FUNCTIONAL CLASSIFICATION OF ROADS


INTRODUCTION

Countries manage their road systems by administrative and functional classifications. The former assigns road ownership, the latter presides over technical requirements and maintenance practices, and influence the administrative classification and financing. In many countries these two classifications are gradually approaching each other, although they never can fully coincide. Functional classification is an indispensable tool for rational assessment and assignment of responsibilities in the road sector. For numerous reasons, including transferability of benchmarks and comparison of performance indicators, it would be beneficial if it used common criteria. This Annex reviews the key ideas in functional classification.

BASIC CONCEPT

For administration countries have organized their roads into hierarchical networks according to their main purposes, i.e. national roads for roads linking the capital to provincial centers, principal cities and other centers of national importance; urban roads for roads and streets serving transport demands within cities and towns; and, rural roads for local transport demands in rural areas. Already the Romans knew that this was not enough and classified roads also functionally, which has evolved into a modern practice. Functional classification is the process by which the roads are grouped into classes by the service they are intended to provide. Basic to this process is the recognition that a trip involves movement through a network of roads. Functionally classified road network assigns each road link a role that channels trips through a network efficiently. The basic concepts of functional classification are applicable regardless of the nature or level of development of the economy or mix of traffic.

The basic idea in functional classification is schematically illustrated in the figure. In the upper left part, lines of travel desire connect trip origins and destinations. Line widths indicate amounts of travel. Sizes of circles indicate the trip generating power of settlements. Since direct-line connections for every desire line cannot be provided, trips are channeled to a road network. This is shown in the lower left part of the figure. Note that the heavy travel movements are served directly, and that low volumes are channeled into indirect paths. The roads shown are labeled local, collector; and arterial - terms that describe the functions of each functional class.

The same concepts apply also in urban areas. However, because of the high intensity of land use and travel throughout an urban area, specific travel generation centers are more difficult to identify. Additional considerations, such as spacing between collectors and arterials, become more important in classifying the urban road network functionally.
ACCESS AND MOBILITY

Allied to the idea of channeling traffic is the dual role the road network plays in providing access to property and in travel mobility. Access is a fixed requirement, necessary at both ends of any trip. Mobility along the path of such trips is defined in terms of "level of service." It can incorporate a wide range of indicators: road condition, travel speed, degree of congestion, and so forth.

The concept of channeling traffic leads not only to a functional hierarchy, but also to a hierarchy of trip distances. As illustrated in the figure, local roads emphasize the land access function and arterials emphasize the mobility function; collectors offer a compromise between both functions. Consequently, arterials should have the highest traffic volumes, the greatest amount of commercial traffic, and the longest average trip lengths. Collectors should have intermediate values for these factors, and locals the lowest values. Also, the longest trips should have the highest percentage of their trips on arterials, and the shortest trips should be concentrated on locals.

PURPOSES OF FUNCTIONAL CLASSIFICATION.

The most important purposes and applications of functional classification include:

- Delineation of public responsibilities in the provision and standard of public roads.
- Assignment of a road’s ownership and responsibility for its management and financing.
- System planning for the road using travel modes, including non-motorized traffic; access management (access control); and, coordination with other modes of transport.
- Assistance to road users for selecting a travel route from origin to destination.
- Assignment of (uniform) minimum standards, including permissible vehicle axle loads, weights and dimensions.
Determination of the size of the public road network and its quality commensurate with what the country can afford at the time.

**ON CLASSIFICATION PROCEDURE AND PROCESS.**

It is important for any classification or re-classification study to invite, with an introduction to the subject, the participation of all stakeholders in the exercise to express their interests and concerns. Concurrent technical work should consider the population and the location of centers for administration, social and economic activities such as education and health, commerce and trade, manufacturing, private and public services, and important transport junctions such as ports, rail stations and border crossings. Following a description of the various centers they may then be divided into groups by their importance at national, regional, provincial, and district level.

The adoption of minimum standards for each class of roads will have financial implications. It is important that the standards adopted are linked to current road standards and what the country can afford at the time. The advantages of this include standardization of services across regions, and an implicit requirement that requests for upgrading will have to be justified by savings in travel and transport costs.

Road classification exercise needs to be carried out with a view to the governments’ financial capacity and users’ willingness to pay for roads. A road network which is too large or has too high technical standards will deteriorate. For roads which are only of limited public interest, the government or local authority may only offer a contribution towards their maintenance provided the users maintain them at their expense (normally at lower standard and also allow limited public travel).  

Functional classification is a permanent but evolving representation of the road network. Demand for road access changes with economic growth and increasing prosperity, with relocation of population, economic activities and trade routes, and with expansion of urban areas and concerns for the environment. The functional classification must thus be updated periodically to take account of changes in transport demands and the road network to fulfill its role as a management tool.

**USE OF MORE DETAILED FUNCTIONAL CLASS BREAKDOWNS**

For several reasons, a state or country may wish to create more than the three functional classes. One reason may be that there are more than three levels of road owners with road system responsibilities. Another reason for creating additional classes is to distinguish that portion of the road system for which the highest design standards (e.g., motorways) are warranted from other arterials that are under the jurisdiction of state or national governments, but which do not warrant

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1 An important and difficult aspect of the classification exercise is to establish how far the government can afford to go in assuming responsibility for basic access, in particular in rural areas. A large part of the road network in Finland and Sweden is owned and maintained by private cooperatives with some financial assistance from the government and local authorities. Equally important are the minimum technical standards. In rural areas, are all-weather 2-lane earth roads affordable and acceptable; or is one-lane roads more appropriate? The financial trade off between network extension and minimum standard is an issue to be considered carefully.
the highest design standards. Additional breakdowns for arterials and collectors may be desirable.

Finally, specialized functional classes may be desirable in some states or countries because of unique functions served. Examples include parkways, truck routes, busways and high occupancy vehicle routes, private (access) roads and routes for non-motorized vehicles.

The following list offers this more extensive classification system. The names are descriptive and countries often have their own names for classes. Again it would be useful if the criteria for classifying roads and paths functionally were the same regardless what the naming system a country has.

Arterials: Motorways and other divided arterials;
           Principal arterials;
           Minor arterials
Collectors: Major collectors;
           Minor collectors
Locals: Public local roads;
        Private local roads;
Other: Bicycle and pedestrian paths.