

# **The Underground Cadastre and Its Implementations in Turkey**

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**Key words:** Underground Cadastre, Infrastructure utilities, Infrastructure Information System

## **SUMMARY**

Planning the infrastructures facilities which have urban life and development level parameters and their applications on the ground are the most important duties of the city managers. These infrastructure facilities are water, sewerage, natural gas, electricity, telecommunication, metro and tunnel. There is spatial data need for these infrastructures which satisfies desired precision criteria as it is demanded all of the engineering constructions. First of all, the relationship with the properties should be identified very clearly for determining the optimum infrastructure routes. Thus, there is a need for an information system which has related to the properties questions such as; what, where, how much, who is the owner, what its geological situation, what kind of plant cover and engineering buildings has on it? When looking from this perspective there are some issues with these infrastructure facilities on the phases of planning and application in Turkey. Due to these problems, there are property cases encountered mostly on where the infrastructure facilities had been established. The basic problem is lying on the data infrastructure which does not satisfy the demanded standards for the needs of an optimal planning. In order to overcome these problems the “purpose” part of cadastre law was changed in the year 2005. By this change, the subject that the data base of spatial information systems are to carry out by cadastre works was added to the cadastre law. In this point of view, an information system model can be designed by adding infrastructure facilities data into the scope of spatial information. However, in the scope of parcel based information systems, the content and the scope of infrastructure facilities should be defined. The data acquired by infrastructure cadastre should be identified with the standards. In this paper, the questions of what are the infrastructure facilities, how the relationships between land properties and the infrastructure facilities are examined in order to fit underground cadastral concept into the current Turkish Cadastral system.

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## **1. INTRODUCTION**

The urban population has gradually increased because of the immigration from rural area to urban area in our country. As a result of this urban areas are enlarging. And then new urban areas and settlements have occurred near the urban boundaries. If the municipalities do not keep these areas under control, they can be faced with a lot of problems on urbanization. In additions to these problems there have been current infrastructures problems on cities as lack of infrastructure data on national wide coordinate system with demanded standard. So the urbanization problem and management the cities have gotten hard day by day. Furthermore, the property problems faced on determining the optimum line of infrastructures establishments are gotten hard for implementation the engineering projects. In conclusion, related countries with natural gas and petroleum have affected negatively for implementation the projects on infrastructure establishments because of the problems stated above. As these establishments have global dimension. Therefore, establishing the infrastructure information system have four dimension data about where the infrastructure establishments were passed or will be passed (X,Y,Z and parcel owner) has become very important. Thus economically, efficiently and applicability are provided for sustainable land use politics and determining the optimum infrastructure establishments line.

## **2. URBAN INFRASTRUCTURE**

The establishments in urban areas that are the outcomes of technology namely electricity, telephone, water and gas supplies are inevitable components of urban life, presents healthiness, easiness and welfare to human life named as underground establishments or infrastructures. Proportionate with the prosperity and technological enhancements the amount and the types of infrastructures are increasing. In the current agenda, central heating pipelines, underground transportation systems, metros, tunnels, radio, television and computer networks, underground cables, petrol and gas pipelines, traffic and lighting signs, underground shops should be added to the existing infrastructures (DPT, 2005). In this context, urban infrastructures can be classified as shown in Fig. 1.

**Table 1.** Urban infrastructures and their types

<b>Urban Infrastructures</b>	<b>Types</b>
<b>Ways</b>	Boulevards, avenues, streets, public squares, bridges, metros, tunnels, teleferics.
<b>Water infrastructures</b>	Drink and usage water, water warehouses, extinguish systems
<b>Waste infrastructures</b>	Sewer systems, rain water canals, substance waste accumulation centers
<b>Electricity infrastructures</b>	Electrification, lighting, traffic, signalization, advertisement panels
<b>Communication infrastructures</b>	Telecommunication infrastructures, base stations, TV cables, internet cables.
<b>Gas</b>	Gas infrastructures
<b>Pipelines</b>	Petrol pipelines, gas pipelines, clean water pipelines
<b>Traffic infrastructures</b>	Bus stops, tramways, teleferic constructions, underground and surface parking areas.
<b>Historical infrastructures</b>	Old underground markets, underground ways, cisterns, water transmitting canals, water bridges.
<b>Underground markets and other residence</b>	Underground closed markets, metro and passing bazaars, shelters.
<b>Natural infrastructures</b>	Caverns
<b>The other...</b>	...

### **3. THE RELATIONSHIP BETWEEN URBAN INFRASTRUCTURES AND OWNERSHIP IN TURKEY**

Infrastructures are not included in the class of real properties determined by the Civil Law (CL) 704th Article. Cadastre works do not concern about the real properties which are not subject about ownership, not registered and not plotted in the Cadastre maps. For that reason, it is not assumed that surveying and plotting of infrastructures irrelevant with cadastre works. The pipelines which are on ways, public squares and children playgrounds etc are surveyed if they are needed. Since these real properties are not registered and managed by state. The relation between infrastructures between register, occurs when they are constructed on the registered real properties. Nationalization or access right can be established when the construction of the infrastructure is on the private or artificial persons' real properties (CL, Article. 727; 744) (Tüdeş and Bıyık, 1994).

Infrastructures can be constructed on open public places (ways, public squares, parks, children playgrounds etc), on public terrains, on treasure terrains, on the real properties of private and artificial persons. Constructions can be on the surface, above the surface and beneath the surface.

As to Civil Law the owner of the real property owns the surface, above, beneath, products and separateness parts of it. This ownership is only to be restricted by special laws. Thus, access right has to be registered when an infrastructure constructed on it according to the Law (Karataş, Bıyık and Demir, 2005).

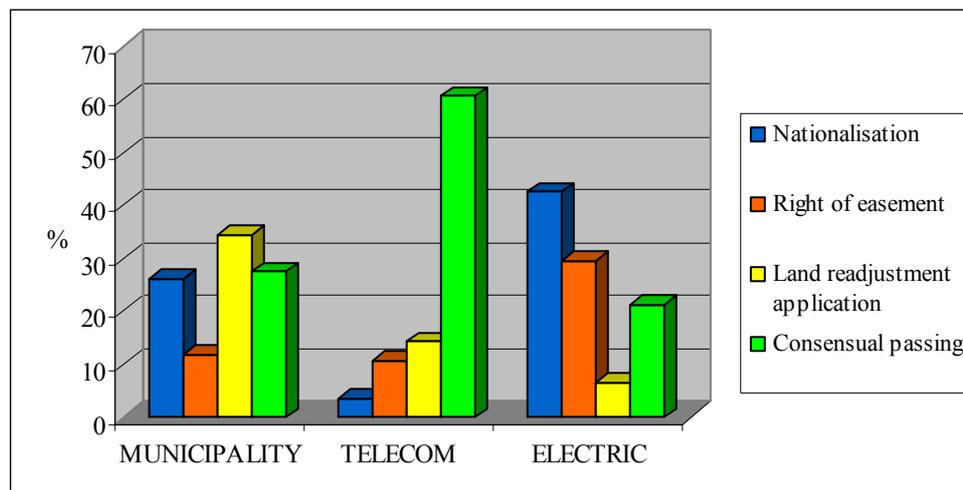
These access rights are;

- Channel right
- Construction right

- Passing right
- Registered as spring right on register (Dörtgöz, 1996).

#### 4. THE METHODS USED IN HOLDING THE PROPERTY OF INFRASTRUCTURE FACILITIES

An inquiry has been done to people living in cities in 65 city centre in 2005 to determine problems of experience and association's works in associations (Municipality, Telecom and Electric Company) getting public utility. In this inquiry study, the responses of public utility to question to be asked about which method they solve possession problems has been showed in Figure 1. Here, it has been understand that municipalities which are public utility solve possession problems by means of land readjustment application and nationalization. According to concerning subjects (Article13,14) of 406 numbered Telegraph and Telephone Law. It has been expressed that Turk Telecom which is authority to carry every kind telecommunication services out and to operate telecommunication underground in Turkey has been solved with more consensual passing and Electric Company which is authority to be transported electric energy to subscriptions has been solved with nationalization and right of easement.



**Figure 1:** Dispersion of Possession Registrations according to The Methods About Infrastructure Facilities

#### 4.1. Layout Standards at Technical Infrastructure

A few of the infrastructure installations usually use the same under road jointly. Therefore at the time of construction, maintenance and reparation of them for not to damage each other and to utilize the land more optimum they must be placed orderly (Tüdeş and Bıyık, 1994). For this purpose, since to determine the place and location all of the installations to be placed underground, a Turkish Standard called “The Principles of Planning and Lay - Out of Underground Related Surface Installations on Urban Roads” was prepared by Turkish Standards Institution in February 1975. Then a new Standard called “City Roads -

Underground Technical, Installation Requirements for Planning and Lay-Out” was accepted in February 1993. But most of the current installations in our country are not appropriate to these standards.

#### **4.2. Coordination of Urban Technical Infrastructure Facilities in Turkey**

According to Law on Metropolitan Municipality Management which was appeared in Official Gazette with law no 3030 in our country on 09.07.1984, infrastructure coordination centers were established to provide coordination of infrastructure services in Metropolitan Municipality (Article 7.). Metropolitan Municipality Law with law no 5216 was come into force on 23.07.2004. The Infrastructure Coordination Centers was take part in this law with this expression “Under the chairmanship of mayor or the person whom the mayor nominated, the underground coordinate center is established with representatives of public bodies or organizations and private establishments which will be determined with regulations (Article 8.).

This center is present in 16 metropolitan municipalities, but not the others. Hereabouts associations serving underground services behave independent in planning and construction workings.

Coordination centers do not perform adequately its tasks and responsibilities indicated in the body of current law. Only underground investment accounts of İstanbul Metropolitan Municipality and Kocaeli Metropolitan Municipality of the 16 metropolis municipalities are active in Infrastructure Coordination Center called AYKOME. It began to work at Kocaeli Metropolis Municipality in 2005.

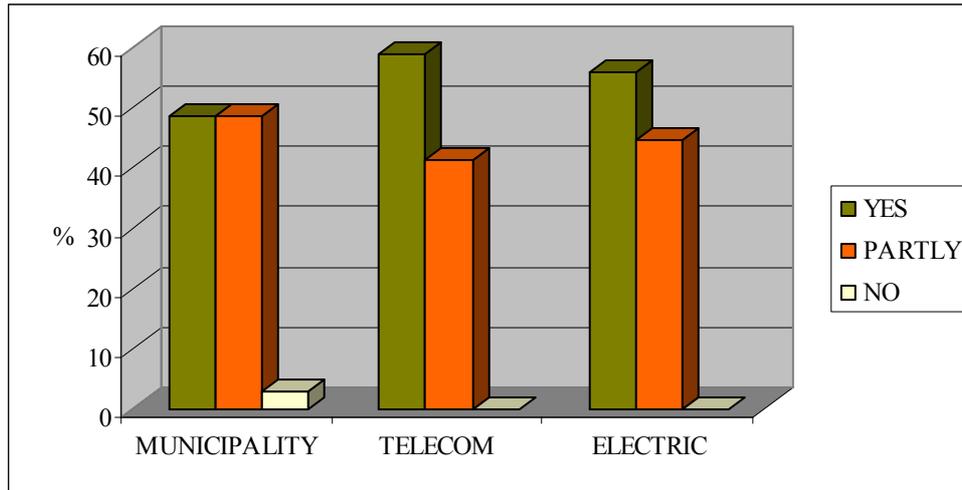
#### **5. THE PRESENT STATE OF THE INFRASTRUCTURAL DATA IN TURKEY, PROBLEMS, AND THE NEED FOR AN INFORMATION SYSTEM**

There are many reasons for the dependence to the persons in determination of the infrastructural facilities that can be sorted as follow:

- Location information and the bases regarding the current infrastructural facilities are not in appropriate standards. Location information of the infrastructural facilities were formed by unreliable survey sketches that are free from coordinate information.
- The survey sketches lost their applicability to the field because of the outdated infrastructure facilities.

On account of these problems, there is not reliable, applicable, and current location information concerning infrastructural facilities in Turkey.

Figure 2 below indicates the answers of the question “Is there any possibility to apply the bases of the infrastructure institutions to the field?” which is asked to the institutions related with infrastructure. It has been seen that the maps or plans present at the infrastructure institutions are not applicable to the field with a percentage of 50%.



**Figure 2.** The applicability possibilities of the maps and plans regarding infrastructure facilities

Since the location information of the infrastructure facilities is not in appropriate standards or insufficient, many problems exist in the maintenance and restitution of the present infrastructural facilities, and also in planning and applying the new ones. However, constructive progressions are occurring in order to settle these problems in Turkey. The institutionalization studies oriented to infrastructural facilities have picked up speed, especially in recent years. Some of the institutions necessitate the preparation of new projects to be in national 3-Dimensional coordinate system. The reasons for that are as follow:

- Governing the cities with usual methods became impracticable.
- Forming the fundamental bases of the infrastructure information system which is indispensable for giving decision more accurately and quickly.

At this point, the most crucial problem is the insufficiency in the data quality of the present infrastructural facilities. Therefore, it is necessary to form the standards of the present data, to gather the 3-D location information of the infrastructural facilities, and to establish the infrastructure information system. In the 8<sup>th</sup> Five-Year Development Plan, Land Registry, Cadastre, Geographical Information and Remote Sensing Systems Personal Specialization Report that includes the period 2001-2005, it has been determined as policy goal to start the production of the infrastructure maps, to define the standards regarding the infrastructural facilities, and then to adapt the produces information to the cadastre information system (DPT, 2001). Moreover, in cadastral studies forming the bases of the location-based information systems that must be convenient for the Cadastre Law initiated the information system requirement for the infrastructural facilities.

## CONCLUSION AND SUGGESTIONS

It must be a lawful necessity that as-built plans showing final condition of installations which they make in has been done in accordance with map standards from association and foundation authorizing to set up and arrange technical infrastructure installation.

Determining graphic, attribute and notation standards with cooperation of related to associations and foundations the associations are generated data from this aspect. While new infrastructure installation is being done in cities, other infrastructure installations appearing by digging of streets and avenues, by determining with measured by a unit established with supporting of relevant association technical support, This important matter can be solved possibly.

On the passing routes of infrastructure installations related to ownership has been faced with intensive problems. In which a case, because of moving this problems to judicial and managerial judgment projects and investments are delayed. Formed of ownership bases with three-dimensions related to passing of infrastructure installations within the context of infrastructure information systems, and determining of optimum passing routes depending on this situation will solve substantial portion of ownership problems. Furthermore, to use restrictions bringing ownership rights by infrastructure installations, permanent right of easement is formed or direct ownership compensation are made.

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