

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- Waterway – Part 3
Module Id	legy_10803
Pre-requisites	Basic Knowledge about Mode of Transport - Railway
Objectives	<p>After going through this lesson, the learners will be able to understand the following:</p> <ul style="list-style-type: none">• Explain the importance of transport and communication• Understand the mode of transport• Explain the importance of railways in social and economic development• Describe the Railways system in different continents• Understand the Trans-Continental Railways• Describe the Union and Pacific Railway• Describe The Orient Express
Keywords	Modes of Transport, Water transport, Sea Routes, Suez Canal, Panama Canal, Mississippi Waterways

2. Development Team

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Natural resources, manufacturing enterprises and markets for products are rarely located at the same place. Transport, communication and trade link areas of production of goods and services with areas of consumption. Distance in modern times is being progressively reduced with each improvement in transport and communication facilities. The world economy today will rather grind to a halt but for an efficient transport and communication system. In earlier days the means of transport and communication were the same. But with the advancement in science and technology, both have acquired specialised and distinct forms.

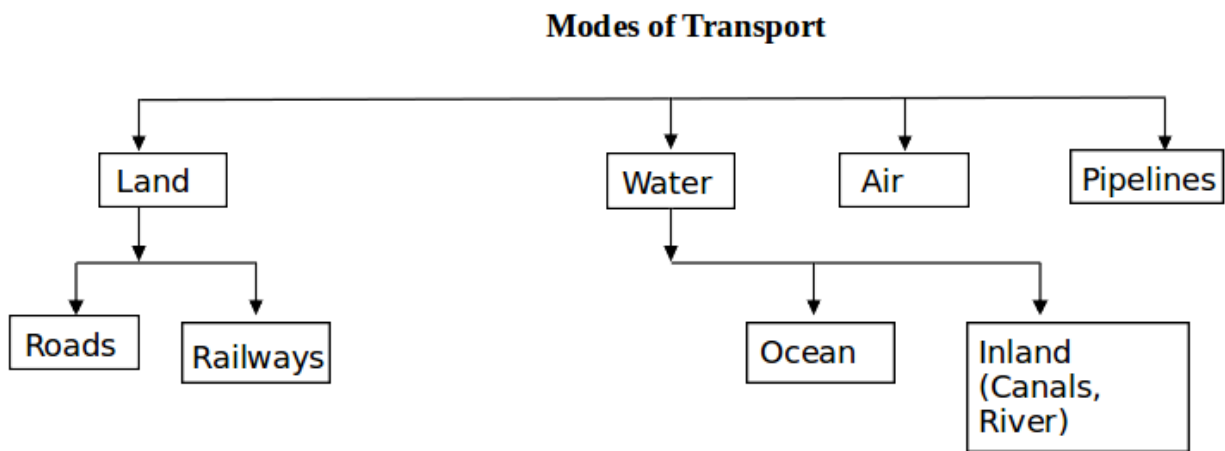
Transport refers to the carriage of goods and passengers from one place to the other using humans, animals and different kinds of vehicles. Such movements take place through land, water and air. Roads and railways form part of the land transport. Waterways and airways are the other two modes. Pipelines are used to carry liquids like water and petroleum, and

natural gas. Transport thus includes transport arteries, vehicles to carry people and goods, and the organisation to maintain arteries and to handle loading, unloading safe delivery.

Communication means conveyance of information from the place of origin to the place of destination through a channel. Postal services, telephone, telegraph and fax services, internet and satellites are some of the major means of communication.

Trade means exchange of goods and services through market channels among places in response to differences in prices or demand and supply. It thus, refers to the flow of goods and services being exchanges between places.

It is now apparent that transport, communication and trade facilitate the movement and exchange of people, goods and services. Transport and communication provide the network or routes, channels and carriers, through which trade takes place. In and communication. Trade will be taken up separately in the next chapter.



Transportation

Transportation of people, goods and services takes place using different modes-land, water, air and pipes. Each mode of transport has its own importance. Which mode should be used depends on the type of goods and services to be transported, transportation cost and the means of transport available. For example, it is economical to move bulk materials using waterways. International movement of goods in general is handled by ocean freighters. Waterways however, restrict transshipment of goods from ports to inland destination and they are slow. Road Transport is cheaper for small distances and is faster too. It renders door to door service. But is one has to move large volume of bulky materials over long distances

especially within a country, railways are most suited. Perishable light and precious goods, on the other hand can be best move by air. In a well-managed transport-system, the various modes supplement and complement each other.

Water Transport

One of the great advantages of water transportation is that it does not require route construction. The oceans are linked with each other and are negotiable with ships of various sizes. All that is needed is to provide port facilities at the two ends. It is much cheaper because the friction of water is far less than that of land. The energy cost of water transportation is lower. Water transport is divided into sea routes and inland waterways.



Fig.1: The view of Seine River (One can see how the river has become an important Inland waterway

Sources:https://upload.wikimedia.org/wikipedia/commons/thumb/1/1a/Seine_river.jpg/1280px-Seine_river.jpg

Sea Routes

Ocean transport is the cheaper means of haulage (carrying of loads) than land and air. The oceans offer a free highway traversable in all directions with no maintenance cost. Ocean-going ships are capable of carrying far larger loads than any other carrier. The introduction of refrigerated chambers for transporting perishable goods such as meat, fruits, vegetables and dairy products, and the development of tankers and other specialised ships has greatly improved the efficiency of ocean transport. The use of containers has not only made cargo handling easier but has eased the transfer of goods to land transport by rail or road at the world's major port. Modern passenger liners (ships) and cargo ships are equipped with radar, wireless and other navigation aids. The development of refrigerated chambers for perishable goods, tankers and specialised ships has also improved cargo transport. The use of containers has made cargo handling at the world major ports easier.

Important Sea Routes

Major sea routes are shown in the Fig, Some important routes have been discussed in the following pages.

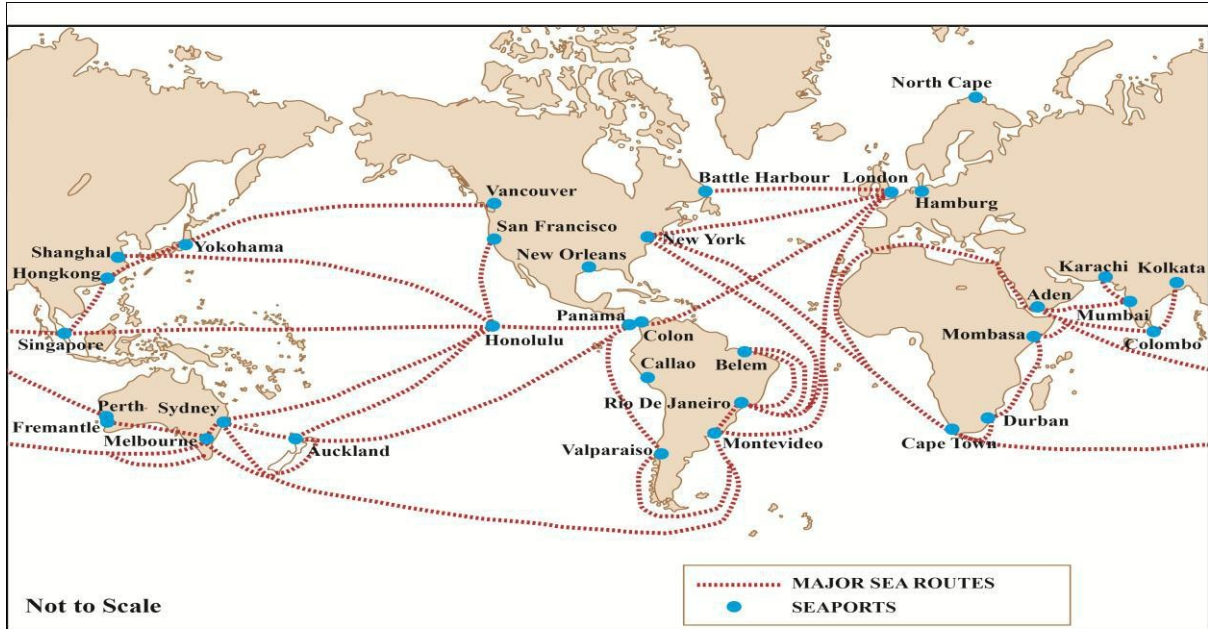


Fig.2: Major Sea Routes and Sea Ports

The Northern Atlantic Sea Route

This links North-eastern U.S.A. and North-western Europe, the two industrially developed regions of the world. The foreign trade over this route is greater than that of the rest of the world combined. One fourth of the world foreign trade moves on this route. It is, therefore, the busiest in the world and otherwise, called the Big Trunk Route. Both the coasts have highly advanced ports and harbour facilities. Rich agricultural, commercial, and industrial regions of Europe export large quantities of manufactured items-textiles, chemicals, machinery, fertilisers, steel and wine to the United States and Canada. Bulky and large quantities of food grains and raw materials, like wheat, wood pulp, copper as well as iron and steel, transport, copper as well as iron and steel, transport, copper as well as iron and steel. Transport equipment etc. is sent to the Western Europe through this route.

The South Atlantic Sea Route

This sea route connects West European and West African countries with ports of Brazil, Argentina and Uruguay in South America. The Ocean Traffic in the South Atlantic is far less than that in the North Atlantic because South America is comparatively less densely populated and has limited economic development. Only south-eastern Brazil, the Plata

estuary and parts of South Africa have large-scale industrial development. There is also very little trade on the east-west route between Rio de Janeiro and Cape Town because both Africa and South America have similar products and resources. Coffee and cocoa from Brazil, and wheat, meat, wool and flax from Argentina are sent to the industrial countries of North America and Western Europe in return for manufactured and semi-finished commodities

The Mediterranean Indian Ocean Sea Route

This sea route passes through the heart of the Old World and serves more countries and people than any other route. Port Said, Aden, Mumbai, Colombo and Singapore are some of the important ports on this route. The construction of Suez Canal has greatly reduced the distance and time as compared to the earlier route through the Cape of Good Hope.

This trade route connects the highly industrialised Western European region with West Africa, South Africa, South-east Asia and the commercial agriculture and livestock economies of Australia and New Zealand. . In fact, all ocean bound traffic from Europe to Africa, Asia and Australia passes through this route. The east bound cargo mainly consists of machinery and industrial products. The west bound cargo includes mineral oil and agricultural products such as cotton, rubber, tea, coffee and sugar. Port Said, Aden, Mumbai, Kochi, Colombo and Singapore are some of the important ports on this route. Before the construction of the Suez Canal this was the route connecting Liverpool and Colombo which was 6,400 km longer than the Suez Canal route. The volume of trade and traffic between both East and West Africa is on the increase due to the development of the rich natural resources such as gold, diamond, copper, tin, groundnut, oil palm, coffee and fruits.

The Cape of Good Hope Sea Route

This sea route is another important one across the Atlantic Ocean which connects West European and West African countries with Brazil, Argentina and Uruguay in South America. The traffic is far less on this route because of the limited development and population in South America and Africa. Only southeaster Brazil and Plata estuary and parts of South Africa have large-scale industries. There is also little traffic on the route between Rio de Janeiro and Cape Town because both South America and Africa have similar products and resources. With the increase in the tempo of economic development in the independent African nations and the exploitation of their rich natural resources such as gold, copper, diamond, tin, chromium, manganese, cotton, oil palm, groundnuts, coffee and fruits, the

volume of traffic round the Cape of Good Hope and from ports in both East and West Africa is on the increase.

Trade across the vast North Pacific Ocean moves by several routes which converge at Honolulu. The direct route on the Great Circle links Vancouver and Yokohama and reduces the travelling distance (2,480 km) by half.



Fig.3 The Cape of Good Hope

Source:

[https://en.wikipedia.org/wiki/Cape_of_Good_Hope#/media/File:Cape_of_Good_Hope_\(Zaian_2008\).JPG](https://en.wikipedia.org/wiki/Cape_of_Good_Hope#/media/File:Cape_of_Good_Hope_(Zaia_n_2008).JPG)

The North Pacific Sea Route

This sea route links the ports on the west-coast of North America with those of Asia. These are Vancouver, Seattle, Portland, San Francisco and Los Angeles on the American side and Yokohama, Kobe, Shanghai, Hong Kong, Manila and Singapore on the Asian side. Trade across the vast North Pacific Ocean goes by several routes which converge at Honolulu. The direct route farther north on the great circle links Vancouver and Yokohama, reduces the travelling distance (about 2,480 km) by half. Wheat, timber, paper and pulp, fish, dairy products and manufactured goods are the main exports from North America. The trade from Asia mainly consists of manufactured goods such as textiles, electrical equipment from Japan, Hong Kong, South Korea and Taiwan, and Tropical raw materials from Southeast Asia, e.g., rubber, copra, palm oil, tea and tin.

The South Pacific Sea Route

This sea route connects Western Europe and North America with Australia, New Zealand and the scattered Pacific islands via the Panama Canal. This route is also used for reaching Hong Kong, Philippines and Indonesia. Goods transported are mostly wheat, meat, wool,

fruits, and dairy products and manufactured articles The distance covered between Panama and Sydney is 12,000 km. Honolulu is an important port on this route.

Coastal Shipping

It is obvious that water transport is a cheaper mode. While oceanic routes connect different countries, coastal shipping is a convenient mode of transportation with long coastlines, e.g. U.S.A, China and India. Shenzhen States in Europe are most suitably placed for coastal shipping connecting one member coast with the other. If properly developed, coastal shipping can reduce the congestion on the land routes.

Shipping Canals

The Suez and the Panama Canals are two vital man-made navigation canals or waterways which serve as gateways of commerce for both the eastern and western worlds.

The Suez Canal

It is a man-made waterway in Egypt. It is a sea-level canal without locks. This canal had been constructed in 1869 in Egypt between Port Said in the north and Port Suez in the south linking the Mediterranean Sea and the Red Sea. It gives Europe a new gateway to the Indian Ocean and reduces direct sea-route distance between Liverpool and Colombo compared to the Cape of Good Hope route.

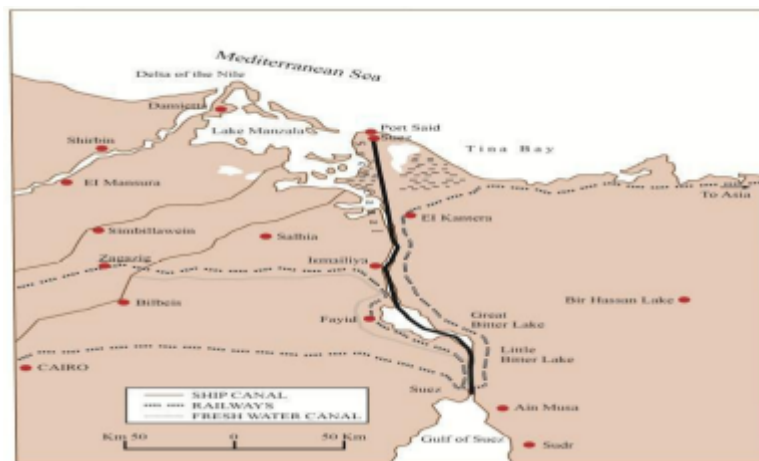


Fig 4: Suez Canal

It is a sea-level canal without locks which is about 160 km and 11 to 15 m deep. About 100 ships travel daily and each ship takes 10-12 hours to cross this canal. The tolls are so heavy that some find it cheaper to go by the longer Cape Route whenever the consequent delay is

not important. A railway follows the canal to Suez, and from Ismailia there is a branch line to Cairo. A navigable fresh-water canal from the Nile also joins the Suez Canal in Ismailia supply fresh-water to Port Said and Suez.



Fig 5: Suez Canal

<https://upload.wikimedia.org/wikipedia/commons/thumb/c/c9/Iss016e019375.jpg/1200px-Iss016e019375.jpg>

The Panama Canal; This canal connects the Atlantic Ocean in the east to the Pacific Ocean in the west. It has been constructed across the Panama Isthmus between Panama City and Colon by the U.S. government which purchased 8 km of area on either side and named it the Canal Zone. The Canal is about 72 km. long and involves a very deep cutting for a length of 12 km. Panama Canal has a lock system. It has a six-lock system and ships cross the different levels (26 m up and down) through these locks before entering the Gulf of Panama.

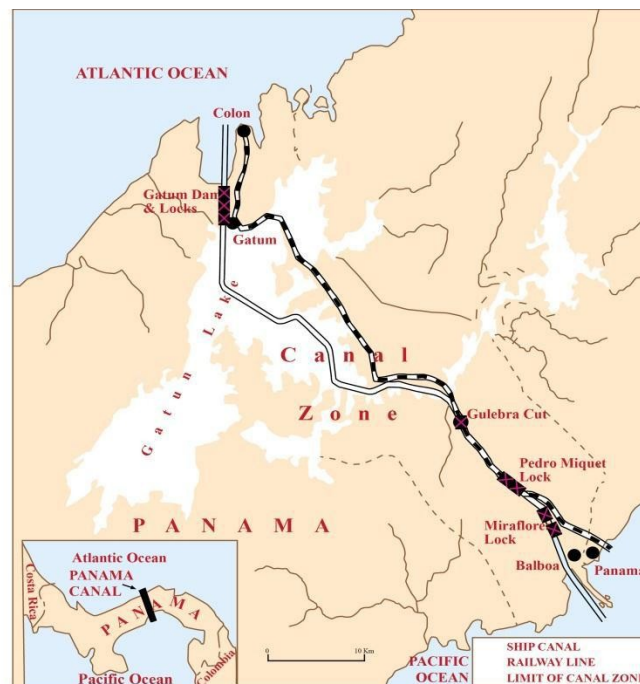


Fig.6: The Panama Canal

It shortens the distance between New York and San Francisco by 13,000 km by sea. Likewise the distance between Western Europe and the West-coast of U.S.A.; and North-eastern and Central U.S.A. and East and South-east Asia is shortened. The economic significance of this Canal is relatively less than that of the Suez. However, it is vital to the economies of Latin America



Fig.7 : The Panama Canal

https://upload.wikimedia.org/wikipedia/commons/3/32/New_Panama_Canal.jpg

Inland Waterways

Rivers, canals, lakes and coastal areas have been important waterways since time immemorial. Boats and steamers are used as means of transport for cargo and passengers. The development of inland waterways is dependent on the navigability width and depth of the channel, continuity in the water flow, and transport technology in use. Rivers are the only means of transport in dense forests. Very heavy cargo like coal, cement, timber and metallic ores can be transported through inland waterways. In ancient times, river ways were the main highways of transportation as in the case of India. But they lost importance because of competition from railways, lack of water in rivers as they were diverted into canals for irrigation, making them unsuitable for navigation: and poor maintenance of inland waterways.



Fig.8: Inland waterways are a major source of transport wherever the river is wide, deep and free of silt

Source:

https://upload.wikimedia.org/wikipedia/commons/7/7d/Inland_Waterways_Association%27s_flotilla_in_the_smaller_of_the_Latchford_Locks_-_geograph.org.uk_-_1499560.jpg

The significance of rivers as inland waterways for domestic and international transport and trade has been recognised throughout the developed world. Despite inherent limitations, many rivers have been modified to enhance their navigability by dredging, stabilising river banks, and building dams and barrages for regulating the flow of water.

The development of inland waterway is dependent on several factors such as width and depth of the channel, continuity in the flow of water and transport technology in use.

Despite inherent limitations, inland water transport has developed in many parts of the world. In these regions, many rivers have been greatly modified to enhance their navigability. Building of dams and barrages for regulating the flow of water and dredging i.e. removal of silt from channel beds for maintaining a constant depth of water does help overcome many problems mentioned earlier. The river banks are stabilised in areas where shifting of channels is a problem. The following river waterways are some of the world important highways of commerce. There are a large number of navigable rivers and canals in western and central Europe and western Russia. The world's densest network of inland waterways is found in France and Germany. Rivers Seine, Rhine and Elbe together with their tributaries flow into the North Sea. Most of the rivers are interconnected through canals. One may travel in this part almost through rivers and canals from the Mediterranean Sea to the North Sea.

The Rhine Waterways

The Rhine flows through Germany and the Netherlands. It is navigable for 700 km from Rotterdam, at its mouth in the Netherlands to Basel in Switzerland. Ocean-going vessels can reach up to Cologne.



Fig.9: The Rhine Waterway

https://upload.wikimedia.org/wikipedia/commons/c/cf/BOLERO_passing_the_Lorelei_in_the_Rhine_upstream.JPG

The Ruhr River joins the Rhine from the east. It flows through a rich coalfield and the whole basin has become a prosperous manufacturing area. Dusseldorf is the Rhine port for this region. Huge tonnage moves along the stretch south of the Ruhr. This waterway is the world most heavily used. Each year more than 20,000 ocean-going ships and 2,00,000 inland vessels exchange their cargoes. It connects the industrial areas of Switzerland, Germany, France, Belgium and the Netherlands with the North Atlantic Sea Route.

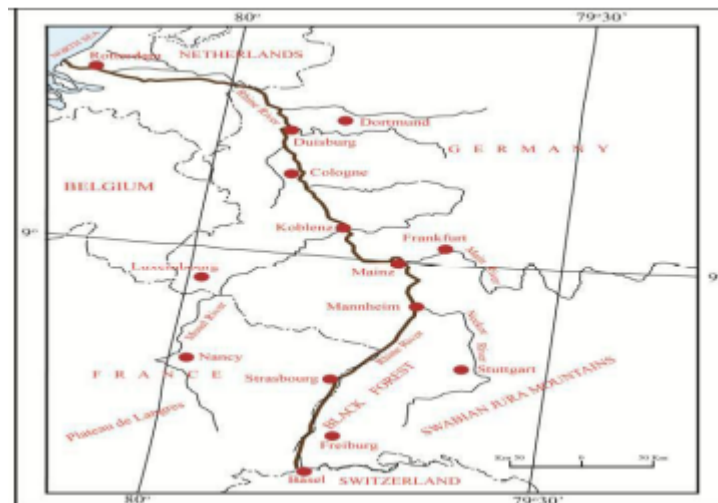


Fig.10: Rhine Waterway

The Danube Waterway

This important inland waterway serves Eastern Europe. The Danube river rises in the Black Forest and flows eastwards through many countries. It is navigable up to Taurna Severin. The chief export items are wheat, maize, timber, and machinery.

The Volga Waterway

Russia has a large number of developed waterways, of which the Volga is one of the most important. It provides a navigable waterway of 11,200 km and drains into the Caspian Sea. The Volga-Moscow Canal connects it with the Moscow region and the Volga-Don Canal with the Black Sea.



Fig.11 The Volga–Baltic Waterway (boxed area) and the entire Volga River in relation to the Caspian Sea and Black Sea

<https://upload.wikimedia.org/wikipedia/commons/1/1e/Baltic-Volga-Black-Caspian.png>

There are two major inland waterways systems in North America: (i) the Great Lakes – St. Lawrence waterway, and (ii) the Mississippi waterway.

The Great Lakes St. Lawrence Seaway

The Great Lakes of North America Superior, Huron Erie and Ontario are connected by Soo Canal and Well and Canal to form an inland waterway. The estuary of St. Lawrence River, along with the Great Lakes, forms a unique commercial waterway in the northern part of North America. The ports on this route like Duluth and Buffalo are equipped with all facilities of ocean ports. As such large ocean-going vessels are able to navigate up the river deep inside the continent to Montreal. But here goods have to be trans-shipped to smaller vessels due to the presence of rapids. Canals have been constructed up to 3.5 m deep to avoid these. This waterway has helped in the industrial and economic growth of the region

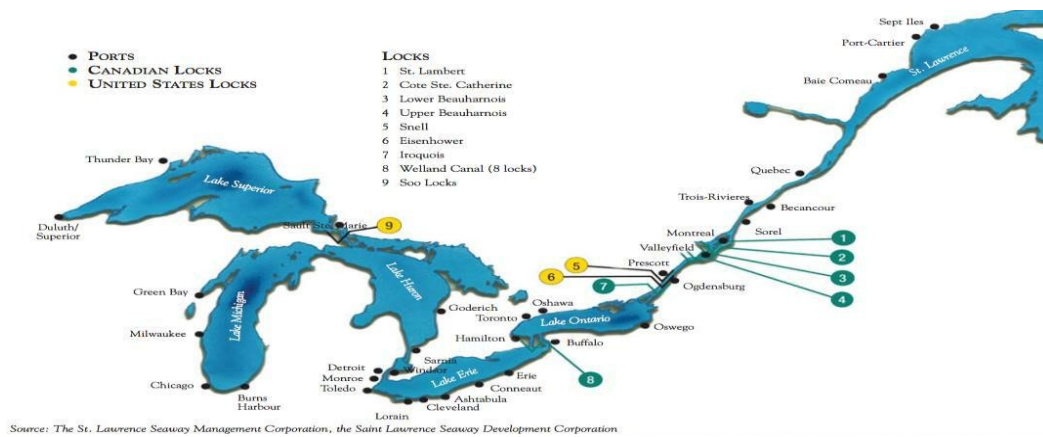


Fig No12 The Great Lakes St. Lawrence Seaway

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The Mississippi Waterways

The Mississippi-Ohio waterway connects the interior part of U.S.A. with the Gulf of Mexico in the south. Large steamers can go through this route up to Minneapolis.



Fig No 13 Waterways on the the Mississippi Waterways

https://upload.wikimedia.org/wikipedia/commons/9/96/A_maze_of_waterways_on_the_Mississippi_Coast_near_Bay_St_Louis_%285593934295%29.jpg

In many countries of Southeast Asia, rivers play an important role in carrying people and goods. But inland waterways of eastern China and India are comparatively more important in terms of volume.

China has many large rivers but some of them, especially in the eastern part, are more developed for water transport. The Huang, the Chang Jiang and the xi rivers are navigable. The densely populated Sichuan region is linked with the Chang Jiang delta, where a dense network of canals has developed. Ocean vessels can reach up to Hankow through this route.



Fig No 14 Inland water transport in NYangtze River

<https://upload.wikimedia.org/wikipedia/commons/a/ae/Yangtze-Ships.JPG>

River Ganga in India is navigable up Patna. There is a regular steamer service between India and Bangladesh through Sundarbans. Kerala is another state where inland water transport through the backwater is prospering. India has a long coast line. There are coastal services to carry passengers and goods.



Fig No 15; Inland water transport in River Ganga

https://upload.wikimedia.org/wikipedia/commons/5/5e/Bank_of_River_Ganga_in_Patna.jpg

Although the Amazon in South America is the longest river in the world and is also navigable up to Iquitos in Peru, which is 3,680 km from the Atlantic coast in the east, it has not yet developed due to sparse population and low economic development of the region.

Parana-Paraguay Waterway:

It is the most important river way in South America. This river system discharges its water in the Atlantic Ocean through the estuary of Rio de la Plata. As such large ships can enter the waterway. Parana is navigable for ocean vessels up to Santa Fe, located at a distance of 240 km. Paraguay provides accessibility to rivers steamers up Asuncion. This waterway has a well-developed hinterland and connects the productive interior to the Atlantic coast.