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The Collaborative ORDnance Data Repository (CORD): 2018 Upgrades

by Roly Evans [Geneva International Centre for Humanitarian Demining] and Erik de Brun [Ripple Design]

The Collaborative ORDnance Data Repository (CORD) has been in existence since 2015. It is a database of over 5,000 entries detailing a wide range of explosive ordnance. The database is used extensively as a means of identifying munitions by those working in the field of humanitarian mine action, but also by others. Users range from mine clearance operators in Sri Lanka, police bomb disposal teams in Florida or Abu Dhabi, human rights advocates in Washington, D.C., to journalists in London. CORD is not intended as a detailed database. It is intended as a simple online ordnance identification guide with limited detail, accessible to all.

CORD grew out of the old ORDATA database formerly hosted on the website of the Center for International Stabilization and Recovery (CISR) at James Madison University. This was a U.S. Government database of mines and explosive remnants of war (ERW) released in 1997 to assist humanitarian demining work. CORD was developed as an improved user interface for those seeking to search more than 5,000 entries in ORDATA.

In early 2017 it was determined that an upgrade of the CORD system would be desirable. The initial system architecture, which was based on an ontology, was designed to maximize interoperability with external databases and enable future integration of a complex, semantic search system. An ontology is a

![Figure 1. The revised CORD user interface showing the updated list of 18 Ordnance Types (often known as Ordnance Categories). In time, further Ordnance Types may be added. All graphics courtesy of GICHD/CISR.](image)

![Figure 2. The revised CORD user interface showing the card view of entries, in this case for one of the new Ordnance Type listed in CORD, Submunitions.](image)
type of database where the data is stored using the Resource Description Framework (RDF) data model in the form of subject–predicate–object expressions, known as triples. This type of database allows for interoperability with other ontologies without the need for lots of additional development. After two years it became clear that interoperability opportunities were limited (and potentially problematic), and a semantic search capability was not required. At the same time that the main benefits of the ontology were not being realized, the drawbacks of such architecture were becoming increasingly problematic. It was clear that the ontology severely limited the search performance of CORD (i.e., its speed and reliability). This was noted both internally and through feedback from site users. In addition, it became clear that data quality was a real issue and some of the specifications and imagery required updating. For example, numerous items had incorrect values for explosive content. Moreover, some of the information within what should only ever be an ordnance identification guide was inappropriate. This included neutralization and disposal options for ordnance alongside recommendations for transport. Information such as this should only be made available to professional explosive ordnance disposal (EOD) operators and should not be detailed in a basic free online database.

The task of revising CORD started in February 2017. The GICHD signed a memorandum of understanding with CISR confirming joint ownership of the database, where GICHD assumed operational control including day-to-day maintenance and development responsibilities. GICHD proceeded to revise the database architecture and page structure prior to commencing ongoing efforts to check specifications and add improved imagery to entries.

**Change from Ontology to Relational Database**

Given the requirements of CORD, it was clear that a relational database was most appropriate for the relatively simple dataset of just over 5,000 entries. A relational database stores data as relations in tabular form, i.e., as a collection of tables with each table consisting of a set of rows and columns. Perhaps the majority of relatively small databases in widespread use today are based on the relational database model. These tend to be simpler and easier to adapt to changing needs over time. A relational database would make it more difficult to integrate with external ontologies; however, opportunities were limited in this area, and in any case it was clear that this was no longer a significant consideration. Moreover, even if other external ontologies could be accessed, it was not clear how the information extracted would be checked for quality prior to being integrated into CORD. Unfortunately, errors do exist in even the better ordnance databases. The improvement in the performance of the search functions and the site in general, that would come with using a relational database, were immediately apparent. The switch improved stability of the system because workarounds that had been put in place to help improve the ontology performance could be eliminated.
New Features in CORD

Aside from changing to a relational database, a number of new features were added to CORD. These include:

- **A What’s New section** gives users easy access to the items most recently updated.
- Ordnance items can now be sorted allowing ordnance records to be viewed in multiple ways (card or list view) and sorted by name or date added/modified. A button in the top right of the user interface screen was added to allow items to be shown in chronological order.
- A number of new fields and field types were added to the database, including an Associated Evidence section detailing evidence associated with particular munitions, such as packaging or fragmentation. This can be particularly useful for entries such as AP Mines, AV Mines, and Submunitions. A Useful Links section was also added, identifying good technical websites with further information on a given item of ordnance: e.g., Submunition and Cluster or Dispenser entries might have a link to the GICHD Cluster Munition Identification Tool (CMID).
- Improvements to backend data editing and entry of CORD were made, allowing features such as captions for individual images as well as editing capabilities for new fields. The systems that record all changes to CORD were also improved.
- A series of analytics dashboards were added to provide insight into site statistics and usage patterns. This will enable GICHD to identify necessary site improvements including usage in particular regions.
- CORD administrators can now export raw data more easily and export a group of ordnance items to PDF. In time, this could lead to ordnance guide extracts of CORD being available on special request. Given the quality management requirements involved, such requests are likely to be resource intensive and thus only available at the discretion of the GICHD.

Changes in CORD Content

A number of changes in the content of CORD were made. Foremost among these changes was revising the categorization of ordnance, known historically as Ordnance Type in CORD (the equivalent of Ordnance Type in the Information Management System for Mine Action (IMSMA) is Category). It should be clearly stated that there is no internationally agreed system of categorizing ordnance. For example, some categorize mortar rounds as projectiles. Others categorize them as a separate group in their own right. Some categorize rocket propelled grenades (RPG) as rockets, some as grenades, others categorize RPGs as recoilless projectiles. It is unlikely that a categorization system that would please everyone fully could be chosen. However, the slightly expanded Ordnance Type list adopted is hopefully a reasonable compromise and an improvement on what was used before.

The number of ordnance types listed in CORD has expanded from eleven to eighteen. The old Landmines type has been split into AP Mines and AV Mines. What was previously designated as Scatterable Munitions is now split between a new Ordnance Type, Submunitions and others, such as AP Mines. Mortar Rounds were previously listed as Projectiles. Technically, this is perfectly reasonable, but it was decided that since the Projectiles group was so large, it would be...
good to split off a new Ordnance Type categorized as Mortar Rounds. Other new Ordnance Types include Fuzes, Small Arms Ammunition (SAA) (for projectiles ≤ 20 mm), Naval Ordnance, Firing Devices and Switches, Demolition Stores, and Locally Manufactured Munitions (LMM). LMM is an Ordnance Type for all the 
artisanal munitions being produced, e.g., in areas of Syria. An 82 mm, high explosive mortar round produced in a workshop would be categorized as a LMM. A challenge in populating this Ordnance Type will be naming items—the range of different models often do not have agreed model names or titles. More Ordnance Types may be added in the future, for example a new Recoiless Ammunition type.

In time, it is possible that entries in CORD will be subcategorized. For instance, an anti-personnel (AP) mine may be subcategorized as an AP blast mine, AP directional fragmentation mine, AP omni-directional fragmentation mine, AP bounding fragmentation mine, etc. This would be a significant task for each ordnance type and would possibly be subject to some debate in the industry. Nevertheless, it is a logical task for CORD to embrace. Ideally there would be an agreed standardized categorization system for ordnance, perhaps as part of the International Mine Action Standards (IMAS). For now, CORD will only categorize at a first level, i.e., Ordnance Type, and at a last level, i.e., the model name of the item.

**Next Steps**

The task of improving content in CORD is in many ways only just beginning. It is a daunting task and the resources available for this are limited. From late 2017 onwards, GICHD staff will commence a review of entries, checking for specification accuracy and adding more item imagery where possible. After all, CORD is primarily an aid to identification, which is a visual process. There is also a need to fill in some gaps. For example, some common submunitions do not yet have an entry in CORD. Ordnance Types such as Fuzes and LMM require populating. The process is not time limited; it should go on for as long as CORD is in existence. Each entry also needs accurate information about where it is being used. We can scan social media for evidence of the use of a particular item in a given country, but this may be difficult to corroborate. Nothing beats positive identification of items on the ground by experienced operators.

The use of ordnance in conflicts is constantly evolving and CORD needs to try to keep up. There are new ordnance categories that represent this, in particular LMM, intended specifically for conflicts in the Middle East but also for items like improvised victim operated AP mines in countries such as Colombia. New entries must be created to reflect the situation on the ground. Please help us by sending any relevant information on these items, be it a Hell Cannon in Syria or a chemical AP mine in Colombia.

In short, CORD needs your help. If you are in the field and can confirm an item is being used in a given country but is not reflected in the CORD database, please get in touch using the contact details on the CORD website. Better still, if you have a photo of an item in the field and are willing for it to be on CORD, please send it in. Image copyright using the new photo captions now available will always be acknowledged. Furthermore, if you see an error in CORD, perhaps a specification detail that is incorrect or a detail for which we do not have but you do, please contact us.

Usage figures for CORD are encouraging; however, we will always need help to make the information more accurate and up-to-date. CORD is an important resource for HMA and beyond. With your help, it can continue to be so.

*The CORD database can be accessed at: http://ordata.info. You may follow CORD on social media via Facebook (@therealCORD.id), Twitter (@therealCORD_ID), or Instagram (@cord_id), or get in touch via email CORD@gichd.org.*

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