

MUĞLA



MUĞLA SITKI KOÇMAN UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING

MUĞLA



TRANSPORTATION ENGINEERING

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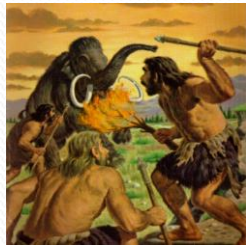
Introduction

Human beings have always had to need or urge to move.

- Looking for foods,



- Hunting,



- Trading,



- Wars.



Introduction

- Whatever the reason for human movement, the result has improved transportation means and modes.
- Adequate transportation for freight (goods) and passenger is now a vital part of the economic and social structure of the entire world.



What is Transportation?

Transportation is one of our most basic human needs.

- Dictionary definitions of Transportation:
 1. Any device used to move an item from one location to another. Common forms of transportation include planes, trains, automobiles, and other two-wheel devices such as bikes or motorcycles.
 2. The process of shipping or moving an item from point A to point B.

What is Transportation?

5 elements are needed for transportation to occur:

- An **infrastructure** or **accommodation**, including terminals or ports.
- A **vehicle** (body or technology)
- **Energy** (fuel or pulse)
- An **Operator**
- **Support Services** which allow that the transportation occurs safely.

What is Transportation?

For transportation we can use **our own transport** or **public transport** depending on the distance, frequency and availability of our time, resources and need to do so comfortably.

What is Transportation?

Private transport is the one in which we are the operators, we can choose a route, the departure time, and interfere with the speed of travel. The user is responsible for the costs of the vehicle.



What is Transportation?

Public transport is shared with other people and are available for people in general. You pay a fee. They have a route, stops, a set schedule and operating speed.



What is Transportation Engineering?

Transportation engineering is the application of technology and scientific principles to the planning, functional design, operation and management of facilities for any mode of transportation in order to provide for the safe, efficient, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods.

It is a sub-discipline of civil engineering.

What is Transportation Engineering?

- The planning aspects of transport engineering relate to urban planning, and involve technical forecasting decisions and political factors.
- Technical forecasting of passenger travel usually involves
 - an urban transportation planning model,
 - requiring the estimation of trip generation (how many trips for what purpose),
 - trip distribution (destination choice, where is the traveler going),
 - mode choice (what mode is being taken), and route assignment (which streets or routes are being used).

What is Transportation Engineering?

- More sophisticated forecasting can include other aspects of traveler decisions,
- including auto ownership,
- trip chaining (the decision to link individual trips together in a tour)
- and the choice of residential or business location (known as land use forecasting).

What is Transportation Engineering?

- Passenger trips are the focus of transport engineering because they often represent the peak of demand on any transportation system.

What does a Transportation Engineer do?

- Transport engineers apply their maths skills and interests in strategic planning and decision making to provide innovative engineering solutions for problems that affect people in their daily lives.
- Transport engineers work in government departments and organizations, planning agencies, private firms and financial institutes – providing technical and managerial support to a wide diversity of transport projects.

Transportation Modes

Transportation modes (types) can be grouped as:

- Land Transportation

Highways



Railroads



Transportation Modes

- Air Transportation



- Airfields

- Cableways, etc.



Transportation Modes

- Water Transportation

- Inland



- Coastal



- Ocean



Transportation Modes

- Pipelines

- Oil



- Gas



- Water Pipelines



Land Transportation, especially **highway**, is the most commonly used one among the transportation modes.

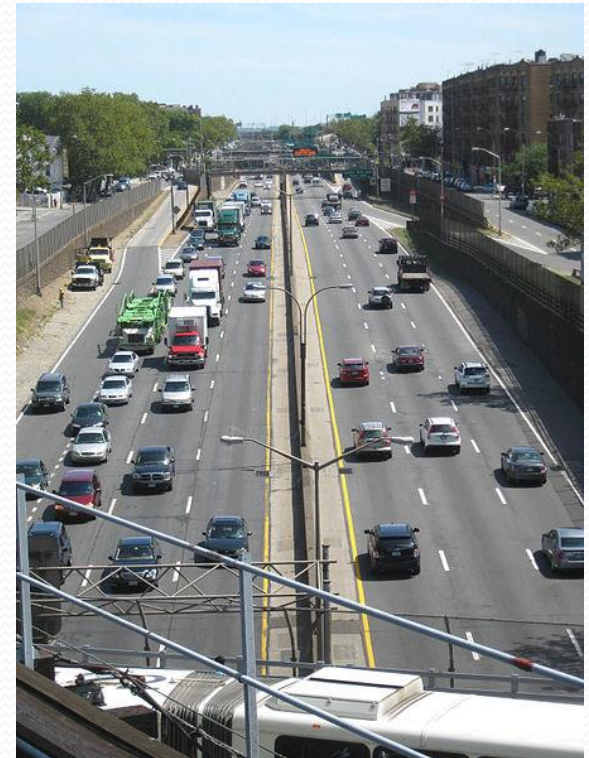
The Usage Ratio of Highway Transportation

- According to the Turkish Ministry of Foreign Affairs, the usage of highways for both passenger and freight transportation is shown in Table for the USA, Europe and Turkey.

	TURKEY	EUROPE	UNITED STATES
Passenger Transportation	95.2 %	79 %	89 %
Freight Transportation	76.1 %	45 %	69.5 %

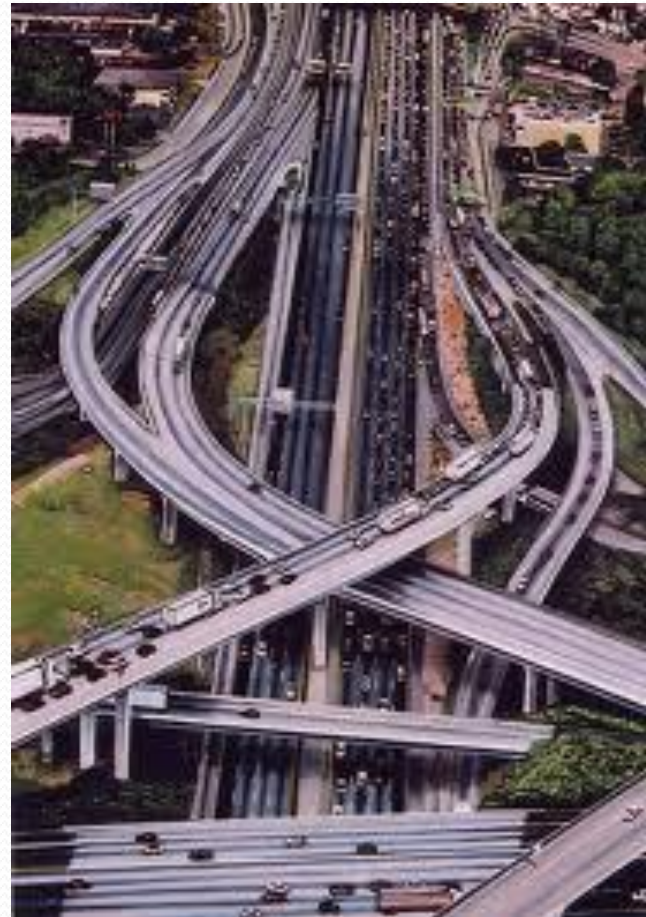
What is Highway?

- A **highway** is a road that serves continuing traffic and is the primary route between communities.
- Generally, it designates major roads.



What is Highway?

- Depending on the rapid growth in global economy, the new highway network demands increase.



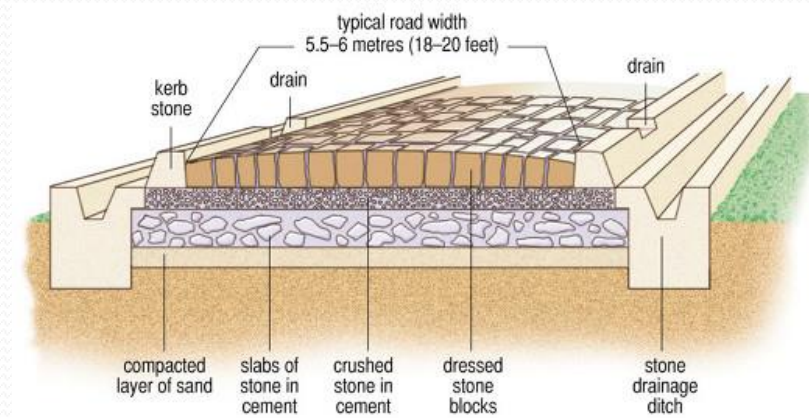
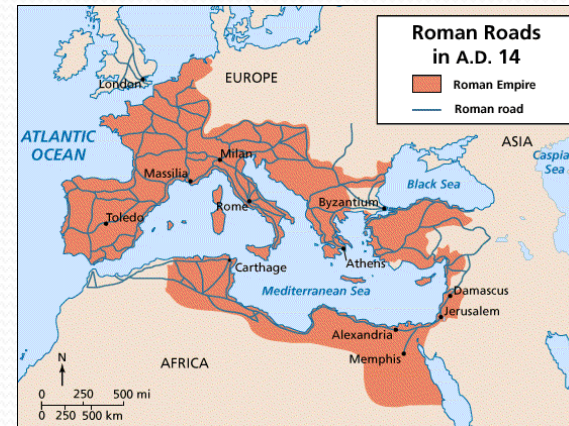
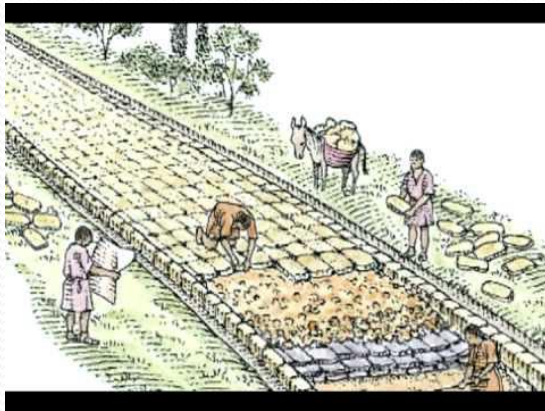
Historical Development

- The traces of highway technique have been found in the prehistorical times.
- Early routes have been established in Asia, 4000 B.C
- There is evidence of roads in Crete before 2000 B.C

Historical Development

- Early routes cannot be classified as “road”.
- However, it should be noted that the Romans have been considered the first road builders of consequence about the years in 300 B.C.
- The Romans have constructed principal of **“First Planned and Then Built”**.

Roman type of Pavement



First book for road construction

- In 1716, French engineer named *Gauthier*.
- The name of book is “*Traité de la Construction des Routes*”. (Treatise on Construction of Roads)

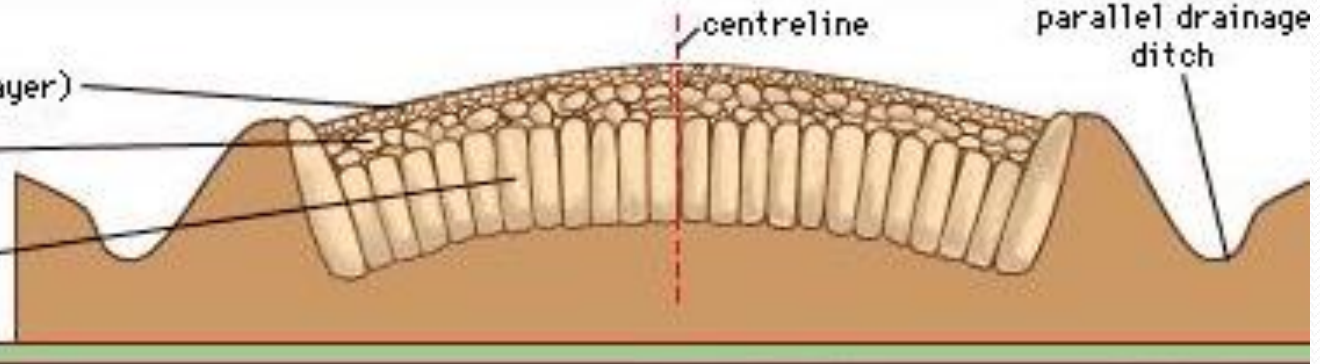
Layers of early modern roads

Trésaguet

gravel or broken stone (1-inch layer)

broken stone (2-inch layer)

foundation layer (8 inches)

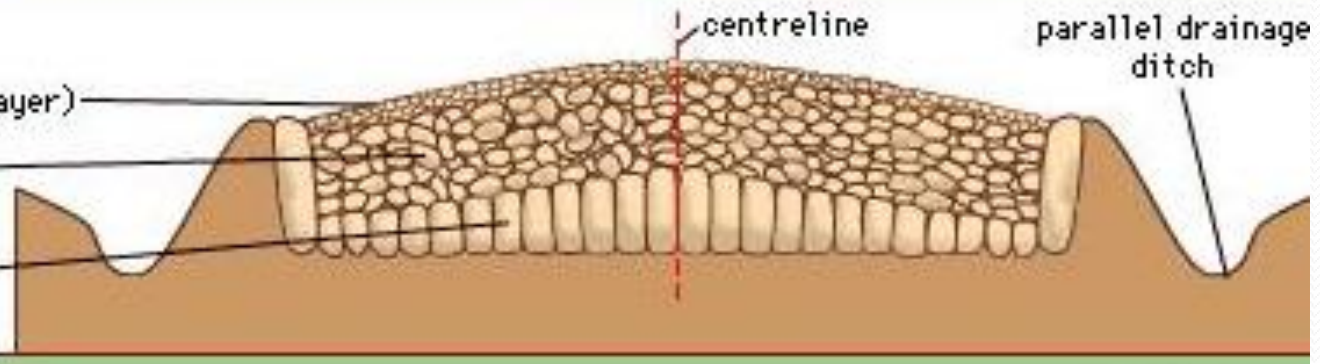


Telford

gravel or broken stone (1-inch layer)

broken stone (7-inch layer)

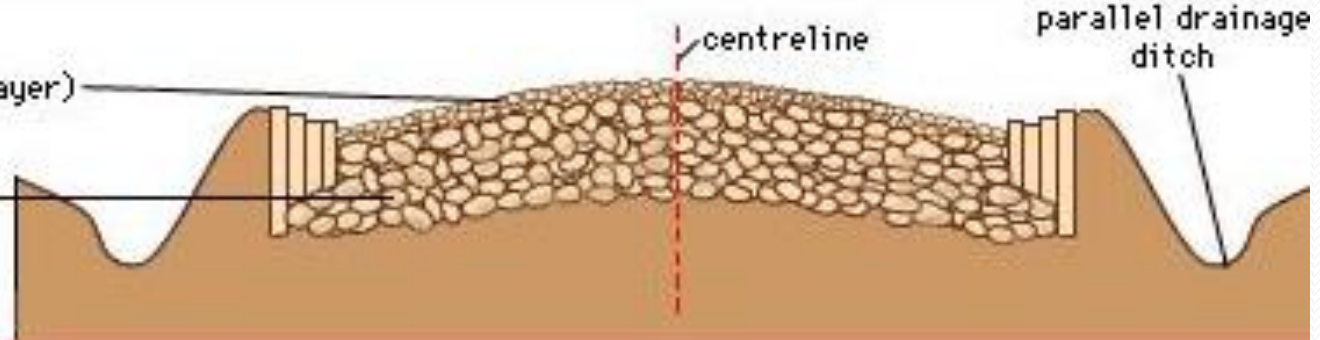
foundation layer (7 inches)



McAdam

gravel or broken stone (1-inch layer)

broken stone (8-inch layer)

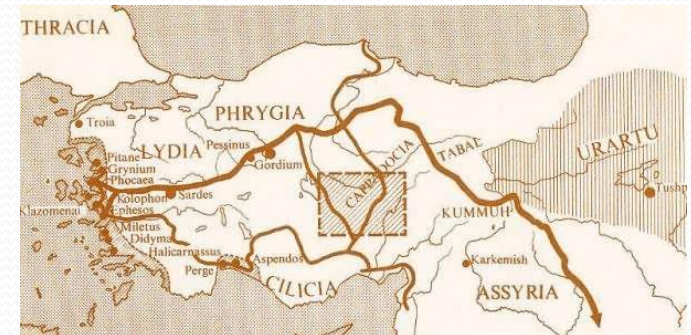


General knowledge about Turkish highway system

During the time of the Roman Empire, Anatolia was covered with a rather heavy network of roads as a result of the traditional Roman policy of roads.

These roads have been planned and constructed for a combination of military and economic purposes.

- Silk road
- Spice road
- Copper road
- King's road



- During the Great Seljuq and Ottoman Empire, roads and bridges have been constructed for the strategic purposes in the directions of military campaigns.

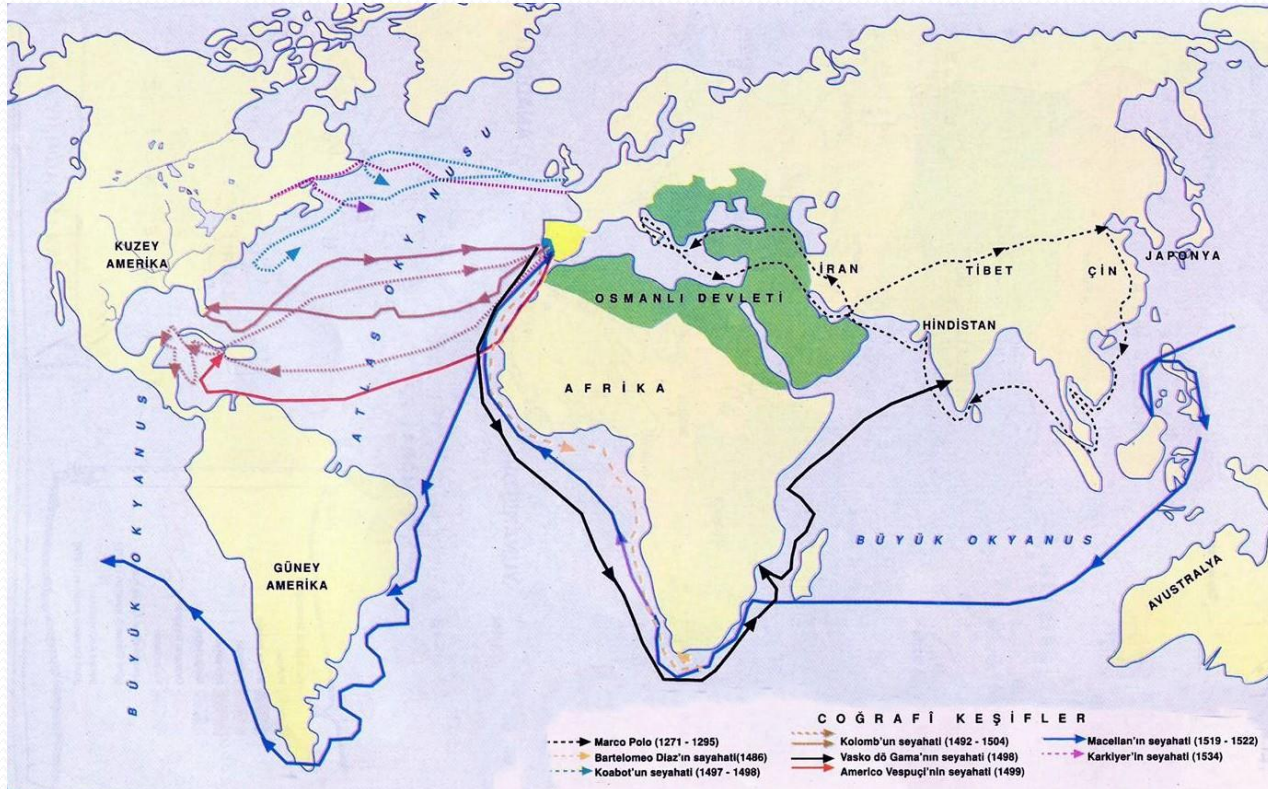


Taşköprü Bridge, Ottoman Empire



Çobandere Bridge, Great Seljuq Empire

- The development of the sea trade in the Far East and in India as a result of the discovery of the seaway around the “Cape of Good Hope” caused the historical caravan roads in Anatolia to be neglected and these roads remained unimproved for many years.



- Road construction was actually in 1866 with the establishment of a “Department of Public Roads”.
- But an effective program was not applied and road building activities were reorganized properly for the first time with the “Highway Legislation” passed in 1929 by the establishing of “Department of Roads and Bridges” (Yollar ve Köprüler Reisliği).
- This act divided public roads into two groups:
 - National Highways
 - Provincial Roads

- Ministry of Public Works was in charged of the construction and maintenance of National Highways and Provincial Departments (Nafia Müd.lüğü) were in charge of Provincial Roads.
- The construction of village roads was to be carried out by villages according to the “Village Law”.
- This situation lasted till 1940.

- The construction of roads near Istanbul and in Eastern Thrace as well as those in southern regions was started during the WWII.
- “Regional Road Divisions” were established in Istanbul and Mersin for this purpose.
- During the war, a “Maintenance Section” was set up within the Department of Roads and Bridges in 1943.

- In 1947, a preparation was made to outline the system of Turkish national highways, to point out the necessary organization, to set up this system and also necessary sources of revenues to finance activities.
- A program for the national system was then definitely drawn out and the plan for construction of 23000 km of highways in 9 years was approved by the Council of Ministers on August 8, 1948.
- “General Directorate of Highways” began to work as an autonomous organization replacing “Department of Roads and Bridges” in 1950.

Organization of General Directorate of Highway

Organization of the General Directorate of Highways consists of:

- The Headquarters (Central Organization)
- 18 Regional Directorate (Bölge Müdürlüğü)

Organization of General Directorate of Highway

All the regional directorates, except 17th region which is merely in charge of the construction of Istanbul suspension bridges, are responsible for;

- The administration
- Construction
- Maintenance and repair of roads within their division.

Administrative classification of roads in Turkey

- Administrative classification of the roads is as follows

- Motorways (Freeway) (*Karayolu*)
(*Devlet yolu*)

- National Highways (*Otoyol*)

- Provincial Roads (*İl yolu*)

- Village Roads (*Köy yolu*) →

Responsibility
in General
Directorate of
Highways

Responsibility in
Ministry of Food,
Agriculture and
Livestock

An aerial photograph of a complex multi-level highway interchange. The roads are filled with cars, and the structure is surrounded by green trees and grass. The text "ANY QUESTIONS?" is overlaid in the center in a bold, red, italicized font.

ANY QUESTIONS ?