



高等院校交通运输类“十二五”规划教材

交通运输专业英语

GAODENGYUANXIAO JIAOTONGYUNSHULEI SHIERWU GUIHUA JIAOCAI

JIAOTONGYUNSHUZHUANYEYINGYU

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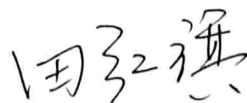
总 序

交通运输业是国民经济体系的重要组成部分，也是促进国民经济发展的重要基础产业和推动社会发展的先决条件。在最近的30年里，我国交通运输业整体上取得飞速发展，交通基础设施、现代化运输装备、客货运量总量和规模等都迅猛扩展，大量的新技术、新设备在铁路等交通运输方式中被投入应用。同时，通过大量的交通基础设施建设，特别是近年来我国高速铁路的不断投入使用，使我国的交通供需矛盾得到一定的缓解，我国交通运输网络的结构也得到了明显改善，颇具规模的现代化综合型交通运输网络已经初步形成。

我国交通运输业日新月异的发展，不仅对专业人才提出了迫切的需求，更使其教材建设成为专业建设的重点和难点之一。为解决当前国内高校交通运输类专业教材内容落后于专业与学科科技发展实际的难题，由中南大学出版社组织国内交通运输领域内的一批专家学者，协同编写了这套交通运输类“十二五”规划教材。参与规划和编写这套教材的人员都是长期从事交通运输专业的科研、教学和管理实践的一线专家学者，他们不仅拥有丰富的教学和科研经验，同时还对我国交通运输相关科学技术的发展和变革也有深入的了解和掌握。这套教材比较全面、系统地介绍了目前国内交通运输领域尤其是高速铁路的客货运输管理、运营技术、车站设计、载运工具、交通信息与控制、道路与铁道工程等方面的内容，在编写时也注意吸收了国内外业界最新的实践和理论成果，突出了实用性和操作性，适合大中专院校交通运输类以及相关专业的培养目标和教学需求，是较为系统和完整的交通运输类系列教材。该套教材不仅可以作为普通高校交通运输专业课程的教材，同时还可以作为各类、各层次学历教育和短期培训的首选教材，也比较适合作为广大学交通运输从业人员的学习参考用书。

由于我们的水平和经验所限，这套教材的编写也有不尽如人意的地方，敬请读者朋友不吝赐教。编者在一定时期之后会根据读者意见以及学科发展和教学等的实际需要，再对教材进行认真的修订，以期保持这套教材的时代性和实用性。

最后衷心感谢参加这套教材编写的全体同仁，正是由于他们的辛勤劳动，编写工作才得以顺利完成。我们还应该真诚感谢中南大学出版社的领导和同志们，正是由于他们的大力支持和认真督促，这套教材才能够如期与读者见面。



中南大学副校长、教授

前言

目前关于交通运输专业英语的教材并不多,而且大都是某一交通领域的专业知识。基于“大交通”的思想,结合多所院校的实际教学,我们编写了此书。《交通运输专业英语》教材从本科教学的实际出发,本着必需、适用的原则,结合应用型层次学校的人才培养目标和定位来编写。本教材以“大交通”为主线,以公路运输、轨道交通、公共交通和物流工程为框架,强调以应用带实践来构建教材的结构和内容,做到基本理论适度,实际综合性突出。书中涵盖交通运输概述、公路运输系统、轨道运输系统、城市公共交通系统和物流工程五部分。本教材把交通类学生应当学习和掌握的交通运输基本英语知识贯穿其中,把国内外的科学技术有机结合起来。此外,本教材在体系结构和编写方面还具有如下特点:

(1)本书各章节之间相互独立,可以从前向后学习,也可以从中抽出一章作为专业外文资料进行研究。

(2)本书没有过于深奥的理论知识,而是以案例和应用的形式介绍国外的技术、工程标准规范和发展现状,每一章的最后都附有思考题、问答题和阅读资料,供学生选用。

(3)本课程在作为交通运输专业英语的同时,还具有交通运输专业导论的性质,学生在学习英文知识的同时,可以进一步加深对专业的认识。

本书的教学参考学时为32~40学时。

本书详细介绍了交通运输涵盖的内容和基本概念,涉及公路运输系统、轨道运输系统、城市公共交通系统和物流工程等内容。本教材可作为交通运输、交通工程、物流工程等专业的本科和交通运输工程学科研究生的专业教材,也可供交通运输管理部门和公共交通运营单位以及物流企业的专业技术人员的参考资料。

本书具体编写人员的分工如下:第一章、第二章由阎春利编写;第三章由黄细燕编写;第四章由闫振英编写;第五章由任淑平、杨亚琛编写。

感谢参与本书资料的收集和整理工作的研究生了。特别感谢本书所有被引文献的作者,他们前期辛苦的工作给了我们编写本书的便利。

由于编者学识有限,加之国内可供参考的资料很少,书中难免出现纰漏、不足及错误,诚请广大读者批评指正,以便修订再版时完善改进。

编者

2014年7月

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Chapter 1

Transportation System Introduction

1.1 Transportation system

1.1.1 The Statue of Transportation

The importance of transportation in world development is multidimensional. For example: one of the basic functions of transportation is to link residence with employment and producers of goods with their users. From a wider viewpoint, transportation facilities provide the options for work, shopping, and recreation, and give access to health, education, and other amenities. Nearly every day, items in the news remind us of transportation's vital role in our economy and its significant relationship to our quality of life. Mobility is important to the whole community. An exploration of the realm of transportation, with emphasis on key aspects of its engineering and its close relationship to our social and economic lives is focused in this course, which is likely to be helpful to lead to transportation engineering solutions in the real world.

Considering your furniture, your clothes, the food you eat, and everything else you use as part of your life, there is very little among those things that did not at some point undergo movement by at least one freight carrier.

Good transportation provides for the safe, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods. The field of transportation can be compared to a mansion with several stories, many chambers, and scores of connections. We would like to take the reader on a short tour of this mansion just to acquaint him or her with some of its characteristics. One of the prerequisites for accompanying us on this trip is to have an open mind; almost everyone will have had several years of personal experience as a user of the transportation system, such as a car driver, a bus passenger, an elevator user, a frequent flyer, or just a sidewalk user. Naturally, almost every person will tend to acquire his or her own personal viewpoint. No

two persons can expect to come to the same conclusion about a problem confronting transportation even though they are each known to be highly objective and rational. Try as hard as you can to approach the field of transportation and its myriad problems with an open mind, free of presumptions and prejudice. Like food, shelter, clothing, and security, transportation is an integral part of human culture. Movement in a broad sense offers inherent joy and pleasure as well as pain, suffering, and frustration. These factors will assume even greater importance in the years ahead.

Everybody is involved with transportation in so great a variety of ways that a mere listing of these ways would take us by surprise. Ultimately, all human beings are interacting over distance and time, and this interaction in itself creates involvement. Transportation has an increasingly close relationship to various social, economic, and political affairs. The role of transportation in the day-to-day life of human beings can be appreciated in various aspects.

Historical of transportation

The principles of transportation engineering have been evolving over many millennia. Human beings are known to have laid out and used convenient routes as early as 3000 B. C. Although it was traders and migrants who opened up most major routes of communication, the military has generally been responsible for improving the status of early routes built by civilians. The first wheeled military vehicles were developed around 2500 B. C. , and since then, vehicles were developed around 2500 B. C. , and since then, significant resources have been devoted by rulers and their builders to constructing and maintaining communication routes in the form of roads.

Steady progress has since been maintained in providing the highway and street network (which forms the stationary component of the transportation system) , in providing vehicles for moving people and goods over this network (which comprises the dynamic part) , and in enhancing the ability of drivers (or controllers) to operate the vehicles. Basically it is these three major interacting components that are to be studied critically.

Before bicycles and motor vehicles came into fashion, vehicle speeds seldom exceeded 10 miles per hour (mph). Naturally, a surface of compacted broken stone made an ideal pavement surface, even for the solid iron wheels then in use. Today, the highway system consists of millions upon millions miles of high-class streets and highways, classified by function, into a series of interconnected networks, which provides access to most part of the world by road. The centerpiece of the highway development program in the developed countries is the freeway system, considered to be one of the greatest public works achievements since the dawn of history. In urban areas, the thrust has been in constructing complicated freeway interchanges, pedestrian and bicycle facilities and high-occupancy vehicle and bus lanes.

Vehicles (and pseudo vehicles) have been in use since human beings learned to walk. People

who traveled on foot could manage between 10 and 25 miles per day. It is claimed that the Incas were able to transmit messages at the rate of 250 miles per day by using fast runners over short stretches, thus achieving speeds of about 10 mph. Horses, on the other hand, could make at most 40 miles per day, by the late 1840s, the horse-drawn street car appeared in a number of cities, operating at an average speed of about 4 mph. It was not until the 1880s that electrically propelled transportation was introduced. By the beginning of World War I, the electric street car had already had a major impact on the growth and structure of the city.

The entire picture for transportation changed in 1885 with Daimler and Benz's introduction of the gasoline-powered internal-combustion engine. Within the last 100 years the motor vehicle has revolutionized private transportation all over the world. Before the appearance of the motor vehicle, vehicle speeds seldom exceeded 10 mph. The car soon changed the situation, and for purposes of safety and efficiency, traffic signals were introduced at intersections.

Some of the most outstanding technological developments in transportation have occurred in the preceding 200 years:

- (1) The first pipelines in the United States were introduced in 1861.
- (2) First railroad opened in 1825.
- (3) The internal-combustion engine was invented in 1866.
- (4) The first automobile was produced in 1886 (by Daimler and Benz).
- (5) The Wright brothers flew the first heavier-than-air machine in 1903.
- (6) The first diesel electric locomotive was introduced in 1921.
- (7) Lindbergh flew over the Atlantic Ocean to Europe in 1927.
- (8) The first diesel engine buses were used in 1938.
- (9) The first limited-access highway in the United States (the Pennsylvania Turn-pike) opened 1940.
- (10) The Interstate Highway system was initiated in 1950.
- (11) The first commercial jet appeared in 1958.
- (12) Astronauts landed on the moon in 1969.
- (13) The use of computers and automation in transportation grew dramatically through the 1960s and 1970s and continues to grow unabated.
- (14) Microcomputers have revolutionized our capabilities to run programs since the 1980s and such capabilities have helped us to examine alternatives quickly and efficiently.

1.1.2 The Definition of Transportation System

Transportation is typically systematic engineering. A system is a set of interrelated parts, called

components that perform a number of functions in order to achieve common goals. It is also, as explained at *Longman Dictionary of Contemporary English*, a group of related parts which work together forming a whole. Transportation is also ordinarily defined as a means of conveyance or travel from one place to another, or, it is a public conveyance of passengers or goods especially as a commercial enterprise. Transportation is everything involved in moving either the person or goods from the origin to the destination. Consider the businessman's trip depicted in Fig. 1.1. The trip is from the businessman's home (origin) to a hotel in a distant trip, the departure and arrival airports are replaced by the railway stations.

The trip could begin in his personal automobile, on a public transit vehicle, or in a taxi. This first link of his trip takes him from home to the airport parking garage or to the door of the airport terminal. This first segment is one of several line-haul portions of the trip if he drives his car, he parks it at the airport parking garage, changing from the highway mode to the walking mode for a short distance, and then taking the shuttle bus to the airport. If he left home by public transit or taxi, he gets dropped off directly at the door to the airport terminal. The places where there is a change of mode are referred to as intermodal transfer points. Fig. 1.1 indicates that this trip has several points where the businessman changes mode. Although the main portion of his trip is by airplane, there are numerous other uses of the transportation system involved.

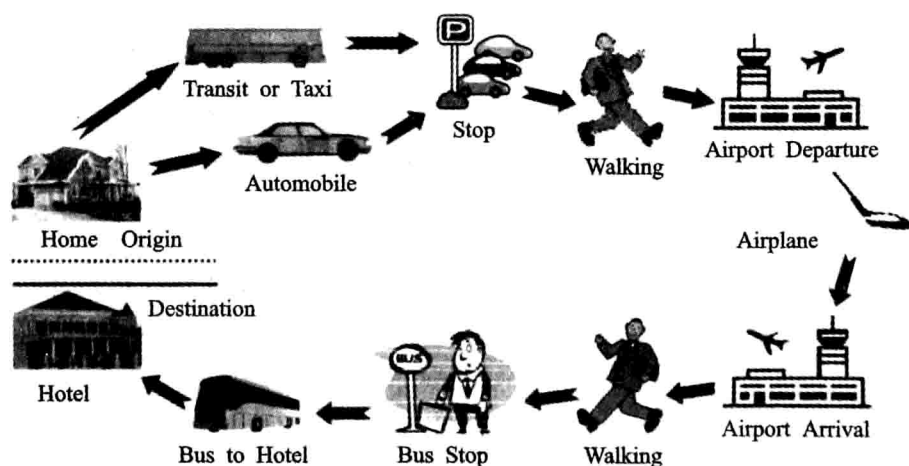


Fig. 1.1 A businessman's trip

The transportation system is organized around society's need to provide an adequate service and involves broad interaction with many other disciplines. The transportation system itself is one of the major or functional systems of society, and is an essential feature of people's lives, especially in wealthy societies. The goals of the transportation system are primarily economic; the most important constraints it faces are environmental. The transportation system itself may be analyzed in functional terms or in terms of modes of transportation. Take the businessman's trip as an example, it is clear

that each segment of his trip depends on at least one constructed facility, such as a roadway or a runway at the intermodal transfer points, constructed facilities such as parking lots or airport terminals are necessary.

Transport system consists of fixed facilities, flow entities and control system that permit people and goods (freight) to overcome the friction of geographical space.

(1) Fixed facilities: physical components of the system that are fixed in space and constitute the network of links.

(2) Flow entities: units that traverse the fixed facilities (include vehicles, container units, railroad cars, etc.).

(3) Control system: vehicular control and flow control. Vehicular control refers to the technological way in which individual vehicles are guided on the fixed facilities. Flow control system consists of the means that permit the efficient and smooth operation of streams of vehicles and the reduction of conflicts between vehicles (signing, marking, and signal systems and the concomitant rules of operation).

Transportation is one of the major or functional systems of modern society. A system, in the sense intended here, is something that may be thought of as a whole consisting of parts or components. The description of a system involves identification of the system itself as distinct from its environment (that is, the rest of the world), identification of its components, and a description of how the components interact. In the case of the transportation system, the components may be conceived of in various ways. For instance, they may be thought of as entities that perform various functions (or tasks) in the provision of transportation.

The transportation system is a functional system in the context of society as a whole because it provides a service the movement of goods and people from place to place that is essential to the functioning of the community as a whole. It is a major functional system because it is an essential feature in the economy and the personal lives of people everywhere, most especially in the developed nations. A highly developed transportation system makes possible the abundance and variety of goods and the high levels of personal mobility that are the hallmarks (for better or for worse) of a wealthy society. The economic scope of the transportation system is indicated by the fact that in 1998, transportation accounted for 11.2 percent of the gross domestic product and 19 percent of the average household expenditures in the United States. Its impact on the lives of individuals is revealed by the fact that in 1995 the average American made 1 568 local trips, and traveled over 27 500 km, 5 000 km of which was for long-distance travel (trips of more than 160 km). At the same time, the transportation system is a major or source of resource consumption and environmental impact.

Transportation accounts for almost two-thirds of the petroleum consumption in the United

States and is a major contributor to environmental problems such as air pollution, noise, and destruction of natural habitats.

If viewed in functional terms, the transportation system includes the following components:

(1) Physical facilities, including streets, roads, highways, railroads, airports sea and ports, pipelines, and canals.

(2) Fleets of vehicles, vessels and aircraft.

(3) Operating bases and facilities, including vehicle maintenance facilities and office space.

(4) Organizations. These may be classified roughly as facility-oriented organizations and operating organizations. Facility-Oriented organizations are primarily involved in planning, designing, constructing, maintaining, and operating fixed facilities. They include the United States Department of Transportation; state departments of transportation (or equivalent agencies); metropolitan planning organizations (organizations responsible for transportation planning at the level of the metropolitan region); local departments of public works, departments of transportation, and similar organizations; port authorities, and private land developers. Operating organizations, also known as carriers, are primarily concerned with operating fleets to provide transportation services. They include railroads, airlines, ship or barge lines, truck lines, transit operators, and private individuals who operate automobiles, motorcycles, and bicycles.

(5) Operating strategies, including vehicle routing, scheduling, and traffic control.

Fig. 1. 2 illustrates the ways in which the functional components of the commercial air transportation system are interrelated. Major organizations include the Federal Aviation Agency (FAA), the airlines, metropolitan planning organizations (MPOs), and airport authorities or other owners and operators of airports of airports. Of these, the FAA, the MPOs, and the airport authorities are primarily concerned with providing facilities, and hence would be considered facility-oriented organization. The FAA is responsible for design standards for air transportation facilities and provides some funding; the MPOs are involved in planning airport facilities at the local level, and the airport authorities actually own and construct the airport. The airlines are primarily concerned with operating commercial air service, and hence are operating organization. In addition, the FAA provides safety regulation (including certification of aircraft and pilots) and air traffic control. The airlines own and operate fleets of aircraft and determine operating strategies, include route structures (that is, which airport pairs are served directly and how the overall network is linked together), schedules, and various other operating policies. The major physical facilities are the airport, which consist of terminals are part of the air traffic control system and are staffed by the FAA. Most activities in the terminals are carded out by tenant organizations, including the airlines, which use them for functions such as ticketing, baggage handling, and loading and unloading aircraft. The airlines also operate the

maintenance facilities, which serve as their operating bases.

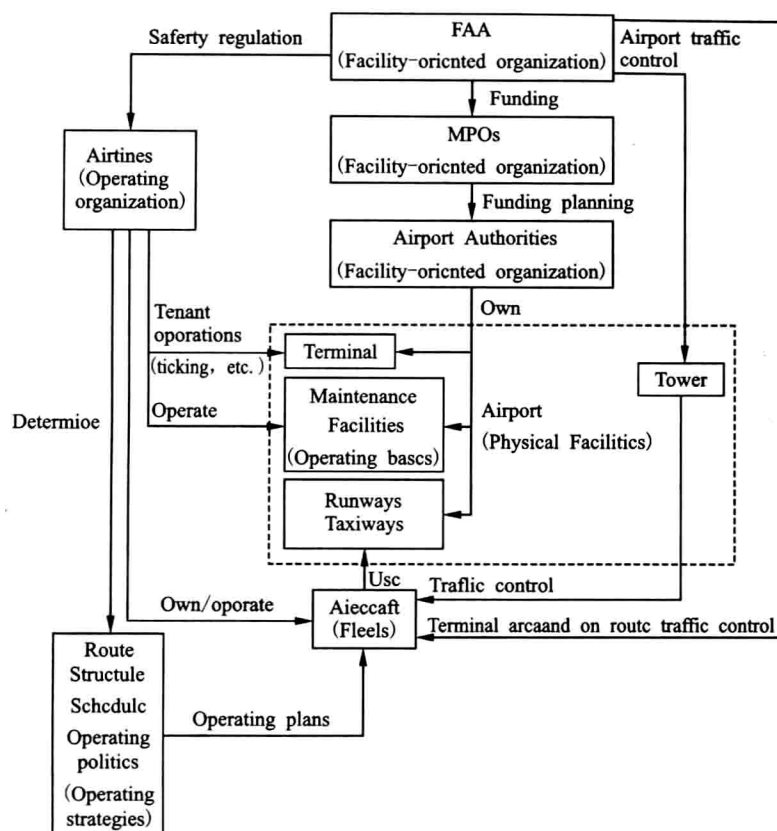


Fig. 1.2 Interrelationship of functional components of a commercial air transportation system

The provision of transportation service results when various organizations construct physical facilities and deploy fleets in accordance with their operating strategies. In order for the system to function effectively, the interactions of the various components must be understood. For instance, in order to design a highway effectively, it is necessary to know the characteristics of both the vehicles and the drivers that will use it, and to be aware of the traffic control strategies that will be employed. To give another example, to design an effective air traffic control system, it is necessary to understand the operating strategies of the airlines; the physical devices used to implement air traffic control; and the characteristics of aircraft, pilots, and airports.

New Words

conveyance [kən'veiəns] n. 交通工具

garage ['gærɑ:ʒ] n. 车库

intermodal [intə'məʊd(ə)l] n. 联运

segment ['segmənt] vi. 分割; n. 段; 部分; vt. 分割

expenditure [ɪk'spendɪtʃə(r)] n. 支出, 花费; 经费, 消费额

metropolitan[ˌmetrəˈpɒlɪtən] adj. 大都市的;大主教辖区的;宗主国的; n. 大城市人;大主教;宗主国的公民

tenant[ˈtenənt] n. 承租人;房客;佃户;居住者; vt. 租借(常用于被动语态); n. (Tenant) 人名;(法)特南

implement[ˈɪmplɪmənt] vt. 实施,执行;实现,使生效; n. 工具,器具;手段

mobility[məʊˈbɪləti] n. 移动性;机动性;[电子]迁移率

Mph miles per hour (速度单位:英里/每小时)

Notes to the Text

(1) Transportation engineering(交通工程): The application of scientific principles to the planning, design, operation, and management of transportation system.

(2) Transportation is typically systematic engineering. A system is a set of interrelated parts, called components that perform a number of functions in order to achieve common goals.

运输是典型的系统工程,该系统是由一组具有相关执行功能的组件组合在一起,以实现共同目标。

(3) The transportation system is a functional system in the context of society as a whole, because it provides a service the movement of goods and people from place to place that is essential to the functioning of the community as a whole.

交通系统是一个社会功能系统,因为它提供了一个商品,和人们从一个地方到另一个地方的运动服务,作为整个社会来说,这是一个至关重要的功能。

Exercises

1. Questions.

(1) What is the definition of transportation?

(2) What is a system? How to understand that transportation is typically systematic engineering?

1.2 Modes of Transportation

1.2.1 Main Means of Transportation

In addition to the functional components as outlined above, the transportation system is often analyzed in terms of the various modes of transportation. Although very commonly used, the term “mode” does not have a very clear definition. In general, it means a “kind” of transportation; in most cases, the modes are distinguished in terms of their physical characteristics, for instance, as

highway, rail, air, and water transportation. In other cases, however, organizational characteristics are important mass transit is almost universally referred to as a “mode” of transportation, although physically, it is primarily a combination of highway and rail transportation. Once a list of modes is agreed upon, they may be classified according to a number of different features. The classification scheme presented in Tab. 1. 1, for instance, classifies modes according to whether they primarily carry freight or passengers, and whether they serve urban, intercity, or special-purpose markets.

Tab. 1. 1 Mode classification scheme

	Freight	Passenger
Urban	Truck(highway)	
Intercity	Truck(highway)	Private auto(highway)
	Rail	Bus(highway)
	Ocean shipping	Rail
	Inland Water	Air
	Pipeline	
	Air	
Special purpose	Conveyor belt	
	Cable systems	

The following are brief descriptions of the more important modes in the United States transportation service, their costs, and the specialized markets they serve. Effectiveness is described in terms of the accessibility of the mode, the level of mobility it provides, and its productivity.

Accessibility refers to the cost of getting to and from the mode in question, and depends primarily on geographical extensiveness.

Mobility is described in terms of speed or travel time. In such descriptions a distinction is made between line-haul speeds and travel times, and door-to-door travel times. This reflects a hierarchical concept of the transportation system in which line-haul modes that is “more efficient” (usually in terms of either speed or cost) provide most of a trip, but other modes are required to provide access to the ultimate origins and destinations. For instance, a typical air trip consists of a line-haul portion from the airport in the city of origin to the airport in the destination city and access portions, which may involve mass transit or private automobile travel, from home to the airport at one end and from the airport to a hotel or place of business at the other for the less-accessible modes, it is misleading to describe performance in terms of the line-haul portion of the trip alone, since this ignores a significant part of the cost of the overall trip (in either money or time) from the point of view of the customer.

Productivity refers to some measure of the total amount of transportation provided per unit time. The amount of transportation is usually thought of as the product of the volume of goods or passengers carded and distance. For instance, productivity might be stated as ton-miles per year or