

# Utility Accommodation

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Present and future demands by the American public call for more sophisticated and higher capacity methods for carrying the products and services provided by the various types of utilities.

With the increase in demand for these products and services a corresponding decrease in the amount of private land for utility right-of-way is becoming economically and sometimes environmentally unobtainable. As a result public street and highway right-of-way has become a very desirable option in the placement of utility lines.

However, since right-of-way for streets and highways has been and is being acquired primarily for the use of the traveling public, the problem of sufficient space and accommodation is paramount. Not only is there a possible conflict between transportation and utility facilities but also there is the possible conflict between the various types of utilities within the limited available space. The number and different types of utilities found in most street and highway rights-of-way make coordination difficult. To cope with these problems, a well planned utility accommodation system must recognize and make provisions for planning, coordination, permits, inspection, location and utility construction and traffic.

## Planning

In most cities there are at least eight different types of utility facilities which are normally placed in street right-of-way. These include electric power, telephone,

gas, sanitary sewer, water, traffic light circuits and street light circuits. Except for traffic and street lights all of the preceding may involve both distribution and transmission lines.

While highway right-of-way usually involves more lateral area the same problems may be encountered as those within cities. However, the difference with street right-of-way where other facilities may be allowed to be placed longitudinally under paved areas, most highway organizations prefer placement outside the pavement. This policy tends to congest each side of the highway and where a highway facility is access controlled the problem becomes more acute.

Accordingly, some type of planning is very important. Unfortunately, past history shows very little planning for utility and transportation accommodation. Most communities were not planned, they just grew and are a result of individuals with private goals and objectives. The growing patterns of most large American cities pre-date the telephone, electric power supply, street lighting and other utilities common to the modern urban area. Public water supply, sewer systems and drainage systems were the first utilities to be installed in most cities. These were usually operated by the municipalities involved. Electric power supply, telephone and telegraph systems followed which were usually private or investor-owned services. The latter services were most often granted franchises to operate within the cities and although encumbered by some

restrictions were left to plan and develop systems as private enterprises.

City planning as done today did not become a function until the very recent past and by that time the damage was done. Urban areas were not prepared to accommodate unplanned traffic and complex utility services in the narrow street rights-of-way. Certainly little consideration was given to environment, conservation or aesthetics. As the automobile became more available to the American public the need for connecting highway arteries between cities was apparent. Highways were constructed and while most privately owned utilities were placed alongside the highway on their own right-of-way, some municipally-owned facilities, especially in or near urban areas, were placed within the highway right-of-way. Probably, governmental highway organizations were somewhat better prepared to deal with the problems of planning and accommodation for transportation and utilities. Such organizations were usually larger and were generally not faced with the unplanned placement of utilities as was the case for cities. However, the planning of early highways did not anticipate utility problems.

Today's streets and highways are better planned as to accommodation, although a number of different agencies and departments are involved in utility regulation, planning and the control process. Each of the regulatory agencies and each utility service agency (privately or publicly-owned) has its own clientele to serve,

its own interests to protect and its own policy relative to utility accommodation. Measures designed to optimize objectives of one often conflict with others.

The future presents challenges to planners to recognize needs and to anticipate demands for transportation and utilities. The problems related to accommodation, economics, environment and aesthetics must be considered.

### **Coordination**

Because of the different ownerships and control arrangements it seems advisable to develop methods for providing a better perspective toward the problems and to implement compromise in the broadest possible public interest. One method to alleviate these problems is to establish utility coordinating committees. Such committees composed of representatives of privately-owned utility companies, governmental utility agencies, regulating bodies and other interested groups have been formed in many communities. These committees have been voluntarily formed to coordinate their utility location problems for the mutual benefit of the parties concerned. In most cases they are organized on an informal basis and must be on call when the need arises. They serve as a focal point for the exchange of information and communication with the concerned parties.

Although utility coordinating committees can be effective for the sake of coordination, in most cases they do not have the authority to determine public policies and plans which bear directly on the utility accommodation process, but they may be able to focus attention on planning problems. They can be especially effective when thoroughfare plans are being made. In numerous cases where no coordinating committee is operating only the problem concerned with the process of moving automobiles is considered. Right-of-way widths are set to accommodate traffic, parking lanes and sidewalks. Utilities are fitted into available space. In practice, utility considerations are almost ignored in the planning process and utilities are definitely subordinated to other interests. But with a coordinating commit-

tee functioning properly a better understanding of the needs to be developed between the city and utility planning processes can be a result.

On a regional statewide level, coordinating or liaison committees are faced with some of the same problems encountered within cities. In most cases these committees are called on to develop plans or methods to deal with highways. And since a larger area is involved, a statewide governmental agency rather than a local entity is usually the regulatory body as concerns utility policies. In the main, a more consistent policy is a result. Utility accommodation planning for highways should begin at the time a particular route is being considered. Once routing is established, individual utilities may be apprised of the necessary relocations and/or locations for new facilities that are to be followed so as to reduce possible conflict with highway construction. Maintenance considerations for both transportation and utility facilities should also be considered in utility locations. Locations must be selected to minimize traffic hazards and the possible hazard to utility maintenance crews from traffic.

Coordinating committees for the most part are concerned with planning where both route right-of-way and utility placement are on new locations and usually are not concerned with repair and excavation of existing underground facilities. Therefore, these problems, in urban areas especially, tend to create hazards. These hazards include not only actual striking of structures, but secondary effects on them by weakening their foundations and surrounding supporting soil.

One solution to the damage problem caused by digging would be a dependable record of all underground utilities in the form of a master map or master cross-reference record. Such records could be consulted whenever an application is received for digging and the impact of such work could be checked as it will affect other in-place facilities. While this concept is commendable, the accuracy and dependability in some cases are questionable.

In the absence of good records the

problem of protecting the underground against digging damage must be handled by consulting the individual utility companies and getting clearance from each. To overcome this problem many utilities have set up various forms of one-call or call-before/you dig systems. These systems vary from each utility on its own system to unified one-number call arrangements. In the latter case a single clearing house is maintained and subsidized and the master or central unit then informs all involved utilities of proposed right-of-way work. Each may then stake or give information directly to the excavator. The manner in which a system functions and its effectiveness may vary, but the concept is an example of coordination by the various utilities in their concern in the safety of underground facilities.

### **Permits**

All utility facilities must have some form of governmental authorization to use space in, on and over right-of-way of public streets, highways, lanes or other public areas. This authorization is given by various types of statutes, ordinances or resolutions granted by various levels of government.

Almost all municipal governments regulate the use of public streets and roads by utilities. In areas outside of the corporate limits of communities, and even in roads which are routed within cities and over which the municipality has no authority, the use of such rights-of-way for utility locations is regulated by towns, counties, State or Federal government agencies.

Regulating powers should be vested in the most appropriate local governmental agency if they are to be effectively administered. Assignment of this function is usually detailed to the city engineer or other engineering officials. The official most closely involved in roads and streets work usually becomes the permit-issuing entity in the city government. In the case of county, state, and Federal right-of-way the assignment of permit issuance and other control and regulating measures is made to the highway agency.

Municipal agencies, upon receipt of applications for service work in rights-of-way

usually distinguish between publicly owned and privately owned utilities. Similarly, a distinction is made between work involving new installations, relocations and major improvements, and work involving emergencies due to failures or damages and work that is necessary to preserve the safety and operation of public services. For work other than emergencies, most cities and suburban communities require privately owned utilities to obtain a permit prior to construction work in the right-of-way. For emergency jobs, the filing of a permit is delayed until repair work is completed.

The regulation of privately-owned utilities in cities or communities generally does not apply to the publicly owned utilities in the matter of record keeping and location systems. This results in the loss of dependable data on which to base future street and/or utility construction.

Control or regulating agencies on the county, state or federal level usually require all utilities, both publicly and privately owned, to obtain permits. This is because of the fact that these agencies do not generally provide their own utility services.

Applications and permits take a variety of forms. They may be numbered to preserve continuity of records and they may involve a standard form. In some cases applications are submitted in the form of individual letters from utilities on their own letterheads. However, a standard form has the advantage of providing a means for formally advising the applicant of the conditions under which the proposed project must be performed. These conditions can cover the time required for work, barricading, methods for backfilling, where applicable, resurfacing pavement cuts, and the limitations to be imposed because of traffic. Legal authority and conditions may also be included.

A good permit system provides a method of recording for all right-of-way utility work. A complete record of all such facilities in a centralized location is desirable to avoid conflicts in the use of right-of-way.

### Inspection

In many situations, while agency permitting and location systems may be very strict, field inspection is often less than adequate to enforce the requirements of the permit or location agreements. Backfilling, compaction, location and restoration are frequently inadequately controlled. An alert program of inspection and certification of right-of-way work provides assurance that the proposed utility construction, reconstruction, modification, relocation or repair has been performed in accordance with requirements.

Official inspection programs are not evidence of a lack of confidence in privately or publicly owned utilities. The actual mechanics of utility work is often assigned to a third party such as a sub-contractor who may or may not be as responsible as the utility itself.

Inspection of earthwork requires detailed knowledge of soil mechanics and material quality control. Inspectors must be trained and supervised to determine that standards of inspection are met.

Inspection and control of right-of-way has limited criteria. The controlling agency is not responsible for the work performed on individual poles, pipes or cables belonging to privately or publicly owned utilities since they have their own standards of workmanship and specifications covering material and products. Each carries its own inspection and control of work without intervention from the controlling agency. The responsibility of the permitting agency lies only in the public right-of-way and is limited to the certification of proper workmanship, location, restoration, and effect on traffic within the right-of-way.

There are two general rules under which an effective inspection system operates: efficient inspection programs result in the workmanlike operations of both privately and publicly owned utilities; and no inspection program is any better than the knowledge, experience and dedication of the inspection staff.

Inspectors should be alert for any possible error in alignment and grade stakes

which could produce costly and inconvenient removal and reconstruction. Following is a partial check list which may assist the inspector in the performance of his duties:

- Check to ascertain that utility personnel are familiar with nomenclature and symbols furnished on alignment and grade stakes along the project.
- Check to assure that a common reference datum is used by both the controlling agency and utility field forces in setting bench marks, construction grade stakes, etc.
- Check for compatibility of elevations of the proposed underground utility and other underground facilities in the right-of-way such as pipelines, bridge footings, and foundation pilings and pile bents.
- Compute or check vertical clearances of overhead utilities to assure that minimum required clearances are obtained above travelway.
- Check to see that minimum horizontal clearances are obtained between other utilities and facilities on the right-of-way.
- Check for placement of poles, towers, and other similar above ground installments to assure that design policies are observed relating to proximity of right-of-way lines, back of curbs, etc.
- Assure that encasement and/or other protective measures for underground lines comply with design policies. Vents and/or markers may be required and should be placed at the right-of-way line.
- Assure that underground utilities are not placed upon unsuitable foundation materials not noted on the plans or schematics, thereby causing removal and reconstruction operations.
- Where manholes are required, assure that they are constructed to temporary grades and adjusted to finish top of curb or pavement grades or that permanent manhole grades are accurately correlated with travelway construction.
- Observe the backfilling of all utility excavated area which may have a critical influence upon pavement areas, embankment slopes, bridge abutments, etc.

Backfill specifications should be rigidly enforced.

#### Location Practices

A number of communities and some areawide agencies have developed guidelines to standardize the location of utilities in street and highway rights-of-way and to use the limited space more efficiently. These standard locations vary with each entity and clear cut patterns are not discernable.

Formation of a model by which locational arrangements can be developed for each set of circumstances would be of value. This, however, is a complex undertaking due to the difficulty of identifying requirements and variables, the difficulty of identifying locational variables on system costs and the lack of uniform data on utility installations. Utility location standards are dictated, in large measure, by the normal depth of cover of buried lines, climatic conditions, geological configurations, the freedom to vary vertically and horizontally from firm and rigid layout lines and whether service depends upon gravity flow gradients, such as gravity storm sewers, sanitary sewers and combined sewer lines.

One of the significant facts of current utility accommodation policies is whether electric power and communication facilities are placed above or below ground. To determine feasibility most private power utilities have made cost studies which indicate for the most part that overheading is the more economical. However, when large obstructions are encountered and/or environment, aesthetics and maintenance are considered, the cost of undergrounding becomes more attractive. Communication utilities, however, when new facilities are involved, are much more consistent in underground placement. Cost studies by the Bell System indicate that with few exceptions undergrounding is the least expensive.

#### Traffic Control

Openings in an existing right-of-way often hinder its true function as a street or road. Control and regulation of utilities are motivated, to some extent, by the need to protect the safety of each utility plant

when utilities enter the same general location for construction or repair of their facilities. The reasoning behind the "call before you dig" program, staking, master records and permits for right-of-way openings is for the safety of all utility services.

In general, control of utility operations is well planned and efficiently administered in a great many areas. Most communities and governmental agencies have adopted rules and regulations, through legislative action, which pertain to right-of-way utility work, barricading trench openings, use of warning signs and other facets of automotive and pedestrian movement. Most communities and agencies have traffic engineering departments to administer traffic and engineering regulations and functions and to coordinate such actions with police officials.

The successful operation and regulation of safety and traffic control practices vary widely with the needs of each area or locality. However, as a minimum, traffic control should be in accordance with the *Manual on Uniform Traffic Control Devices* (MUTD) as issued by the Federal Highway Administration, U.S. Department of Transportation. The following guidelines contained therein are not all-inclusive, however, they are a good base upon which to build.

- Traffic engineering agencies should be properly budgeted and staffed to provide the technical and professional capabilities to propose effective permit conditions to minimize traffic and safety conditions.

- A close relationship should exist between engineering agencies, right-of-way inspection units and public safety units which patrol and enforce rules and regulations promulgated for the protection of the public and the providing of optimum street and road use.

- Application for permits to open right-of-way for utility work should be reviewed with traffic engineering administrators, who in turn should maintain close liaison with police traffic personnel and inspection personnel.

- Traffic control rules and regulations should be enacted and made a part of the permit.

- Right-of-way openings should be regulated on major thoroughfares, whenever possible, to prohibit the closing of more than one traffic lane at a time.

- Limitations of right-of-way openings, except emergency operations, during busy periods, such as Christmas shopping days and major local events, and prohibition against work in the public way, during heavy traffic hours, should be instituted and firmly enforced.

- A carefully planned program should be instituted covering the investigation of all accidents and claims relating to or attributed to utility work in the right-of-way authorized by official permits.

- While no permits are normally issued for non-street openings, such as the openings of manholes, vaults and other utility chambers for installation, inspection and repair purposes, such openings should be barricaded in accordance with standards established by the local agency.

- The coverings of open trenches with steel plate or timber bridging should be required when cuts are opened and work is not underway.

- All safety and traffic control practices should be examined in relation to, and conforming with, the provisions of the Williams-Steiger Occupational Safety and Health Act (OSHA) or federally accepted state regulations, and the MUTD, current issue.

#### Summary

Utility accommodation within streets and highways is in the public interest. While the transportation and utility industries would prefer to occupy rights-of-ways acquired for their own interests, the public demands consideration be allowed for costs and environment. Accordingly, the use of a common right-of-way is becoming much more viable.

The use of this right-of-way by two different industries creates problems. These problems are not insurmountable. Better understanding needs to be developed between the two industries. Communication and liaison are paramount.