

## 1.1 INTRODUCTION

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Transportation systems of regional and national extent are composed of networks of interconnected facilities and services. It follows that nearly all transportation projects must be analyzed with due consideration for their position within a modal or intermodal network, and for their impacts on network performance. That is, the network context of a transportation project is usually very important. Thus, it is appropriate to begin a volume on transportation engineering with a chapter on national transportation networks.

The subject of national transportation networks may be approached from at least two different perspectives. One approach, common to most introductory transportation textbooks, describes the physical elements of the various transport modes and their classification into functional subsystems. A second approach focuses on the availability of national transportation network databases and their use for engineering planning and operations studies. The latter approach is emphasized in this chapter, with the aim of providing the reader with some guidance on obtaining and using such networks. In describing these network databases, however, some high-level descriptions of the physical networks are also provided.

The modal networks considered are highway, rail, waterway, and pipeline and their intermodal connections. Airports and airline service networks are deliberately excluded, as air transport is markedly different in character from the surface transportation modes. Likewise, urban highway networks and bus and rail public transportation networks are not covered, since the emphasis is on national and state-level applications. For reasons of space and focus, only transportation networks in the United States are included, although the general concepts presented apply to any national or regional transportation network.

The chapter begins with a general consideration of the characteristics and properties of national transportation networks and the corresponding network databases. The modal networks are then described, followed by a section on multimodal networks and intermodal connections. The concluding section discusses national and local applications of network databases for practical planning studies.