

1. Details of Module and its structure

Module Detail	
Subject Name	Geography
Course Name	Geography 03 (Class XII, Semester - 1)
Module Name/Title	Transport and Communication- Road Transport – Part 1
Module Id	legy_10801
Pre-requisites	Basic Knowledge about Transport and Communication
Objectives	After going through this lesson, the learners will be able to understand the following: <ul style="list-style-type: none">• Traffic Flows• Highways
Keywords	Traffic Flows, Highways

2. Development Team

Role	Name	Affiliation
National MOOC Coordinator (NMC)	Prof. Amarendra P. Behera	CIET, NCERT, New Delhi
Program Coordinator	Dr. Mohd. Mamur Ali	CIET, NCERT, New Delhi
Course Coordinator (CC) / PI	Dr. Tannu Malik	DESS, NCERT, New Delhi
Course Co-Coordinator / Co-PI	Dr. Archana	CIET, NCERT, New Delhi
Subject Matter Expert (SME)	Kumar Shyam Shaisshav	PGT KV Pachimvihar, New Delhi
Review Team	Dr. Phool Kumar Malik	Government College Sidhrawali, Gurugram

The Organisation for Economic Co-operation and Development (OECD) defines a road as "a line of communication (travelled way) using a stabilized base other than rails or air strips open to public traffic, primarily for the use of road motor vehicles running on their own wheels," which includes "bridges, tunnels, supporting structures, junctions, crossings, interchanges, and toll roads, but not cycle paths."

A **road** is a thoroughfare, route, or way on land between two places that has been paved or otherwise improved to allow travel by foot or some form of conveyance, including a horse, cart, bicycle, or motor vehicle.

Roads consist of one or two roadways (British English: carriageways), each with one or more lanes and any associated sidewalks (British English: pavement) and road verges.

Roads that are available for use by the public may be referred to as public roads or as highway.

In urban areas roads may diverge through a city or village and be named as streets, serving a dual function as urban space easement and route. Modern roads are normally smoothed, paved, or otherwise prepared to allow easy travel. Historically many roads were simply recognizable routes without any formal construction or maintenance.

In the United Kingdom there is some ambiguity between the terms highway and road. The Highway code details rules for "road users". For the purposes of the English law, Highways Act 1980, which covers England and Wales but not Scotland or Northern Ireland, the term *road* is defined to be "any length of highway or of any other road to which the public has access, and includes bridges over which a road passes." This includes footpaths, bridleways and cycle tracks, and also road and driveways on private land and many car parks. Vehicle Excise Duty, a road use tax, is payable on some vehicles used on the public road.

The definition of a road depends on the definition of a highway, however there is no formal definition for a highway in the relevant Act. A 1984 ruling said "the land over which a public right of way exists is known as a highway; and although most highways have been made up into roads, and most easements of way exist over footpaths, the presence or absence of a made road has nothing to do with the distinction. Another legal view is that while a highway historically included footpaths, bridleways, drift ways, etc., it can now be used to mean those ways that allow the movement of motor-vehicles, and the term *rights of way* can be used to cover the wider usage.

In the United States, laws distinguish between *public roads*, which are open to public use, and *private roads*, which are privately controlled.

Road transport is the most economical for short distances compared to railways. Freight transport by road is gaining importance because it offers door-to-door service. But unmetalled roads, though simple in construction, are not effective and serviceable for all seasons. During the rainy season these become unmotorable and even the metalled ones are seriously handicapped during heavy rains and floods. In such conditions, the high embankment of rail-tracks and the efficient maintenance of railway transport service, is an effective solution. But the rail kilometrage being small cannot serve the needs of vast and developing countries at a low cost. Roads, therefore, play a vital role in a nation's trade and commerce and for promoting tourism. The quality of the roads varies greatly between developed and developing countries because road construction and maintenance require heavy expenditure. In developed countries good quality roads are universal and provide long-distance links in the form of motorways, autobahns (Germany), and inter-state highways for speedy movement. Lorries, of increasing size and power to carry heavy loads, are common. But unfortunately, the world's road system is not well developed. The world's total motorable road length is only about 15 million km, of which North America accounts for 33 per cent. The highest road density and the highest number of vehicles are registered in this continent compared to Western Europe.

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Traffic Flows: Traffic on roads has increased dramatically in recent years. When the road network cannot cope with the demands of traffic, congestion occurs. City roads suffer from chronic traffic congestion. Peaks (high points) and troughs (low points) of traffic flow can be seen on roads at particular times of the day, for example, peaks occurring during the rush hour before and after work. Most of the cities in the world have been facing the problem of congestion. In North America, highway density is high, about 0.65 km per sq km. Every place is within 20 km distance from a highway. Cities located on the Pacific coast (west) are well-connected with those of the Atlantic Coast (east). Likewise, the cities of Canada in the north are linked with those of Mexico in the south. The Trans-Canadian Highway links Vancouver in British Columbia (west coast) to St. John's City in Newfoundland (east coast)

and the Alaskan Highway links Edmonton (Canada) to Anchorage (Alaska). The Pan-American Highway, a large portion of which has been constructed, will connect the countries of South America, Central America and U.S.A.-Canada. The Trans-continental Stuart Highway connects Darwin (north coast) and Melbourne via Tennant Creek and Alice Springs in Australia. Europe has a large number of vehicles and a well-developed highway network. But highways face a lot of competition from railways and waterways. In Russia, a dense highway network is developed in the industrialised region west of the Urals with Moscow as the hub. The important Moscow-Vladivostok Highway serves the region to the east. Due to the vast geographical area, highways in Russia are not as important as railways. In China, highways criss-cross the country connecting all major cities such as Tsungtso (near Vietnam boundary), Shanghai (central China), Guangzhou (south) and Beijing (north). A new highway links Chengdu with Lhasa in Tibet.

The Road network of India is second largest road network in The World with total length of around 4,320,000 kilometers. Indian road network consists of **1000 km** -Expressways, **79,243 km** -National Highways, **1,31,899 km** -State Highways and Other major district and rural roads. In India, there are many highways linking the major towns and cities. The Golden Quadrilateral (GQ) or Super Expressway is underway to connect the four metropolitan cities — New Delhi, Mumbai, Bangalore, Chennai, Kolkata and Hyderabad.

The National Highways Network of India covers 79,243 km of the country, including 1000 km of limited-access highway or limited-access road. NH 7 is the longest national highway in India with a total distance of 4,572 km from Varanasi to Kanyakumari. But as per the new scheme, the longest national highway will be NH44, running from Srinagar to Kanyakumari.

In Africa, a highway joins Algiers in the north to Conakry in Guinea. Similarly, Cairo is also connected to Cape Town.

Highways- Highways are metalled roads connecting distant places. They are constructed in a manner for unobstructed vehicular movement. As such these are 80 m wide, with separate traffic lanes, bridges, flyovers and dual carriageways to facilitate uninterrupted traffic flow. In developed countries, every city and port town is linked through highways.

In the United States, "highway" is a general term for denoting a public way, including the entire area within the right-of-way, and includes many forms:

1. a high-speed, limited-access road like expressways, two-lane expressway, freeways, and large toll highways.

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2. an important road that connects cities and large towns.
 3. any road or street, or a travel way of any kind, including pedestrian ways, trails, and navigable waterways, to which the public has a perpetual right of use.

Note that the phrase "right-of-way" is used differently in the United States than it is in the United Kingdom and certain other places. In the U.S. a highway or road "right-of-way" means the land on which the pavement rests, plus the shoulders beside the pavements, plus any median strip, plus any other adjacent piece of land that is designated for the purposes of the highway or road. In other words, the "right-of-way" is the strip of land for the highway or road, and a sign that say, "No Parking on Right-of-Way" means just that: don't park on the pavement or on the land adjacent to it.

Many paved highways for vehicles are part of the official National Highway System of the U.S.. Paved highways in the "[U.S. Highway](#)" system (for example, U.S. Highway 53) can vary from two lanes wide (one lane each direction), shoulderless, roads with no access control, to multi-lane high-speed controlled-access highway, such as the [Interstate Highways](#). These roads are usually distinguished by being important, but not always the primary, routes that connect populated areas. (Sometimes, the primary route is a State Highway.) Since their inception many decades ago, the construction of "U.S. Highways", and their major improvements, have been paid for 50% with Federal funds, especially from motor fuel taxes, and 50% with State funds from whatever tax resources that the state has. Thus, the system of "U.S. Highways" has always been an equal partnership between the Federal Government and the State governments. This was a plan that changed dramatically with the advent of the Interstate Highway system beginning in the 1950s, but do not forget that the system of "U.S. Highways" continued to be upgraded under the 50%-50% funding. Highways continue to be widened, old bridges continue to be replaced with newer and better ones, and so forth.

Highways" in China, more often than not, refer to China National Highways. The fully controlled-access, multi-lane, divided routes are instead called expressways. As of 2013, there were 5.98 million km of highways and 104,000 km of expressways in China; both total lengths are the longest in the world.

In Mainland China, private companies reimbursed through tolls are the primary means of creating and financing the National Trunk Highway System (NTHS).

Expressways are lumped with first-grade G-prefixed *guódào* , or "national highway") or A-prefixed first-grade expressways in major municipal cities. All roads in the NTHS and most A-prefixed roads are expressways.

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- M-prefix: National (Trunk) Expressways (planned)
 - G-prefix: National highways (typically expressways)
 - A-prefix: Municipal highways (typically expressways)
 - S-prefix: Provincial highways
 - X-prefix: County highways
 - Y-prefix: Rural roads
 - Z-prefix: Special use roads (e.g., airport expressways)

Some highways are numbered with a leading zero (e.g. G030).

The expressways of Singapore are all dual carriageways with grade-separated access. They usually have three lanes in each direction, although there are two- or five-lane carriageways in some places. There are nine expressways, with the newest one, the Marina Coastal Expressway which is constructed under modern technology under the water.

Construction on the first expressway, the Pan Island Expressway, started in 1966. The other expressways were completed in stages, with the first phase of the Kallang-Paya Lebar Expressway being the most recently completed, in 2007. Today, there are 148.9 kilometres of expressways in Singapore.

The term *Freeway* during the 1990s was used on a few expressways (such as the Jingshi Freeway). The term *freeway* has since been replaced with *expressway* on all signs in China. The Chinese name for expressways is uniform; in pinyin, it is *gāosù gōnglù*, which literally means "high speed public road".

Signs on the National Highways (G-prefix) are green, while on the lower-grade highways and urban expressways (A-prefix) are blue.

Border Roads- Roads laid along international boundaries are called border roads. They play an important role in integrating people in remote areas with major cities and providing defence. Almost all countries have such roads to transport goods to border villages and military camps.

Eurasia, Africa, North America, South America, and Australia each have an extensive road network that connects most cities. The North and South American road networks are separated by the Darién Gap, the only interruption in the Pan-American Highway. Eurasia and Africa are connected by roads on the Sinai Peninsula. The European Peninsula is connected to the Scandinavian Peninsula by the Oresund Bridge, and both have many

connections to the mainland of Eurasia, including the bridges over the Bosphorus. Antarctica has very few roads and no continent-bridging network, though there are a few ice roads between bases, such as the South Pole Traverse. Bahrain is the only island country to be connected to a continental network by road (the King Fahd Causeway to Saudi Arabia). Even well-connected road networks are controlled by many different legal jurisdictions, and laws such as which side of the road to drive on vary accordingly.

In Australia, a *highway* is a distinct type of road from freeways, expressways, and motorways. The word *highway* is generally used to mean major roads connecting large cities, towns and different parts of metropolitan areas. Metropolitan highways often have traffic lights at intersections, and rural highways usually have only one lane in each direction. The words *freeway*, *expressway* or *motorway* are generally reserved for the most arterial routes, usually with grade-separated intersections and usually significantly straightened and widened to a minimum of four lanes. The term *motorway* is used in some Australian cities to refer to freeways that have been allocated a metropolitan route number. Roads may be part-highway and part-freeway until they are fully upgraded. The Cahill expressway is the only "named" expressway in New South Wales, which opened in 1954, the first in the region

Many populated domestic islands are connected to the mainland by bridges. A very long example is the 113-mile (181.9 km) Overseas Highway connecting many of the Florida Keys with the continental United States.

Even on main lands, some settlements have no roads connecting with the primary continental network, due to natural obstacles like mountains or wetlands, remoteness, or general expense. Unpaved roads or lack of roads are more common in developing countries, and these can become impassible in wet conditions. As of 2014, only 43% of rural Africans have access to an all-season road. Due to steepness, mud, snow, or fords, roads can sometimes be passable only to four-wheel drive vehicles, those with snow chains or snow tires, or those capable of deep wading or amphibious operation.

Cities on the mainland of continents which do not have road access include:

- [Iquitos, Peru](#), population 437,376 (2015) in the [Amazon rainforest](#)
- [Juneau, Alaska](#), population 32,406 (2014)
- [Nome, Alaska](#), population 3,788 (2014)
- [Rankin Inlet](#), Nunavut, population 2,577 (2011)
- [Supai, Arizona](#), population 208 (2010) in the [Grand Canyon](#)

Most disconnected settlements have local road networks connecting ports, buildings, and other points of interest.

Where demand for travel by road vehicle to a disconnected island or mainland settlement is high, roll-on/roll-off ferries are commonly available if the journey is relatively short. For long-distance trips, passengers usually travel by air and rent a car upon arrival. If facilities are available, vehicles and cargo can also be shipped to many disconnected settlements by boat, or air transport at much greater expense.. The island of Great Britain is connected to the European road network by Eurotunnel Shuttle - an example of a car shuttle train which is a service used in other parts of Europe to travel under mountains and over wetlands.

In polar areas, disconnected settlements are often more easily reached by snowmobile or dogsled in cold weather, which can produce sea ice that blocks ports, and bad weather that prevents flying. For example, resupply aircraft are only flown to Amundsen–Scott South Pole Station October to February, and many residents of coastal Alaska have bulk cargo shipped in only during the warmer months. Permanent darkness during the winter can also make long-distance travel more dangerous in polar areas. Continental road networks do reach into these areas, such as the Dalton Highway to the North Slope of Alaska, the R21 highway to Murmansk in Russia, and many roads in Scandinavia (though due to fjords water transport is sometimes faster). Large areas of Alaska, Canada, Greenland, and Siberia are sparsely connected. For example, all 25 communities of Nunavut are disconnected from each other and the main North American road network.

Road transport of people and cargo by may also be obstructed by border controls and travel restrictions. For example, travel from other parts of Asia to South Korea would require passage through the hostile country of North Korea. Moving between most countries in Africa and Eurasia would require passing through Egypt and Israel, which is a politically sensitive area.

Some places are intentionally car-free, and roads (if present) might be used by bicycles or pedestrians.

Roads are under construction to many remote places, such as the villages of the Annapurna Circuit, and a road was completed in 2013 to Mêdog County. Additional intercontinental and transoceanic fixed links have been proposed, including a Bering Strait crossing that would connect Eurasia-Africa and North America, a Malacca Strait Bridge to the largest island of Indonesia from Asia, and a Strait of Gibraltar crossing to connect Europe and Africa directly.

- The country with the shortest roadway network is the nation of Tuvalu, an island in the South Pacific with only 8 kilometers of (paved) roadways.

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- The longest national highway in the world, continuous point to point, is the Trans-Canada Highway at 7,821 kilometers (4,857 miles) long. The longest national Highway in the world non-continuous, is Australia's highway 1 at over 20,000 kms (12,427 miles) long.
 - There are an estimated 32,345,165 kilometers (20,098,353 miles) of roadways in the world today.
 - In 2002, an estimated 1.18 million people died on the roadway networks of the world: an average of 3242 deaths per day. Road traffic injuries accounted for 2.1% of all global deaths, making them the eleventh leading cause of global deaths worldwide. In addition to deaths, an estimated 20 million to 50 million people are injured in road crashes each year.
 - Over the next 50 years, analysts predict that we will see the first underground and above ground automated high networks. Possibly as early as 2020 or as late as 2040-2050 in a more pessimistic analysis, we will begin to see special, above-ground lanes with markings that allow our increasingly intelligent cars to self-pilot over long distances. This type of system would have enormous benefits for traffic congestion, safety and emissions.