GPCET
Pioneering Innovative Education

G. PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY

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Nandikotkur Road, Venkayapalli, Kurnool – 518452

Department of Civil Engineering

Bridge Course
On
Transportation Engineering - II

Modes of transportation

- Roads
- Railways
- Water ways
- Airways

Discuss the advantages and disadvantages of each mode with their limitations

There are numerous advantages of road transport in comparison to other modes of transport:

Advantages:

1. Less Capital Outlay:

Road transport required much less capital Investment as compared to other modes of transport such as railways and air transport. The cost of constructing, operating and maintaining roads is cheaper than that of the railways. Roads are generally constructed by the government and local authorities and only small revenue is charged for the use of roads.

2. Door to Door Service:

The outstanding advantage of road transport is that it provides door to door or warehouse to warehouse service. This reduces cartage, loading and unloading expenses.

3. Service in Rural Areas:

Road transport is most suited for carrying goods and people to and from rural areas which are not served by rail, water or air transport. Exchange of goods, between large towns and small villages is made possible only through road transport.

4. Flexible Service:

Road transport has a great advantage over other modes of transport for its flexible service, its routes and timings can be adjusted and changed to individual requirements without much inconvenience.

5. Suitable for Short Distance:

It is more economic and quicker for carrying goods and people over short distances. Delays in transit of goods on account of intermediate loading and handling are avoided. Goods can be loaded direct into a road vehicle and transported straight to their place of destination.

6. Lesser Risk of Damage in Transit:

As the intermediate loading and handling is avoided, there is lesser risk of damage, breakage etc. of the goods in transit. Thus, road transport is most suited for transporting delicate goods like chinaware and glassware, which are likely to be damaged in the process of loading and unloading.

7. **Saving in Packing Cost:**

As compared to other modes of transport, the process of packing in motor transport is less complicated. Goods transported by motor transport require less packing or no packing in several cases.

8. **Rapid Speed:**

If the goods are to be sent immediately or quickly, motor transport is more suited than the railways or water transport. Water transport is very slow. Also much time is wasted in booking the goods and taking delivery of the goods in case of railway and water transport.

9. **Less Cost:**

Road transport not only requires less initial capital investment, the cost of operation and maintenance is also comparatively less. Even if the rate charged by motor transport is a little higher than that by the railways, the actual effective cost of transporting goods by motor transport is less. The actual cost is less because the motor transport saves in packing costs and the expenses of intermediate loading, unloading and handling charges.

10. **Private Owned Vehicles:**

Another advantage of road transport is that big businessmen can afford to have their own motor vehicles and initiate their own road services to market their products without causing any delay.

11. **Feeder to other Modes of Transport:**

The movement of goods begins and ultimately ends by making use of roads. Road and motor transport act as a feeder to the other modes of transport such as railways, ships and airways.

Disadvantages:

In spite of various merits, road/motor has some serious limitations:

1. **Seasonal Nature:**

Motor transport is not as reliable as rail transport. During rainy or flood season, roads become unfit and unsafe for use.

2. **Accidents and Breakdowns:**

There are more chances of accidents and breakdowns in case of motor transport. Thus, motor transport is not as safe as rail transport.

3. **Unsuitable for Long Distance and Bulky Traffic:**

This mode of transport is unsuitable and costly for transporting cheap and bulky goods over long distances.

4. **Slow Speed:**

The speed of motor transport is comparatively slow and limited.

5. **Lack of Organisation:**

The road transport is comparatively less organised. More often, it is irregular and undependable. The rates charged for transportation are also unstable and unequal.

Advantages and Disadvantages of Railway Transport

Advantages:

1. **Dependable:**

The greatest advantage of the railway transport is that it is the most dependable mode of transport as it is the least affected by weather conditions such as rains, fog etc. compared to other modes of transport.

2. **Better Organized:**

The rail transport is better organized than any other form of transport. It has fixed routes and schedules. Its service is more certain, uniform and regular as compared to other modes of transport.

3. **High Speed over Long Distances:**

Its speed over long distances is more than any other mode of transport, except airways. Thus, it is the best choice for long distance traffic.

4. **Suitable for Bulky and Heavy Goods:**

Railway transport is economical, quicker and best suited for carrying heavy and bulky goods over long distances.

5. **Cheaper Transport:**

It is a cheaper mode of transport as compared to other modes of transport. Most of the working expenses of railways are in the nature of fixed costs. Every increase in the railway traffic is followed by a decrease in the average cost. Rail transport is economical in the use of labour also as one driver and one guard are sufficient to carry much more load than the motor transport.

6. **Safety:**

Railway is the safest form of transport. The chances of accidents and breakdowns of railways are minimum as compared to other modes of transport. Moreover, the traffic can be protected from the exposure to sun, rains, snow etc.

7. **Larger Capacity:**

The carrying capacity of the railways is extremely large. Moreover, its capacity is elastic which can easily be increased by adding more wagons.

8. **Public Welfare:**

It is the largest public undertaking in the country. Railways perform many public utility services. Their charges are based on 'charge what the traffic can bear' principle which helps the poor. In fact, it is national necessity.

9. **Administrative Facilities of Government:**

Railways provide administrative facilities to the Government. The defence forces and the public servants drive their mobility primarily from the railways.

10. **Employment Opportunities:**

The railways provide greater employment opportunities for both skilled and unskilled labor. Over 16 lakh persons are depending upon railways for their livelihood.

Disadvantages:

Although railway transport has many advantages, it suffers from certain serious limitations:

1. **Huge Capital Outlay:**

The railway requires is large investment of capital. The cost of construction, maintenance and overhead expenses are very high as compared to other modes of transport. Moreover, the investments are specific and immobile. In case the traffic is not sufficient, the investments may mean wastage of huge resources.

2. **Lack of Flexibility:**

Another disadvantage of railway transport is its inflexibility. Its routes and timings cannot be adjusted to individual requirements.

3. **Lack of Door to Door Service:**

Rail transport cannot provide door to door service as it is tied to a particular track. Intermediate loading or unloading involves greater cost, more wear and tear and wastage of time.

The time and cost of terminal operations are a great disadvantage of rail transport.

4. **Monopoly:**

As railways require huge capital outlay, they may give rise to monopolies and work against public interest at large. Even if controlled and managed by the government, lack of competition may breed inefficiency and high costs.

5. **Unsuitable for Short Distance and Small Loads:**

Railway transport is unsuitable and uneconomical for short distance and small traffic of goods.

6. **Booking Formalities:**

It involves much time and labour in booking and taking delivery of goods through railways as compared to motor transport.

7. **No Rural Service:**

Because of huge capital requirements and traffic, railways cannot be operated economically in rural areas. Thus, large rural areas have no railway service even today. This causes much inconvenience to the people living in rural areas.

8. **Under-utilized Capacity:**

The railway must have full load for its ideal and economic operation. As it has a very large carrying capacity, under-utilization of its capacity, in most of the regions, is a great financial problem and loss to the economy.

9. **Centralized Administration:**

Being the public utility service railways have monopoly position and as such there is centralized administration. Local authorities fail to meet the personal requirements of the people as compared to roadways

Types of Road as per function

Expressway, National Highway, State Highway, Major District Road, Other District Roads, Village Roads

Modern modes of transportation

BRTS (bus rapid transits)

Bus rapid **transit** (BRT, **BRTS**) is a bus-based mass **transit** system. A true BRT system generally has specialized design, services and infrastructure to improve system quality and remove the typical causes of delay.

Metro rail

Metro Transit is the operator of both of the region's light rail lines: the Metro Blue Line and the Metro Green Line. Service on the Metro Red Line bus rapid transit line is operated by Minnesota Valley Transit Authority.

Types of road as per material

Bituminous road

The primary use (70%) of asphalt/**bitumen** is in **road construction**, where it is used as the glue or binder mixed with aggregate particles to create asphalt concrete. Its other main uses are for bituminous waterproofing products, including production of roofing felt and for sealing flat roofs.

Concrete road

Bituminous surface treatment (BST) or chip seal is used mainly on low-traffic **roads**, but also as a sealing coat to rejuvenate an asphalt **concrete** pavement. It generally consists of aggregate spread over sprayed-on asphalt emulsion or cut-back asphalt cement.

Traffic signs

Regulatory signs:

One type of **regulatory signs** are traffic **signs** intended to instruct road users on what they must or should do (or not do) under a given set of circumstances.

Warning signs

A **warning** sign is a type of traffic sign that indicates a hazard ahead on the road that may not be readily apparent to a driver. While designs vary, they usually take the shape of an equilateral triangle with a white background and thick red border.

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RIGHT HAND CURVE


LEFT HAND CURVE


RIGHT HAIR PIN BEND


LEFT HAND PIN BEND


RIGHT REVERSE BEND


LEFT REVERSE BEND


STEEP ASCENT


STEEP DESCENT


NARROW ROAD AHEAD


ROAD WIDENS AHEAD


NARROW BRIDGE


SLIPPERY ROAD


LOOSE GRAVEL


PEDESTRIAN CROSSING


SCHOOL AHEAD


MAN AT WORK


CROSS ROAD


GAP IN MEDIAN


SIDE ROAD RIGHT


SIDE ROAD LEFT


Y - INTER SECTION


Y - INTER SECTION


Y - INTER SECTION


T - INTER SECTION


STAGGERED INTERSECTION


STAGGERED INTERSECTION


MAJOR ROAD AHEAD


MAJOR ROAD AHEAD


ROUND ABOUT


DANGEROUS DIP


HUMP OR ROUGH ROAD


UNGUARDED LEVEL CROSSING


GUARDED LEVEL CROSSING

Informatory sign

An information sign is a very legibly printed and very noticeable placard that informs people of the purpose of an object, or gives them instruction on the use of something. An example is a traffic sign such as a stop sign.