



## Information Quality Management in Mine Action

by Armen Harutyunyan [ United Nations Mine Action Office-Sudan ]

*Data management is a vital component of mine-action operations. Mismanagement of data originates in the field and often leads to unorganized operations and additional costs. A refocus on data-management guidelines and methodologies will result in better quality data management throughout the field.*

Articles published in *The Journal of ERW and Mine Action* have repeatedly raised concerns over the quality of mine-action data management. For instance, Thomas Powell in his article, "Data Standardization," stated: "To achieve quality data, the data development process must follow a disciplined, structured, and well-defined approach—a sequential development process that ensures completeness and validity, structural integrity, business-rule integrity, and conformance to conversion rules."<sup>1</sup> In another article, "Information Systems for Mine Action from the Data Entry Point of View," by Zoran Grujic noted that simply having an information system is not enough to solve a state's problems, but he instead emphasizes that the bigger challenge is to populate the database with meaningful information.<sup>2</sup> More recently in his article, "Total Quality Management in Mine Action," Daniel Eriksson pointed out that information-management tools can be utilized to find cases of poor data quality and to assist the quality-management systems.<sup>3</sup>

### Lack of Information Quality Management

Most mine-action organizations recruit quality-assurance officers to ensure that the quality of clearance and mine-risk education operations are compliant with organizational and international standards. Clearance operations justifiably receive a lot of attention due to the importance of these standards when it comes to the safety of demining personnel and the safety of land before its release to local communities. The conformance costs<sup>4</sup> of quality in this particular case are fully justified; a demining accident usually costs more in terms of follow-up clearance and support to survivors than the costs of ensuring that the operations are conducted safely and to the required standards.

Unfortunately, the data-management function of mine-action operations has not received the same amount of attention when it comes to quality management of data. While this does not necessarily relate to the safety of operations, poor quality data collection, analysis and dissemination might lead to allocating additional resources to deal with the consequences of data-management problems. Allocating such additional resources results in nonconformance quality costs.<sup>5</sup> A mine-risk education team sent to eliminate a hazard or scheduled clearance may be based on inaccurate information generated by the data collector and processed by the data-management systems. The reported hazard may not be present or may be of a different type than initially reported. When the size or location of reported minefields and danger areas are incorrectly reported with insufficient details on the accident's cause, determining the follow-up actions required to address the threat is difficult.

A stated role of the Information Management System for Mine Action, currently in use by most national and international mine-action agencies, is:

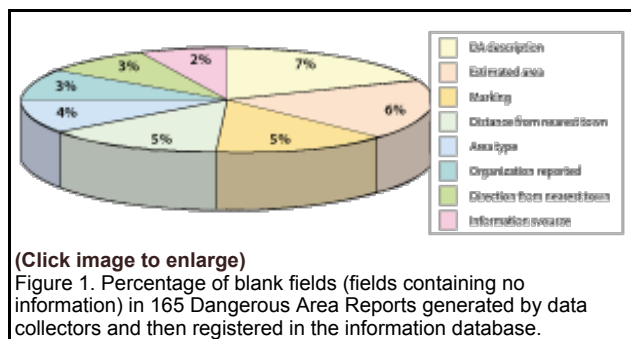
- “to help managers track the progress of their work
- to analyze and support decisions for prioritisation and more”<sup>6</sup>

Earlier versions of IMSMA allowed data managers to enter data independently from the rest of the operational cell. Issues arising from this were often further compounded by field managers sometimes paying little attention to the data quality generated in the field and entering data into the system without analysis or supervision. For field staff, the data quality only became a problem when the field managers requested data for prioritization and decision-making processes. This was usually where the errors in the data surfaced; in most cases these errors were identified too late and required allocating additional resources to resolve the problem. The field managers tended to blame the database and the data managers for the information quality or for the missing parts of it, usually ignoring that the actual, original incomplete data came from the field directly to the data managers.

Perhaps one of the most pressing problems in the way mine-action information-management systems are applied is the tendency to separate the information-management systems from the operational cell responsible for deploying mine-action teams on the ground. While in most organizations the two departments usually have the same reporting lines or chain of command (in certain cases, the information-management section is a part of the operational cell), data-entry operators and data managers are often left to make their own decisions as to the data format and the type of data analysis required for the operational deployment.

Two recurring problems can be identified in mine-action information management:

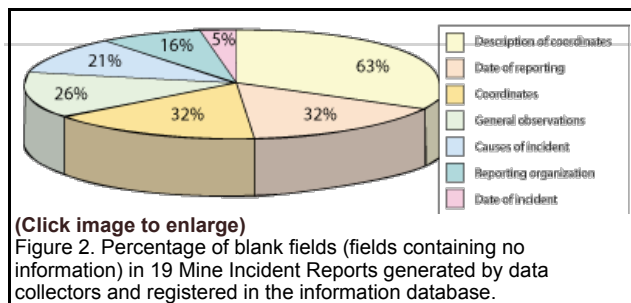
1. New hazards/threats recorded by mine-action teams are entered into a database without the data properly verified and analyzed by the data managers or the operations officers, resulting in poor quality data that fails to allow for efficient decision-making when prioritizing the deployment of mine-action teams for follow-up activities.
2. Information on mine/ERW-related accidents gets entered into a database but does not provide a sufficient amount of qualitative and quantitative data that can be efficiently used for further decision-making on the deployment of clearance or mine-risk-education teams to eliminate the hazard that may have caused the accident.



Two charts illustrate insufficient amounts of information that make it difficult for a decision-making process to identify what type of mine-clearance assets are required for deployment to the identified hazard. Figure 1 illustrates the number of fields left blank when filling in reports to register a reported dangerous area.

As seen in Figure 1, 7 percent (or 11 out of 156) of all reports entered into the database had no information describing the location of the danger, and 6 percent (10 reports) have no estimated size of the suspected hazardous area. This type of information is critical when deciding what kind of clearance team should be deployed (mechanical, mine-detection dogs, manual or a combination of clearance teams) or whether the task would involve only battle-area clearance, for example.

Analysis of the quality of data gathering and managing shows a high degree of insufficient information when it comes to recording mine/ERW incidents as well. Figure 2 shows the percentage of information fields left blank by data collectors while gathering information on mine incidents. As seen from the chart, certain missing elements of information prevent efficient allocation of either clearance or mine-risk education assets.



## Data Quality Management

Although the functions of data-management systems in mine action were considered a part of support services and frequently mistaken for what an information-technology department is to any business, mine-action information management plays an increasingly important role in the decision-making process of any mine-action operation.

Two major technology changes have recently addressed the problem of data quality management. First, the 2009 introduction of chapter 08.20 (Land Release) of IMSMA, was a paradigm shift in data-management procedures. Chapter 08.20 of IMAS points out that correct data management using trained staff and correct supervision of these staff with fully

trained supervisors are two of the essential principals of “a good survey in mine action.”<sup>7</sup>

The second shift should greatly improve the data quality management: The introduction of IMSMA<sup>New Generation</sup> makes quality management possible through the workbench and the reconciliation processes. With IMSMA<sup>NG</sup>, data initially entered into the database can only become part of the database if a supervisor validates it.<sup>6</sup> If managed and supervised as intended, the IMSMA<sup>NG</sup> is a step forward promoting quality-information management. This system mandates the involvement of the operational decision-maker and clearly integrates data quality and analysis for better mine-action planning and operation on the ground.

While new tools and guidelines are invented to facilitate the data management, the quality of data will also be dependent on the internal guidelines and quality management systems within each organization and program. Senior managers must pay attention to the way data is organized within their departments. A variety of methodologies currently exist for managers to monitor quality management. The Six Sigma methodology, for example, seeks to improve the quality of process outputs by identifying and removing the causes of defects. One of the components of Six Sigma is known as DMAIC, a system comprised of five phases:

1. **Define** the problem
2. **Measure** key aspects of the current process
3. **Analyze** the data
4. **Improve** or optimize the current process
5. **Control** and implement the future state process to ensure that any deviations from the target are corrected before they result in defects

The Six Sigma methodology emphasizes the importance of an entire organization’s participation and dedication, and even more so, the involvement of the senior and middle managers. This is not to say that mine-action managers should necessarily adopt the Six Sigma approach, but rather that it is essential that an information-management system is defined, measured, analyzed, improved and controlled in a way that adds value to the mine-action process rather than a process which misinforms and adds cost. This attitude and this process within mine action need incorporation at all levels of the entire organization.

## Summary

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The challenges that mine-action organizations face with data-management systems have contributed to the necessity of introducing the land-release chapters into IMAS and have also resulted in improved databases that allow better analysis at all levels.

If there were previous doubts as to where data management fits in mine action, IMAS 08.20 has dotted the i’s and crossed the t’s—data management is an **essential** part of mine-action **operations** and must therefore form a vital part of operational and quality-assurance departments at senior and middle- management levels from the field to the headquarters. Only then can the data be used in a manner that will ensure that mine-action operators and national centers have a full picture of the mine/ERW problem in their areas of responsibility, and are able to plan for the optimal amount of resources required to achieve their target. ↕

## Biography

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## Endnotes

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4. Collier, Paul M. *Accounting for Managers: Interpreting Accounting Information for Decision-Making*, (England: Wiley, 2009). Quality-conformance costs are costs incurred to achieve the specified standard of quality, and include prevention costs and testing or inspection costs.
5. Nonconformance cost of quality includes the costs of eliminating internal and external failures that could have been otherwise avoided.
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