of protective measures!

The development process\textsuperscript{1,2}

\textbf{The Military Utility}

\textbf{Theoretical Model}

\[ P = C \cdot c_j \cdot c_t \cdot c_s \cdot \xi \cdot \frac{\rho_j}{\sqrt{\rho_t}} \]

1\textsuperscript{st} ISMS 2012. Kingston, Canada.
2\textsuperscript{nd} ISMS 2014. Vienna, Austria.
Military Utility - Requirements

- Limited Information
- Educational Level
- No Calculation Equipment
- Short Time Frames
The final tool

\[ P_d = C \cdot c_j \cdot \frac{1}{\sqrt{\rho_t}} \cdot 95 \cdot (c_S + c_{design}) \]

Protective Measure built by Sandbags

- Shaped charge, maximum penetration in armour:
  - 8 Calibres
  - 7 Calibres
  - 6 Calibres
  - 5 Calibres
  - 4 Calibres
But, what if …

… only a partial solution is possible?

… another place in the conflict spectrum?
Acceptable Risk?
How To Communicate Risks?

10^{-6}!!!

???
Terrain and Infrastructure
Protective Measures
Today
- Binary Approach to Risk Factors

Terrain and Infrastructure + Protective Measures + Render Safe Procedures \( \rightarrow \) RISK
Tomorrow
- A Dynamic Risk Management Model

Terrain and Infrastructure
Protective Measures
Render Safe Procedures

\[ \text{Probability} + \text{Consequence} \rightarrow \text{RISK} \]
Conclusions

• Dynamic threats require dynamic tools!
• Military Utility - supportive programs must be adapted to the military reality!
• EOD operations – apt for dynamic risk concept development!
• Further research needed for a Dynamic Risk Management Model!
Discussion

- What inputs do you have for a dynamic risk management concept?
- How communicate risk to decision makers?