India Needs an Integrated Transport Plan

Vijaya Singh
Former General Manager, Central Railway
and
Former Managing Director, Tata Projects Ltd.

Prologue

The Author has a very wide experience in the Railways as also in the execution of large projects. In this Paper he brings out that India should have an integrated transport plan for the major mechanised transport modes. He adds that it would be in the best interest of the country if each mode is developed to its potential keeping its characteristics in view. Further, there should not be any unhealthy competition between transportation modes and they should supplement and not compete with each other.

- Editor

Introduction

Introduction of railways in India was a revolutionary development which played an important part in the overall development of the country. The first railway line was opened to traffic in 1953 and railways remained the only mechanical mode of transport for more than seven decades. Railways were a monopoly on the one hand and on the other they had to carry heavy social responsibility of meeting the requirements of defence, public administration, trade and commerce, development of industry, movement of people for business, employment, education, pilgrimage, family get-togethers and other personal reasons. Railway lines were constructed and services were introduced to meet these requirements even though they were not justified on purely commercial considerations.

For freight traffic, the freight rates for different commodities were determined not by the cost of transport but by “What The Traffic Could Bear”. The rates were low for low priced commodities like salt and food grains, which were important for low income groups and high for manufactured goods and other goods of high value. Passenger trains were run even on lines having scanty traffic in order to meet...
administrative requirements and to provide a service to the common people. All the private companies which had constructed the railway lines initially were running at a loss and were being subsidised by the government.

The first passenger car came to India in 1904 but for many years the cars were few in number and were owned by senior government officials and very rich people and were used by them for travel within the city or for short distances and they made no impact on Indian Railways.

The situation started changing in the Thirties when bus services were introduced for intercity travel and started sharing short distance passenger traffic with railways. This, however, did not hurt the railways as they were not in a position to carry this traffic as no investment had been made for developing the capacity of railways during the Second World War years. The trains were overcrowded and railways discouraged people from travelling by train. Notices were put up at all railway stations telling the people to “Travel if you must”.

In the Fifties, most of the states nationalised passenger road transport and rickety lorries which were being operated by private parties, were replaced by much better buses having powerful diesel engines. The seats were comfortable, over booking was not done and buses ran according to a fixed time table. The distance covered by these bus services also increased. At the same time trucks of different capacities for carrying freight traffic appeared on the roads. They were owned by small operators, each one having a small number of vehicles and in some cases the drivers themselves being the owners of the trucks. Since railways did not have the capacity to handle all the traffic which was being offered and it took several months to get a wagon allotted to a customer, they did not react to this development.

The situation has undergone a radical change over the years and road transport is now moving goods over long distances and this is not confined to smalls and wagon loads but in some cases bulk commodities are also being moved by road. The inability of railways to move all the traffic offered to them and the attitude of railways towards the customers has resulted in the diversion of even the traffic of bulk commodities, for which railways have a distinct cost advantage, over roads. This process has been helped by the principle of “What the Traffic Can Bear” for determination of freight rates and it became advantageous to customers to move their high rated goods by road. Railways were forced to take cognisance of this fact and it became necessary to introduce freight rates which were commercially viable and which would also minimise subsidies for low rated traffic.

With heavy investment on development of road network and introduction of powerful high capacity road vehicles, road transport has emerged as a competitor of Indian Railways. Realisation has now come to Railways of the ground they have lost
on account of their inadequacy and a serious thought is being given to face the challenge.

In the case of intercity passenger traffic also road transport is having a large share while for upper class passengers, air lines are offering stiff competition and Railways are contemplating introduction of high speed Bullet Trains and ‘Maglev Services’ in order to retrieve this traffic from them.

Coastal shipping and inland water transport are also being developed as an alternative to railways and roads and railways are also facing competition from oil and gas pipe lines which are taking away high rated traffic from them. Pit-head power houses and high voltage power transmission lines are another challenge to Indian Railways as coal for thermal power houses constitutes about 40% of the total freight traffic carried by them.

In view of the above developments, need has arisen of having an integrated national transport policy for the country. All the modes of transport discussed above are being developed independently by the authorities controlling them and a lot of investment is being made on each one of them without taking into account the developments on other modes of transport and in some cases with the intention of competing with other modes of transport.

It is not in the best interest of the country to have this kind of competition at our present stage of development and each mode of transport should be developed to handle traffic for which it is most suitable. It is not necessary for railways to compete with air lines for the limited number of passengers who want to reach their destination in the shortest possible time and can afford to pay for it. It is also not necessary for road transport to compete with railways for moving bulk commodities over long distances or even manufactured goods which can be clubbed to form train loads and which can be moved economically by railways. It is necessary to make a detailed study of the characteristics of each mode of transport and to allocate to each mode the type of traffic for which it is most suitable and adequate resources should be made available to each mode to develop adequate capacity to handle the traffic allocated to it. In the following paragraphs the characteristics of each mode of transport and its suitability for different categories of traffic have been discussed.

**Railways**

The cost of construction of an electrified railway line with modern signalling is very high and such an investment would be justified only on routes having high potential for freight and passenger traffic. Once the line is constructed its capacity should be utilised to the maximum extent by running trains having heavy trailing loads at close intervals. The capital investment in these trains comprising one or more locomotives and a large number of freight wagons or passenger coaches is very high and they
should move without any interruption so as to reach the destination in the shortest possible time. These factors determine the traffic for which rail transport is most suitable.

Rail transport is energy efficient and at the prevailing average speeds it consumes about $1/6$ of the energy required by road transport for carrying one tonne of freight traffic over a distance of one kilometer and $1/30$ energy as compared to air transport. In the case of passenger traffic, it consumes $1/40$ to $1/15$ of energy per passenger as compared to that consumed by a car having one occupant, depending upon the size of the car; $1/4$ of the energy consumed by a bus and $1/7$ to $1/18$ by an aircraft depending upon its size.

Rail transport causes minimum damage to the environment as it consumes less energy and is not dependent on fossil fuels for its operation. Electric traction is now being used extensively for operation of trains and the source of power supply could be hydro-electricity, nuclear power or any source of renewable energy. The requirement of land for railways is also much less as compared to road transport for carrying the same level of traffic.

Taking all the above factors into account, rail transport is suitable under the following conditions:

1. Traffic density should be high. It is suitable for mass movement of passengers and bulk movement of goods.

2. The freight traffic should preferably be in train loads from the point of origin to the destination and detention of trains for detachment and attachment of wagons enroute should be avoided or kept down to the minimum. Goods offered by different parties should be clubbed to make full train loads between nodal points. A combination of road and rail transport will help in this process.

3. Railways are suitable for bulk movement of goods even over short distances as for movement of coal from collieries to thermal power houses on Merry-Go-round service or over dedicated freight corridors as for movement of iron ore from mines to steel mills or to ports for export.

4. Rail transport is also suitable for mass transport of passengers even for short distances as in the case of suburban services. Rail transport has advantage over roads as it occupies less space and is pollution free.

5. Railways are suitable for long distance passenger traffic as they provide sleeping accommodation and unlike airlines which are much faster, railway fares are affordable for common people. There is no need for railways to
make heavy investment on running very high speed trains in order to compete with air lines and the small section of passengers who are willing to pay a high price to save journey time may continue to travel by air.

6. Railways can not afford to reach every town and every village and the movement of traffic from the point of origin to the railhead will have to be carried out by road transport which should work as the feeder service to railways for long distance passenger traffic.

7. Short distance piecemeal freight traffic, even along railway lines, will have to be carried by road transport as it would not be economical for railways to handle this traffic.

8. Short distance passenger traffic can continue to be carried by railways by running a few stopping trains during peak hours but during the remaining period this traffic will have to be carried by road transport.

Quality of Service

Railways will have to do a lot of work in order to improve the quality of service to the rail users and to develop capacity in such a manner that it is always ahead of the demand. The length of the railway network is 63,327 km. Some areas of the country are not adequately covered by railway lines and there is need for constructing new railway lines in these areas.

Railways are not having adequate capacity even for handling the present level of passenger and freight traffic. Passenger trains are overcrowded and unreserved coaches very often carry passengers more than three times their capacity. It is quite common to see passengers travelling on the roof of trains. For reserved accommodation, one has to book it several days in advance and even “Tatkal” tickets are not available at short notice.

Reliability of service and punctuality require a lot of improvement. Rail fractures, parting of trains and signal failures, which are the common causes of disruption of traffic and loss of punctuality, should be eliminated by design improvements, greater quality control and improved maintenance. Staff failure is another cause of delays and it must be countered by better training and enforcement of discipline. Another factor to be taken care of is the deterioration in the law and order situation which manifests itself in frequent chain pulling, movement of pedestrians and cattle across railway track and even across level crossings when the gates are closed and ‘Dharnas’ and ‘Bandhs’ on issues not at all related to railways.

Cleanliness and maintenance of trains and stations also requires improvement.
In the case of freight traffic, even long distance bulk traffic is moving by roads due to inability of railways to lift all the traffic which is offered. There is also uncertainty about the time which may be taken to reach the goods to the destination. We should discontinue the system of moving goods trains on open timing and they should follow a time table as is the case with passenger trains. This would be possible if we have dedicated freight corridors on all important routes and freight trains are not required to give precedence to fast moving mail and express trains.

**Speed of Trains**

Raising the speed of passenger and freight trains also requires serious consideration. People want to cut short their journey time and to reach the destination as early as possible. They would also like their goods to reach the destination in the shortest possible time. However, there is a cost associated with higher speeds and one should take into account the technical feasibility and the economics of raising the speed of trains while taking a decision.

Shatabdi Expresses are at present operating on Indian Railways at a speed of 145 Km per hour. Technical feasibility has been established for raising the speed to 160 Km per hour on the existing tracks and using vehicles already in use. Even at these speeds there are many speed restrictions, on sharp curves, in yards of stations in which trains have to negotiate turnouts and on some of the bridges and trains are able to run at the maximum permissible speed only on short stretches of the entire route, resulting in low average speed of trains. For higher speeds on the existing tracks there will be many more speed restrictions and if higher speeds are to be introduced on Indian Railways, then it would be necessary to lay new tracks having mild curves and no speed restrictions over bridges and station yards.

The problem of sharp curves on existing tracks can be overcome by having tilting coach bodies which have been used successfully by some countries but the problem of overtaking of slow trains by fast trains will get aggravated further. Another problem which will have to be faced is the maintenance of track which is required to be maintained according to strict specifications for high speed trains. It would be difficult to maintain the track to a high standard if heavy freight trains are also to be moved on the same track. It is, therefore, necessary to have separate tracks for high speed trains which will have to have their alignment away from the existing tracks on account of the restriction on curvature.

Indian Railways are going for quadrupling of track on their busy routes and it is also proposed to construct dedicated freight corridors along these routes. It would be desirable to reserve one corridor for long distance Mail and Express trains and the other corridor for slow passenger trains and slow freight trains which serve the goods sheds at stations along the route.
For deciding the maximum speed of passenger and goods trains, it is necessary to consider the economics of high speed operation. The hauling power required to haul a train at higher speed increases in proportion of the cube of the speed, other parameters remaining constant. This was confirmed while making trial runs before introduction of the Rajdhani Express. The WDM-4 locomotive which was used to haul the train when it was introduced, could haul 20 coaches at a speed of 100 Km per hour but only 12 coaches at 130 Km per hour and only 5 coaches at 160 Km per hour. If the number of coaches and the carrying capacity are to be retained then either double heading or multiple heading will be necessary or more trains will have to be run with reduced number of coaches. In our country we are not able to satisfy the demand for passenger traffic and reduction in the number of coaches is not favoured and we will have to use more powerful locomotives or do multiple heading in order to retain the carrying capacity of trains. For running Bullet Trains at even higher speeds, the power requirement would be much greater.

The energy consumption at higher speeds per tonne - kilometer of traffic moved, increases in proportion of the square of the speed. Thus the energy consumption for raising the speed to 145 km per hour is more than double of that for the speed of 100 kmph. The energy consumption for raising the speed to 300/350 kmph, the speed of Bullet Trains, would be 9 to 12 times that at 100 kmph. In fact it would be comparable to the energy used by large capacity aeroplanes and much higher than that used by smaller planes. Thus the argument that trains use less energy is no more valid at the speed of Bullet Trains. On the British Railways, the actual energy consumption for raising the speed of trains between London and Edinburgh from 225 kmph to 350 kmph, was found to be more than double and the saving in travel time was only 45 minutes.

The higher energy consumption results in higher pollution and higher cost. On the recently constructed Barcelona- Madrid high speed line with maximum permissible speed of 350 kmph, the fare for one way journey of 325 miles, is US$ 200, which is about the same as for air travel and such trains will be beyond the reach of our common people. Not only the operating cost is high but also the cost of construction of high speed lines, which have to have very mild curves and can not avoid costly land near cities and will have long tunnels and tall bridges in hilly terrain, is very high.

It is argued that ‘Maglev’ trains and ‘Super Maglev’ trains do not require very high tractive effort but the cost of creating magnetic field to lift up the entire train and make it levitate requires use of superconducters which have to be maintained at the temperature of liquid Nitrogen in the entire length of the track. This involves heavy initial cost and very high maintenance cost for the system. In the case of super Maglev trains which will move in vacuum to be maintained in tunnels, the cost of construction and maintenance would be even higher. The trains will have to be
pressurised as in the case of an aircraft. It would be much cheaper to have helicopter service for short distances and flights by aeroplanes for long distances than to go for Maglev Trains for high speed travel.

It would be seen from the above discussion that there is little economic justification for introducing Bullet trains or Maglev trains by Indian Railways and the field of high speed travel should be left to air lines.

In the case of freight trains we are at present having a maximum speed of 75 kmph which is proposed to be raised to 100 kmph. It would be worthwhile to make a cost-benefit analysis of this proposal before it is implemented on a large scale. In the case of freight trains also, the power requirement varies in proportion of the cube of the speed. Thus for hauling a train at 100 kmph, we will require locomotives which are 2.4 times more powerful than those required for hauling the same train at 75 kmph.

The energy consumed for moving the train varies in proportion of the square of the speed. Thus the energy consumed for moving the train at 100 kmph would be 1.8 times the energy required for moving the same train at 75 kmph over the same distance which would result in significant increase in energy consumption and the operating cost. The corresponding saving in the running time for a distance of 1000 km would be about 3.4 hours which would make a very small dent in the Wagon Turnround of 5.5 days. As regards customer satisfaction, it will not make much difference to them if their goods reach 3 or 4 hours later but any increase in freight rates on account of high speeds will be resented. The requirement of more powerful locomotives, improved suspension of wagons, stronger track structure and higher standard of maintenance of track and rolling stock, will also add to the cost.

Here it is worth while to mention that the average speeds of trains on Indian Railways are very low. Effort should be made to remove speed restrictions, provide separate corridors for trains having different speeds thus avoiding detentions on account of giving precedence to fast trains and general improvement in operation and this would be much more cost effective in reducing the overall journey time than raising the maximum permissible speed of trains.

Road Transport

Road transport is a versatile mode of transport with a wide range of unit size, varying from bicycles, rickshaws, scooters, motor cycles, autos, cars to buses of large capacity. Pedestrians also use roads for short distances. In the case of freight traffic, we have hand carts, bullock carts, tampoes and tractor-trailer combinations of large capacity. We have very large network of roads having different standards of construction.
National Highways/Expressways 66,754 km
State Highways 1,28,000 km
Major District Roads 4,70,000 km
Rural and other roads 28,50,000 km
Total 3,51,47,544 km

47% of these roads are unpaved. The standard of construction and carrying capacity of roads also varies widely ranging from narrow lanes inside urban and rural areas, single lane rural roads to eight lane Expressways, having very high standard of construction. Road transport can reach up to the door of the customer even in remote areas and can provide a suitable vehicle for moving small and large consignments of freight and for carrying single individuals or a large group of passengers.

Its disadvantage is that its energy consumption is high, it is the main source of generation of green house gases and pollution of the environment and its cost of operation is high as compared to railways, for traffic which can be carried by either of these modes. The requirement of land is also higher for roads as compared to railways for carrying the same amount of traffic.

Considering the above factors, the following are the categories of traffic for which road transport is advantageous and should be developed.

1. As feeder service for railways for long distance freight traffic from the point of origin to the nearest loading point of railways.

2. Door to door movement of piecemeal traffic which can not be clubbed to make train loads.

3. Door to door movement of all categories of traffic between points not served by railways or where rail transport is available for very short distances out of the total distances for which the goods are to be transported.

4. Short distance piecemeal traffic along railway lines which is uneconomical for railways.

5. In the case of passenger traffic, people prefer to use individual transport which gives them the freedom to move according to their convenience. They use bicycles, scooters, motor bikes and cars of different sizes depending upon what they can afford. This results in congestion on roads and slow movement of vehicles. This should be discouraged and convenient public transport provided at affordable rates on all busy routes. Public transport does not exist in villages and small towns at present and the only alternative is to hire rickshaws and autos operated by private
operators, which are slow, overcrowded and expensive. Reliable and convenient public transport should also be provided on all the routes connecting villages to the nearest towns and, between towns located at short distances from each other and from towns and villages to the nearest rail heads. Long distance travel by road in individual cars and even by public buses on routes served by railways should be discouraged by imposing heavy toll on road users on the one hand and providing convenient and affordable train services on the other.

6. For intra-city transport, in all major cities rail transport in various forms like, surface lines, metros, mono-rails and tramways should be adopted on busy routes, as it is pollution free and occupies minimum space. Feeder services by buses should be provided to supplement rail transport and use of individual vehicles should be kept down to the minimum. On less busy routes in big cities and in small cities in which there is not enough traffic to justify introduction of rail transport, convenient public road transport should be made available. Bus service with high frequency should be introduced on busy routes and plying of rickshaws and autos should be confined to routes not served by bus service.

**Quality of Service**

The traffic conditions on most of the roads are chaotic. There is a mix of slow moving and fast moving vehicles, speed restrictions and lane discipline are not observed, overtaking is done indiscriminately from either side and pedestrians cross the roads at any point and expose themselves to great risk. There are many unregistered vehicles on the road like agricultural tractor-trailer combines and Jugads (Improvised vehicles) and in most cases they are driven by unlicensed drivers. Even licensed drivers do not have sufficient training and very often deliberately violate rules. The number of traffic police men is inadequate and even those who are on duty do not enforce the rules. As a consequence of all the above factors, there are frequent traffic jams, average speeds are low and the accident rate is high. A very strong drive is required to be made to overcome these shortcomings.

Maintenance of roads is also poor. They are full of pot holes and drivers have to keep an eye on the road all the time instead of watching traffic on the road and road signs. Very often drivers swerve suddenly to avoid a pot hole and this results in accidents.

The level of traffic on many roads is much higher than their carrying capacity. It is necessary to widen these roads and to provide additional lanes in them.

Parking space is another serious problem. Adequate parking space is not available in shopping areas and even in residential areas. Vehicles are parked alongside
the road blocking the foot path and one or more lanes of the road. Freight vehicles also do not have demarcated parking space and are parked alongside roads blocking one or more lanes. Rickshaws and autos also do not have demarcated parking space and they cluster around road crossings where they expect to get passengers, making it hazardous for vehicles to negotiate these crossings.

All these shortcomings will have to be eliminated and not only the infrastructure will have to be improved but even the road users will have to be trained and disciplined in order to have efficient accident free service, improved average speed, reduced wear and tear of vehicles and the road surface and reduction in the level of pollution. Some of the metropolitan cities are trying to make all round improvement in the system on the above lines but a lot more is required to be done.

**Speed**

It is also important to carefully consider the maximum speed to be permitted on our highways. In the case of road vehicles also the energy consumed is proportional to the square of the speed. Very high speeds result in high consumption of energy and greater pollution and are also a safety hazard. In our country, it would not be desirable to permit speeds higher than 100 kmph on our highways.

**Air Lines**

There has been rapid development of air travel in our country during recent years. A number of private air lines have come up and some of them are providing air travel at a low price by cutting down the cost to bare minimum and offering air fares which are comparable to upper class railway fares. Railways have responded by cutting down upper class fares and are considering introduction of very high speed trains. Introduction of low cost air travel is welcome as it enables many more people to afford high speed travel. However, the competition is unrealistic as air travel can never bring down the cost to the level of railway travel nor can railways ever achieve the speed of air travel.

The number of airports in India is 449 out of which 122 are passenger traffic airports including 11 international airports. Bulk of passenger and freight traffic is handled at the four major airports, viz., Mumbai, Delhi, Chennai and Kolkata.

Air travel is the fastest mode of transport but there is a fixed element of time spent at the terminals at both ends of the journey as a result of which the overall journey time for short distances like Delhi to Agra, is comparable or even higher than that by rail or road. However, for longer distances like Delhi to Mumbai, the saving in time is considerable but only a small number of people in our country can afford air travel and overwhelming majority will continue to travel by train in the foreseeable
future. There is, therefore, little justification for railways to make heavy investment on introduction of very high speed Bullet Trains or on Maglev Service. In our country the field of very high speed travel should be left to be carted for by airlines and railways should use all their resources to create adequate capacity for the overwhelming majority of passengers who can not afford air travel and patronise railways.

As regards freight traffic, transport by air is very expansive and is resorted to for meeting emergencies and for light materials of high value. Air lines are not in competition with other modes of transport in this field.

While planning the growth of air transport in our country, it should be kept in view that even large aircrafts of modern design consume seven times more energy to move one ton of load over one kilometer as compared to railways while for small aircraft the consumption is 30 times. With progressive reduction in the global availability of petroleum products their price will go on increasing and air travel become even more costly in future. It would, therefore, not be prudent to encourage excessive growth of air travel. The damaging effect of air travel on environment should also be kept in view. Fuel consumption of aeroplanes is very high and they produce large volume of green house gases and discharge them at high altitudes where they are more damaging as a source of climate change.

Shipping

India is having a long coast line of 7518 km. We have 12 major and about 200 intermediate and minor ports. Thus there is tremendous potential for development of coastal shipping which remains unutilised at present. The total loading on coastal shipping was 31 million tons in 1999-2000 and total unloading 42 million tons.

Passenger services are operating from the main land to Port Blair and between the islands of Andaman and Nicobar archipelago and between Cochin and Lakshadweep. A passenger service is also operating between Mumbai and Goa.

The scope for inland water transport is very limited as most of our rivers do not have the requisite depth of water (2m) during dry months as most of the water is diverted into canals for irrigation purposes. Construction of rail and road bridges having inadequate headroom for movement of ships is another constraint. The volume of inland water traffic has gone down over the years. However, there has been some increase in traffic from 32.48 million tons in 2003-04 to 55.82 million tonnes in 2007-2008.

Three National Waterways which were initially identified for development are (1) Ganga- Bhagirathi-Hooghly river system from Allahabad to Haldia (1600km) (2) River Brahmaputra from Dhubri to Sadya (981 km) and (3) West coast Canal alongwith Champakkara and Udyogamandal canals from Kottapuram to Kollam (205 km). Two
more waterways were added subsequently, one of which is in Andhra Pradesh, Tamil Nadu and Puducherry, having total length of 1095 km and the other in Orissa on river Brahmani having a length of 623 km. However, very little work has been done for the development of these waterways.

The following are the advantages of water transport:

1. Low capital cost: No expenditure is required to be incurred on construction of waterways unlike roads and railway lines. The only cost to be incurred on infrastructure is for ports. As regards ships, they can be owned by individual operators and investment can be made progressively to match the level of traffic.

2. The cost of maintenance of the system is also low. Some expenditure may have to be incurred on dredging in the sections in which the water depth is inadequate during dry months.

3. Low fuel cost: The fuel consumption is lower than that for railways in the case of ships. The fuel consumption is much less when compared to road transport.

4. Environment friendly: Shipping does not require land except for ports. Emission of green house gases is low and they are emitted away from habitation.

Water transport has the following disadvantages:

1. Water transport is restricted to areas having navigable inland waterways and to coastal areas. It can be used with advantage only for traffic originating and terminating at locations served by waterways or for traffic for which major portion of the distance can be covered by waterway.

2. The routes are circuitous as they have to follow the alignment of the waterway and the coast line.

3. The speed is slow as compared to road and rail transport. The time taken by water transport is very high due to slow speed and the routes being circuitous. To illustrate the point, a ship carrying soda ash from Okha to Guwahati would take about 45 days for the journey while it can be covered by railway in one tenth of that time. As a result of this, the overall cost of transporting one tonne of soda ash by rail and by ship is almost the same even though the cost per tonne kilometer by ship is almost half of that by rail. To this should be added the cost of inventory on account of
the goods being in transit for a long time. Water transport can therefore
be adopted only for bulk cargo of low value. For international traffic also
rail transport will be much faster and cheaper as compared to movement
by ships for many destinations once the Trans Asian Railway becomes
operational.

Taking all the factors into account there is scope for development of coastal
shipping where the cargo originates near the coast such as the rich iron ore deposits
of Goa, Ratnagiri, North Karnataka, Calicut in Kerala, Ongole in Andhra Pradesh and
Cuttack in Orissa. We also have rich lime stone deposits in coastal areas of Gujarat
and bauxite deposits in Maharashtra and Orissa. If manufacturing industries are set
up based on these deposits and product moved to consuming centres on sea coast,
it would be economical to move the products by coastal shipping. Movement of coal
from collieries in Orrissa to thermal power houses located on the east coast is being
planned by coastal shipping. Some of the industrial groups have developed dedicated
jetties for movement of their raw materials and products along the west coast.

While choosing the mode of transport, the cost, the quality of service and the
effect on environment should be the deciding factors and the quantum of investment
to be made on each mode should be decided by an independent agency taking these
factors into account.

Oil and Gas Pipe Lines

Indian Railways earlier opposed the laying of pipe lines for transport of
petroleum products and gas as the POL traffic was highly remunerative for them. The
main argument was that railways were carrying the traffic on existing tracks and they
were in a position to induct more rolling stock to match the growing demand and,
therefore, there was no justification for incurring heavy expenditure on laying pipe
lines for carrying these products. It was further argued that rail transport was more
reliable as in the event of obstruction on one of the routes the traffic could be diverted
to another route while in the case of pipe lines this facility would not be available.
These arguments had some validity when the traffic was low but after the phenomenal
increase in the volume of traffic which has already taken place and which is growing
rapidly, there is no doubt that pipe lines are the most efficient and least cost solution
for transport of POL and gas in large quantity from refineries or from ports to nodal
points in each area, from where they should be moved by road to petrol pumps and
other retail outlets. Bulk consumers could get the supply directly by pipe line.

In the case of gas, pipe lines are supplying gas to the filling stations of gas
cylinders which are transported by road to various retail dealers in cities and villages,
while a beginning has been made for supply of piped gas to individual consumers in a
few major cities.
Transport of POL traffic by railways is continuing on a limited scale in areas not served by pipe lines and it may be a good strategy to keep the railway alternative available to meet emergencies in the event of breakdown of the piped supply. The oil companies who own the pipe lines and Indian Railways should jointly work out the best strategy for handling POL traffic, supplementing instead of competing with each other.

**Conclusion**

It would be seen from the above discussion that each mode of transport has its own characteristics which make it suitable for particular categories of traffic and the integrated transport plan of the country should make optimum use of the strength of each mode and avoid unnecessary competition. Thus, railways should be used primarily for movement of goods in train loads from the point of origin to the final destination or where it is possible to club the goods to make train loads between two nodal points, as rail transport is economical and uses much less energy as compared to road transport. Railways should develop adequate capacity for handling this traffic so that the customers are not forced to take resort to road transport and bear a higher cost.

Road transport should be used for traffic between points not served by railways, work as a feeder service to railways from point of origin to the rail head and should also be used for piecemeal traffic along railway routes which can not be clubbed to make train loads. Unhealthy competition by road transport for traffic for which railways are most suitable should be avoided. In fact if railways are able to generate adequate capacity for carrying the traffic for which they are most suitable, the market will take care of the rational distribution of work load between railways and other modes of transport.

In the case of passenger traffic also, railways should concentrate on mass transport of passengers on long and even short distances while roads should provide service between points not connected by railway lines and should serve as a feeder service for long distance railway traffic from the point of origin to the railhead. They should also supplement railway services for short distance passengers even along railway routes during periods when railway service is not available.

Air lines should carry limited number of passengers who place a high value on their time and can afford to pay for it. The number of such passengers in our country is very small and railways need not try to compete with air lines and make heavy investment on constructing new lines for high speed trains, which will consume much more energy as compared to trains moving at the prevailing speeds and for which the fare will be comparable to air fare. The money can best be used to create adequate capacity for carrying the vast majority of passengers in reasonable comfort at a cost which they can afford.
Shipping and oil and gas pipe lines should be developed to carry traffic for which they are most advantageous and in their case also unhealthy competition with roads and railways and development of overlapping facilities should be avoided. Transport of oil and gas should be shared between pipe lines, railways and roads.

It is necessary to have a strong centralised planning set up, preferably in the Planning Commission, to ensure that each mode of transport develops in sectors for which it is most advantageous and overlapping investment by different modes of transport for carrying the same traffic is avoided.

References