Harmonisation of Spatial Information on Utilities in the Netherlands

Aegidius KAP, The Netherlands

Key words: Spatial information, Utilities, technical aspects, legal spects, harmonisation

SUMMARY

In the Netherlands the availability of geographic information on cables and pipelines has long been an issue that had little attention. Recently two events have brought the subject into attention again.

The Netherlands Centre for Underground Construction issued a report on the risks of the poor availability of information on cables and pipelines. The national politics reacted on this report. One of the main concerns mentioned was the economical damage caused by excavation activities.

The Supreme Court of the Netherlands ruled that telecom cables should be considered as immovable property, which will influence the way these cables are dealt with in taxation and registration within the Cadastre.

This paper will describe the current situation in the Netherlands, and will distinguish steps that have to be taken to reach a harmonised approach towards the registration and interoperability of cables and pipelines.

Since technical, legal and organisational issues will interact with each other, this paper will distinguish several objectives for the registration of cables and pipelines.

The description of the situation in the Netherlands will be used to illustrate the interaction between the various objectives and between the technical, legal and organisational issues.

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1. INTRODUCTION

In the Netherlands the availability of geographic information on cables and pipelines has long been an issue that had little attention. Recently two events have brought the subject into attention again.
The Netherlands Centre for Underground Construction issued a report on the risks of the poor availability of information on cables and pipelines (COB 2003). The national politics reacted on this report. One of the main concerns was the economic damage caused by excavation activities.
Further, the Supreme Court of the Netherlands ruled that telecom cables should be considered as immovable property, which will influence the way these cables are dealt with in taxation and the registration within the Cadastre.
This creates a situation where there are both technical (excavation damage) and legal (cables as immovable goods) problems to be solved, working towards a solution being the most optimal system for registration of cables and pipelines.
This paper will use the situation in the Netherlands as an example to underline the necessity for a multi-disciplinary approach, where technical, legal and organisational issues are combined.

2. OBJECTIVES OF REGISTRATION

When considering the registration of cable and pipeline information we will have to consider the objectives of a registration. Five possible objectives for registering can be considered.
- Internal maintenance
- Disaster management
- Excavation Damage
- Liability for Damage
- Legal Security

These objectives cannot be seen separately, they all relate to the same real world phenomenon, the cable or pipeline, but each objective will focus on another aspect of this phenomenon, as there are for example the legal status or the geometry.
The challenge will be to find a combined solution that provides the best fit to all the objectives and that integrates technical, legal and organisational aspects.
In this paper the general idea will be described. To investigate the subject thoroughly one will have to perform an extensive research using information analysis techniques, which will result in a more comprehensive system model.

2.1 Internal maintenance

Utility companies keep information to operate and control their internal processes. The main process is the distribution of products, like water or electricity. They need to know the capacity of their cables or pipelines; how the cables or pipelines connect to each other and to the houses of the consumers. Generally no information exchange will take place with respect to this objective, moreover, for reasons of security and competition, some part of the information are preferred to be secluded.
The information maintained with respect to this objective will be mainly topological.
Internally the topological structure of the cables and pipelines must be known and the kind of connectors. The capacity of the cables or pipelines can be seen as an attribute.
Externally the relation to the customer can also be regarded as purely a topological relation. The addresses will have coordinates, but no high demands are set to the geometrical quality on this subject.
The information exchange will work by pre-designed processes and protocols.

A recent development that may influence the subject of internal maintenance is the liberalisation of the energy market.
In 2003 two EU Directives were issued concerning common rules for the internal market in electricity and natural gas. (EU 2003) As an effect of these directives the energy market in the Netherlands is being liberalised, a process that went into effect during 2004 and 2005. As a result of these regulations utility companies cannot operate as one body any longer, but have to be separated into a network operator and an energy supplier, giving the customers a free choice of energy supplier.
In this early stage of the process of liberalisation it is hard to draw any conclusion on how this liberalisation of the market and the separation of network operation and energy supply will influence the management of geo-information with respect to cables and pipelines.
For this article we will consider the utility company as one body with their internal geo-information processes, where in the future a division will lead to inter-organisational information exchange. Further research will be required to study the influences of the organisational changes on the exchange of geo-information.
Also on the issue of liability for excavation damage the new configuration of executive bodies will need further investigation, to study whether and how the new situation affects these processes.

2.2 Disaster management

In case of disaster rescue services must have immediate access to information on the pipelines and their surroundings, likes buildings that should be evacuated or risk increasing chemical plants or fuel storages. The nature of this is objective is small-scale; The data need can generally be satisfied with scales 1:10.000. An important point is response time and actuality of the data.
In the Netherlands the Ministry of the Interior issued a model that is used as a uniform risk map, and which is implemented and maintained by the provinces (See figure 1 (Friesland 2005)).

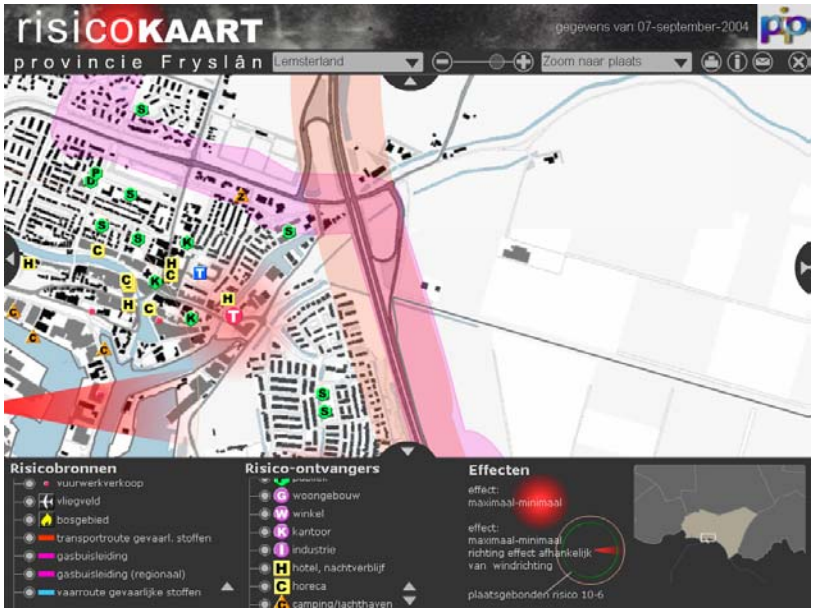

Figure 1 Risk Map in the Province of Fryslan

2.3 Excavation damage

The need for reliable information is high. Damaging a cable can have a high impact, not only for the disaster risk, but also in the sense of economical damage.
The nature of the data is large-scale, especially in builded area. The main issue at this point is data quality. Geometric quality is important, as is accuracy and reliability. Furthermore we will have to look at availability and accessibility.
The issue of data quality applies to both the cable and pipeline geometry data and the reference data like a large-scale base map. Furthermore we will have to look at data quality as part of the whole geo-information prosess.

2.4 Liability for damage

Closely related with the previous item, but here also legal aspects have to be taken into account. The question here is how the quality of the data influences the liability for the caused damage. Can an excavator still been held responsible if the network operator delivers bad quality data?

2.5 Legal security

Since the Supreme Court proclaimed the telecom cables as to be immovable goods, this also raises questions to how utilities in general should be treated. Since the registration of rights on immovable goods is done within the Dutch Cadastre. The Cadastre also plays a role in the production of the large-scale base map. In earlier days these facts provided arguments to incorporate a centralised registration within the Cadastre. Technical developments from the recent years have opened ways to other organisational solutions.

2.6 Multi-objective approach

The main concern triggering the discussion about the registration of cables and pipelines lies in the economic damage that is caused by excavation activities, and the possible disaster risks that are connected to excavation in the complexity of the underground. It will not be denied that an improvement of the geometric registration of cables and pipelines will lower the risks and limit the economic damage, but one must not look at the registration of cables and pipelines as only a technical problem of surveyors and data storage and accessibility.

This paper will discuss the current situation in the Netherlands, and will distinguish the steps that have to been taken towards a harmonized approach for the registration and interoperability of spatial information on cables and pipelines.
This paper will not give the final solution, but it will provide means to facilitate policy decisions on technical, legal and organizational issues. Also will this paper not be a comprehensive description of all the issues involved. The issues mentioned are used as examples to illustrate the interaction between technical, legal and organisational issues.

3. TECHNICAL, LEGAL AND ORGANISATIONAL ISSUES

New technological developments will open up possibilities for organisational solutions. Open access technologies will facilitate models other than a centralised registration. On the other hand, legal issues will ask for organisational and technical solutions. This chapter will illustrate the interaction between these issues.

3.1 Legal issues

Considering the registration of cables and pipelines for legal security one has to distinguish between the rights on the ground parcels in which the cable or pipeline lies, and the rights on the cable or pipeline itself. To describe the current situation we will describe the situation of registration of rights as it is maintained in the Dutch Cadastre.

3.1.1 Rights on ground parcels

In the current situation within the Dutch Cadastre there is no explicit registration of cables and pipelines. Within the cadastral registration cables and pipelines can only be recognised as restriction on rights on ground parcels, for example a right of superficies.
A parcel can stretch out over a large area, and when a right restriction is placed on such a parcel, it is not possible to identify whether the cable lies under a smaller or larger part of the parcel, since the geometry of the cable or pipeline is not registered. When a parcel is divided it often happens that both new parcels will carry the right restriction, when most likely the cable will only lie under one of them. The availability of the geometry of the cables and pipelines could have an added value.
Since the judgement of the Dutch Supreme Court telecom networks are considered as immovable goods. For the registration purposes it is now possible to attach a drawing of the network to the deed. A solution that needs further working out.

3.1.2 Rights on cables, pipelines and networks

The judgement of the Supreme Court ruling that telecom cables are immovable goods sets demands for the way that the rights on cables and pipelines are registered. The Cadastre in the Netherlands registers all immovable goods, and was now faced with a new task. The solution with the attachment of the drawing solves the situation for the Dutch Cadastral system, which is a registration of deeds. With the registration of the deed the legal security for the rights on the cable are guaranteed.

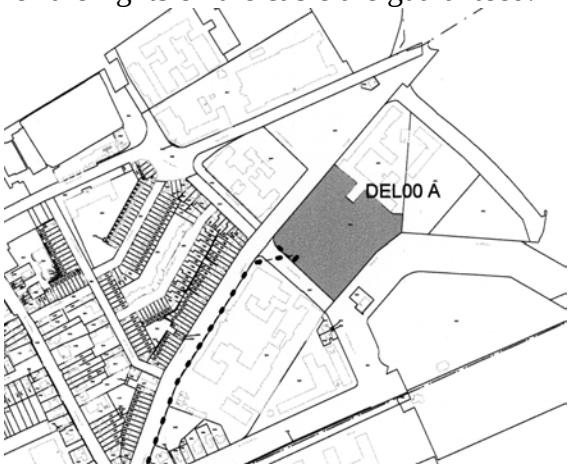

Figure 2 Cable on a drawing as attached to a cadastral deed

Access to the geometrical aspects of the cable and pipeline information will however have an added value.

3.1.3 Vertical accession versus horizontal accession

According to Dutch Law the basic rule of accession is that buildings and other constructions that are permanently fixed to the land are part of that land. Consequently structures under or above that are permanently fixed are owned by the owner of the land, unless other rights or restrictions have been established on the surface parcel. (Vertical accession)
Vertical accession applies *unless* the construction is part of another property. This can be the case when a cellar extends under the house of the neighbour. (Horizontal accession)

3.1.4 Three-dimensional Cadastre

The rule of horizontal accession could be applied to a network that is connected to one or more parcels owned by the same person or company that holds the (economic) ownership of the network, in this way the right on the cable could be defined.
A next step could be to see the networks as separate legal entities, without a necessary connection to a ground parcel. Since the whole structure of the Dutch Cadastre is based on a two-dimensional design, where ground parcels covers the territory of the Netherlands, the possibility to extend to a three-dimensional situation needs a redesign of the system, both technical and legal. (Stoter 2004)

3.2 Organisational issues

3.2.1 Centralised or decentralised registration

In the beginning of the 70's the need for an adequate registration of cables and pipelines was felt already. The Ministry of Finance initiated a working group, which resulted in a law proposal for Cable and pipeline registration.
At the same time the cable operators organised themselves with the help of so called KLIC's, Cable and Pipeline Information Centres. The KLIC's serve as a portal between excavators and cable operators. (KLIC 2005)
In 1986 the law proposal was withdrawn after pressure from the cable operators, and referring to the self-regulation of the KLIC's.

3.2.2 Self-regulation or central control

The KLIC's in the Netherlands play an important role in the prevention of excavation damage to cables and pipelines. The vast majority of cable operators are taking part in KLIC. However, due to the self-regulation, there is no legal obligation to take part in the KLIC. An excavator inquiring the KLIC does not have the certainty that the list of cable operators is complete.
And there is also no obligation for an excavator to inquire with the KLIC. Jurisprudence has provided precedents in cases where damage was caused without prior investigation. It was judged that no necessary caution was taken and the liability was laid to the excavator.

3.3 Technical issues

3.3.1 Quality of the information

Although the system of KLIC increases the accessibility of the information, the quality of the information stays a crucial factor. Various error sources can be distinguished.
Especially in the soil of the Netherlands the cables can move with respect to the place where they were laid. The procedures of surveying cables and pipelines are not uniformly.
Also the reference system can be an error source. If a cable is surveyed with reference to topography, one has to be aware of changes in the reference maps.

Another source of error is the diversity of map material. Every cable operator uses his own system, resulting in maps with different symbols, colours, and scales.

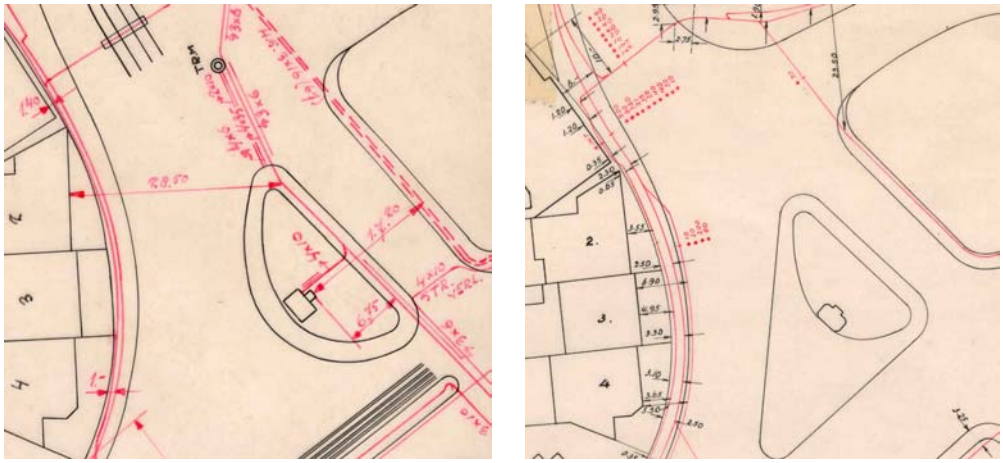

Figure 3 Telecom and electricity with a different reference

3.3.2 Interoperability

For many of the issues there lies a solution in the advancement of ICT-developments.
The maintenance of the information can remain with the cable operator, and using open access technologies the information can be shared. Steps are being taking towards the development of online-access to cable and pipeline information.
This shifts the issue of centralisation of the registration as it was discussed in the 70's and 80's towards the issues of coordination of the developments.
The development of open standards for the cable and pipeline information is picked up by the sector. Besides that, the large-scale base map of the Netherlands is also available for online inquiry.
The use of open access will facilitate the enquiry and querying of the information. It will be possible to visualise cables and pipelines of multiple operators in one view, without or with limited delay. It will certainly be a step forward, but it will also expose the problems with the quality of the data.

Open access to cable information also opens the possibility to connect the cadastral registration to the geometry of the cables and pipelines. The cadastre can register the legal situation without having to register the geometry. The design of such a system and the legal consequences need further research.

The interoperability of cable and pipeline information cannot be seen separately from the interoperability of the reference data. Online access to the large-scale base map will be a step forward, but the reference frame of the existing data does not always comply with the existing large-scale base map of the current date. Here also the quality of the data will be the crucial factor.
For reasons of liability it will be necessary to set up a legal framework. The extensiveness of the framework needs further research, but an obligation to take part in KLIC or its successor must be part of it.

3.3.3 Awareness of data quality

The quality of the data will always remain divers for various reasons. The use of metadata will help the communication between cable operator and excavator, also in the case of occurring damage and the discussion for liability. If the cable operator only has old data available with a low accuracy, the excavator will have to take more precaution than when recent high quality data is available.
The availability of metadata also facilitates the discussion of the division of liability between the operator and the excavator.

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Legislation

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Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas

BIOGRAPHICAL NOTES

Aegidius Kap graduated at the Department of Geodesy of the Delft University of Technology in 1993. After working at the Dutch Cadastre he returned to the University in 1999 to work as an assistant professor.
He is focusing his research on the availability and accessibility of geo-information.

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