

Standardizing Metal Detector Testing

CEN Workshop 7:
Humanitarian Mine Action
- Test and Evaluation
- Metal Detectors

Secretariat hosted by JRC



Standardizing Metal Detector Testing: CW07

- Description of the CW07 project; objectives and progress
- What tests do we need to specify?
- Conclusions



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The Origin of CW07

- Mandate from EC for standardization in humanitarian mine action
- Creation of CEN BT/WG 126 which identifies standardization priorities
 - Metal detector T&E is a priority! Many trials performed already.
- Both ITEP and CEN BT/WG 126 mandate JRC to initiate standardization of metal detector test and evaluation
 - CEN Workshop route chosen





The Objectives of CW07

- Specify standard tests for evaluating metal detectors
- Give guidelines, principles and **procedures**
- Quantify performance
- Give more value to end-users from **comparable** results of metal detector trials - based on sound scientific principles
- Publish a CEN Workshop Agreement (CWA)
- Aim of integrating into IMAS system; first as Technical Note

CW07 Progress to date

- Kick-off meeting at CEN in Brussels, November 2001
- First CW07 meeting (35+ participants from all over the world) at Ispra in December 2001
- Second CW07 meeting at JRC, Ispra in April 2002
- Drafting Working Group meeting at DRDC Suffield, Canada, June 2002
- Drafting Working Group meeting at Ispra, September 2002
- Third CW07 meeting at JRC, Ispra in December 2002
- CWA submitted to CEN for publication in May 2003



CW07 Plan

- CEN to publish CWA
- User training and verification in 2003 in various global locations
- Experimental verification in collaboration with MACs, demining organizations
- Review CWA and publish new version if necessary



Who is involved?

- CEN gives overall standardization advice
- GICHD (responsible for IMAS)
 - active participation in CW07 meetings - UNMAS also involved
 - advice on how CW07 can be compatible with IMAS structure
- Chairmanship and Secretariat of CW07 provided by JRC
- Process co-coordinated with ITEP



Who is providing the technical input?

- Metal detector “end-users”
 - Experienced demining engineers and consultants
 - NGOs and others operating demining programmes using metal detectors
- Manufacturers of metal detectors
- R & D institutions with experience of developing or testing metal detectors



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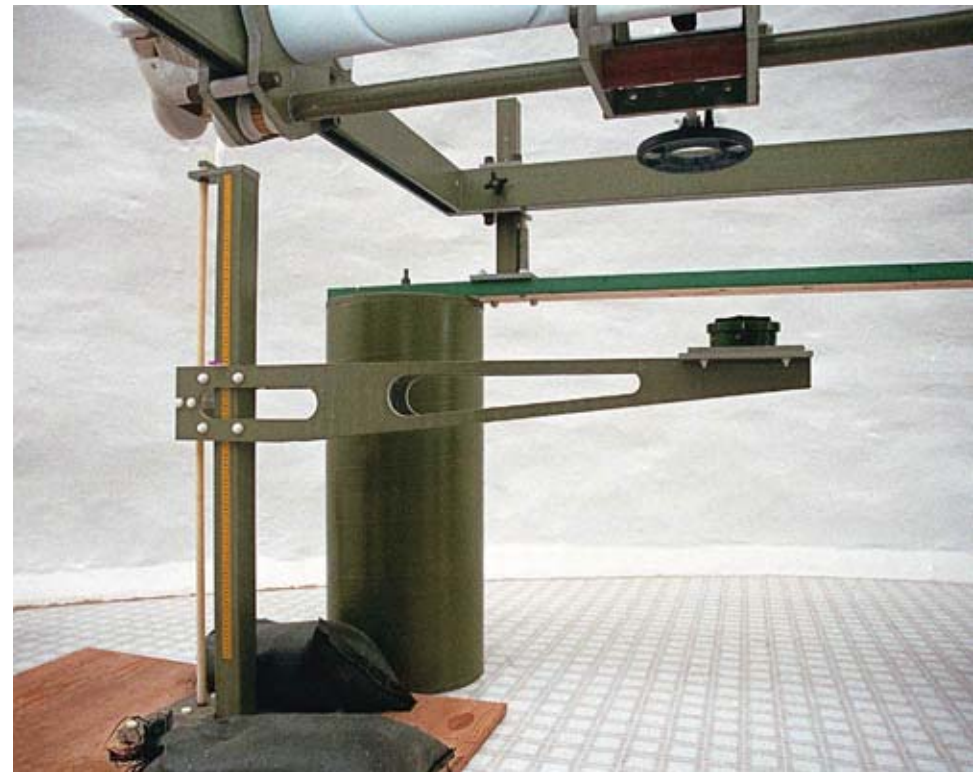
What tests are needed?

- In-air tests
 - Performance in controlled conditions
- In-soil tests
 - Performance in soil (still well-controlled)
- Field tests
 - Can the detector really find that mine in this soil?
 - Other tests; e.g. ergonomics, durability, maintenance



In-Air Tests

- Controlled conditions, no soil!
- Max detection height used to measure sensitivity
- Standard targets
- Sensitivity stability
- Low-tech alternatives



In-Soil Tests

- Controlled conditions, but with soil also.
- Max detection height used to measure how sensitivity is affected by soils
- Low-tech alternatives



Field Tests

- Less-controlled, but “realistic” conditions
- Targets buried at standard depths - detection performance recorded as yes/no
 - standard targets
 - inert real mines
 - rocks...



Other Tests

- Maintenance, battery considerations etc.
- Robustness
- Ergonomics
- EMC



JRC Supporting Work

- Which are the best targets to choose as standard?
 - Experiments in air and in soil are giving some answers
 - Theoretical study will reinforce the conclusions
 - Central provision of standard targets to user community (e.g. JRC)
- CW07 has revealed gaps in knowledge about how to characterize soils that affect metal detectors
 - Classify soil by its (complex) magnetic susceptibility and (to a lesser extent) electrical conductivity
 - Devise simple ways of in-situ soil measurement and classification according to its effect on metal detectors



Supporting Work

- Do the agreed standard tests support the user community?
 - JRC is verifying some tests by experimental work
 - Proposal to make training and verification campaign through MACs
- How do we measure detection reliability?
 - Can we avoid using large test target populations?
 - Apply ideas from non-destructive testing



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Conclusions

CW07 will produce a testing standard giving;

- Quantified metal detector performance
- Assessment whether detector is suitable for the user's target/soil combination
- Comparable, repeatable results from standardized trials

