

Development and Initiatives

Paving the way for flawless data exchange

by Arthur de Groof, Project officer for SIKB, and Frank Lamé, Chair, ISO/TC 190, Soil Quality

The increase in the amount of data flying around the world is nothing less than breathtaking. In 2007 alone, more unique data were created than in the previous 5 000 years!

Not too long ago, new data were produced by physically reading an instrument and jotting down the value in a logbook. When full, the logbook was stored alongside other logbooks in what could be called the database. To access the information, it was necessary to either physically go to the database, or ask a data manager to create copies of the required pages and have them sent.

These cumbersome procedures were facilitated first by automatic data loggers, and then by a rapid succession of ever-faster computers, exponentially increasing the sheer volume of data produced. As databases followed this trend, they have become larger and larger.

This is of course a great boon for anyone requiring information – as long as the data can be easily accessed. Several formats have been developed over the years to facilitate access, but in a way, digital data is just like electric current: it can pass only if the plug fits the socket. Standards play a crucial role in ensuring this viability, and as databases are continuously developing, the need for International Standards for data exchange is growing rapidly.

Halted flow

The environmental sector has matured considerably over the last four decades. One consequence is the increasing number and importance of various measurements, which has in turn resulted in a greater demand for standards.

Vast databases on soils have been developed by national and internation-



al pedological, geological, agricultural and environmental institutions. The fact that soil characteristics are determined from at least four different perspectives underlines the need to harmonize data exchange.

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Digital technology has made these databases far more accessible than before, enabling, for example, a consultant in a site characterization project to create a much better sampling plan much more quickly. More recently, fieldworkers have started directly inputting their data in handheld computers and sending the information to consultants via the Internet. Consultants in turn, send the data to laboratories online, and then download the test results.

With this working methodology, consultants, laboratory personnel and other involved parties require seamless data exchange. But more often than not, consultants can only communicate online with one or very few laboratories. A consultant's own data cannot easily be re-used by another consultant performing a second opinion or follow-up research. And then there are the challenges in aggregating data by authorities, for example in monitoring programmes. Site characterization is only one example; similar issues are encountered in many other fields.

About the authors



Arthur de Groof is Programme Secretary for SIKB, a foundation that maintains a quality assurance structure for soil quality in the Netherlands. He is

involved in projects for the further development of several quality assurance guidelines, and responsible for the further development of a format for the exchange of digital soil data.



Frank Lamé has been involved in environmental standardization since 1987, on a national, European (CEN) as well as international (ISO) level. Since

2001 he has served as Chair of ISO/TC 190, *Soil Quality*, and as Chair of CEN/TC 345, *Characterisation of Soils*, since its establishment in 2002.

Soil quality goes digital

ISO/TC 190, *Soil quality*, was created in 1985. Both the chair and secretariat are held by NEN.

The committee currently has **23** fully participating members and **33** observers, working on soil quality in six subcommittees. In addition, **11** international organizations are in liaison.

The future standard discussed in this article is being developed by a working group of subcommittee **1 (ISO/TC 190/SC 1/WG 3, Evaluation of criteria, terminology and codification)**.

The chair and secretariat of **ISO/TC 190/SC 1 and WG 3** are held by the French standardization body and ISO member, AFNOR. The subcommittee currently has **17** fully participating members and **12** observers.

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Technology is here

For some years now, the Netherlands has maintained a national quality assurance structure for all critical activities in site characterization and remediation. Within this structure, amidst certification and accreditation schemes for fieldwork, analyses and more, there is a digital format (in the XML programming language) for the exchange of digital data. This format is being developed and expanded continuously to keep up with new market demands and technological developments.

The keeper of the format, the Foundation Infrastructure for Quality Assurance of Soil Management (SIKB), faced the challenges described above. In consultation with the Netherlands' standardization body and ISO member, NEN, the parties involved concluded that the technology required to meet these challenges is all either available or under development. Together, SIKB and NEN decided to launch a proposal for a new ISO standard.

Grounding solutions

The result is a new standard on recording and exchange of soil-related data, currently being developed by ISO/TC 190/SC 1, *Evaluation of criteria, terminology and codification*. The committee's draft version will be released during the second quarter of 2009, for discussion in November of this year. According to the current timetable, the new standard could be available in 2011.

The information given in the standard should provide the context for the presentation of results of a site characterization, including analyses undertaken on soil samples.

To ensure “that all plugs fit all sockets” so that data can be accessed by all, the standard defines the information that could be included in any site investigation report. Where considered useful, the standard provides guidelines to the encoding of data, in most cases by referring to other International Standards, for example ISO 25177:2008, *Soil quality – Field soil description*.

Anyone using software that follows these formats and guidelines should be able to rely upon a flawless data transfer,

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without needing to know about the technology behind it. Still, soil contamination experts will want to be in charge of their own data. Therefore, the new standard will also describe the way soil contamination descriptions can be placed, referred to and recognized in the data format or in data sets encoded according to the new standard. The subcommittee aims to optimize flexibility, as well as to provide for the need to handle geographical features.

With the new International Standard on recording and exchange of soil-related data, ISO will be providing a sound and yet flexible basis for the seamless transfer of digital soil data, including geographical features. It should be worthwhile to discuss the applicability of the same principles in other sectors.

Integrated national structure for quality assurance

Over the past decade, the Netherlands has developed an integrated structure for quality assurance of all critical activities in site characterization and remediation.

Critical activities have been defined as those activities having a decisive influence on results at the end of the chain, for example sampling, chemical analysis and site remediation. Crucial to the structure is the fact that both public and private parties play a role.

The national authorities have laid down the rule that any critical activity in site characterization and remediation can only be performed by licensed organizations. Such licenses can be obtained only by organizations which are certified or accredited to perform the critical activity. Most documents describing the requirements for performance of the activity are maintained by SIKB, a foundation in which both the public and the private parties concerned participate (www.sikb.nl). For the technical requirements, these documents most often refer to standards maintained by NEN. ■