Chapter - 2

TRANSPORT – A GENERAL OUTLINE
The word ‘Transport’ has been derived from the Latin word ‘transportare’. Trans means across and portare means to carry from this, it is obvious that the word transport refers to the carrying of goods and persons from one place to another. Provision for a continuous and an uninterrupted mobility of persons and materials is a basic necessity of the society.

Transport of material goods implies consideration of two factors, the vehicle or unit of conveyance and a medium usually determines the type and design of the vehicle. For example, across wild country or Service Mountain tracks, the only vehicle that can be used is either man himself or some domesticated animal. For moving on water surface boats and steamers of various designs have been evolved.

2.1. Classification of Transport

Transport can be classified from two-angle (1) According to the tracks or vehicles used (2) According to the energy used for moving the vehicles.

According to the tracks or vehicles used, transport can be divided as (a) Land transport- Road transport and Rail transport. (b) Water transport (c) Air transport.

According to the energy used for moving the vehicles, following four energies can be used.
(a) Human energy

(b) Animal energy

(c) Mechanical energy

(d) Air energy.

Along with the advancement of civilisation has increased in transport. Modern age is that of machines, in some areas owing to geographical factors. The human energy in transport is still used. Transport by pack and draught animals continues to occupy an important place in undeveloped remote areas. In olden days when mechanical energy was not invented, air energy was used to move boats and small ships. The classification of subsequent paragraphs is noteworthy.

2.2. Road Transport

Road transport includes (a) transport by human energy, i.e., porters. (b) transport by pack and draught animals like mules, donkeys, horses, bullocks, camels or elephants which function in different regions where local conditions make them popular and economical to use. (c) transport by country carts. (d) transport by modern vehicles like automobiles, trucks and motor buses.

The foremost advantage of road transport is that roads are usually provided by State authority and any vehicle can used on payment of a certain tax fixed by law. Road vehicles are comparatively cheaper than railway services. Moreover the flexibility of road transport is a decided advantage over railway
services. Door to door service is possible compared to the railways. Road transport is better suited for light traffic and short distance. For long distances, and heavy traffic, railways are more economical.

Human porters and transport by pack animals still existing in undeveloped regions. Even now there is a surprisingly large amount of traffic, which uses these primitive transport techniques, but these are gradually being replaced by mechanical road transport, as the economic development of the regions progresses. Motor vehicles are the most popular means of road transport, however, in backward regions, horse carriage and bullock carts still hold their value. Bullock carts and horse carriages are cheap and economical for short journeys. It is much useful in congested places where delays in loading and unloading are considerable. In India for example, a 2.5 tonnes lorry for a run under 100 miles may be the cheapest means of transport, but for short rural distances of 5 to 10 miles, the bullock cart is still unbeaten.

2.3. Road Development in Karnataka

Roads are always recognised as an infrastructure and arteries of the nation. Roads play a decisive role in initiating and accelerating the process of economic development. Road network of Karnataka is 1,34,062 km in length and spreads over a geographical area of 1, 91,791. sq. km of the State (as of March 2002), amounting to an average road length of 70 km per 100 sq. km. Started initially with a substantial responsibility of the State Government in the recent years participation of the private sector has been initiated in financing and developing of facilities for roads
and bridges. Karnataka Road Development Corporation has been set up in 1999 with the expectation that the corporation would raise resources from market and financial institution, and take up economically viable and strategically important roads for development and earn returns. In addition to this, the Corporation under various Central/State financial assistance schemes has been provided for investment in roads and bridges. For instance, the Karnataka State Highways Project with World Bank assistance is under formulation for the improvement of 900 kms of State highways. An amount of Rs 520 acres was provided in the Annual Plan 2003-04 for this project to be carried out from July 2001 to December 2006. As far as rural roads are concerned, Rs. 106.40 crores have been provided during the Annual Plan of 2003-04 under Prime Minister Gramodaya Sadak Yojana (PMGSY). For the construction of rural roads through NABARD assistance Rs. 120 crore was is provided during the Annual Plan 2003-04.

Studies indicate that there exists a very high correlation between road development and indicators of economic development such as gross domestic product, industrial and agricultural production. The investment in road sector generates greater employment than many sectors for the same investment. Investment on roads and employment generation can be viewed in Table 2.1 and Figure 2.1
Table 2.1

Recent Investment and Employment Linkages with Road Development

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment (Rs. in Crore)</th>
<th>Employment (Lakh Persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-86</td>
<td>4000</td>
<td>12</td>
</tr>
<tr>
<td>1986-91</td>
<td>11500</td>
<td>35</td>
</tr>
<tr>
<td>1991-96</td>
<td>21000</td>
<td>63</td>
</tr>
<tr>
<td>1996-2001</td>
<td>27752</td>
<td>83</td>
</tr>
</tbody>
</table>


Figure 2.1

Recent investment and Employment Linkages with Road Development (Investment in Crores)

2.4. Current Status in Karnataka

Total road length in Karnataka comprises of national highways, State highways, important district roads, other district
roads, ZP roads, and village roads. The total length of road at present is of the order of 154 thousand kilometers in 2003-04, of which 62.70 per cent is surface road. On an average, about 80 kilometers of road exists per every 100 sq. km of geographical area. However, the distribution of the roads between the districts, and within the districts is not at all balanced. The national standard envisages a road network of about 100 kms per 100 sq. km of area. Thus, the State as a whole is lagging behind the suggested norms. The breakups of these by districts are shown in Appendix-I. The road developments by types of roads in Karnataka are shown in the subsequent tables.

Table 2.2
Details of Growth in Road Length in Karnataka State

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National Highways</td>
<td>1997</td>
<td>1997</td>
<td>3728</td>
<td>3967</td>
</tr>
<tr>
<td>State Roads</td>
<td>11288</td>
<td>11395</td>
<td>9829</td>
<td>9590</td>
</tr>
<tr>
<td>Major District Roads</td>
<td>18063</td>
<td>28311</td>
<td>28247</td>
<td>38247</td>
</tr>
<tr>
<td>Other District Roads</td>
<td>3179</td>
<td>2090</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Municipal Roads</td>
<td>8056</td>
<td>8366</td>
<td>8366</td>
<td>8366</td>
</tr>
<tr>
<td>Other Roads</td>
<td>91494</td>
<td>8361</td>
<td>104034</td>
<td>94034</td>
</tr>
<tr>
<td>All Roads</td>
<td>133987</td>
<td>137520</td>
<td>145204</td>
<td>154164</td>
</tr>
</tbody>
</table>


In the rural segment there has been substantial improvement in the accessibility of villages by roads. As of 2003-04 there were only 27 villages which remain unconnected by roads in the State. In 1991-92, they were 199. The number of villages connected by all-weather roads is also progressing from 12649 in 1991-92 to
18,295 in 2003-04. And likewise, there has been a reduction in the number of villages connected by kutcha and non-motorable roads from 7433 to 3501 in this period.

In order to develop roads and bridges in rural areas the State has utilised the Rural Infrastructure Development Fund (RIDF) under its different tranches. The road length improved upto March 2003 was 1693 kilometres under RIDF-II, 2985 kilometres under RIDF III, 2319 kilometres under RIDF IV, 2535 kilometres under RIDF V, 2201 kilometres under RIDF VI, 518 kilometres under RIDF VII and 44 kilometres under RIDF VIII. Out of 1,535 number of road project works taken up under all these trenches, 1,336 projects have been completed in respect of bridges, the number of projects taken up was 391 in this period of which 339 were completed. Under the Pradhan Mantri Gram Sadak Yojana launched in 2000 in Karnataka, all unconnected rural inhabitations with a population of more than 1,000 persons is expected to be covered in the next 3 years. Funds for this programme are being provided by the Centre as additional central assistance and a sum of Rs. 416.66 crore have been spent upto December 2004 and a road length of 1,336 kilometres has been asphalted.

A number of departments are associated in the development of road network. Agency-wise break up of road length in Karnataka is shown in Figure 2.2. It should be noted that Zilla panchayats under the decentralised development have a larger share of responsibility in the development of rural roads in Karnataka (as seen from Figure 2.2 also). The quality of the roads viewed by the types of roads as shown in Table 2.3.
With respect to the lane width, out of the total 10,021 kms of State highways, single lane roads account for 59 per cent, intermediate lane roads 31 per cent, and less than 10 per cent are double lane roads. In case of major district roads, 93 per cent are single lane roads, 6 per cent intermediate lane roads and less than 1 per cent are double lane roads.

**Figure 2.2**

*Agency-wise Breakup of Road Length*

- Total
- Public Works Department
- Zilla Panchayat
- Irrigation Department
- Forest Department

Table 2.3
Surface Type-wise Break-up of Different Categories of Roads

<table>
<thead>
<tr>
<th>Length of Road Category -Km</th>
<th>Surface Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cement</td>
<td>Concrete</td>
</tr>
<tr>
<td>NH</td>
<td>90</td>
<td>3407</td>
</tr>
<tr>
<td>SH</td>
<td>108</td>
<td>9899</td>
</tr>
<tr>
<td>MDR</td>
<td>24</td>
<td>22626</td>
</tr>
<tr>
<td>ODR</td>
<td>-</td>
<td>1116</td>
</tr>
<tr>
<td>Village Road</td>
<td>06</td>
<td>10712</td>
</tr>
<tr>
<td>Taluk Devl. Road</td>
<td>-</td>
<td>368</td>
</tr>
<tr>
<td>Irrigation Dept.</td>
<td>03</td>
<td>646</td>
</tr>
<tr>
<td>Forest</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>231</td>
<td>48789</td>
</tr>
</tbody>
</table>


2.5. Organisational Structure on Road Development

a. Public Works Department (PWD)

PWD is one of the very old departments of the State. For a long time this is the only engineering department looking after all engineering related activities. Subsequently the original department was bifurcated into PWD (Roads and Buildings) and Irrigation Departments.

Associated organisations with PWD are:

- Karnataka Road Development Corporation Limited (KRDCL).
- Karnataka State Highway Improvement Project (KSHIP).
- The Chief Architect, Karnataka, Bangalore (CA).
- Port and Inland Water Transport (PIWT).
b. The major activities of the Department are:

- Collection of field data on existing road network (NH, SH and MDR) and bridges for upgradation, improvement and maintenance.
- Traffic survey and preparation of database.
- Investigation, survey, planning, design, preparation of estimates, tendering, implementation of new road projects, upkeep and routine annual maintenance of existing roads including quality assurance/checking.
- Preparation of estimates, including structural designs, for the buildings of Government departments, construction including quality checking/assurance.

With increasing deterioration of roads, it is necessary to concentrate more and more on maintenance. It is always felt that PWD should concentrate on maintenance activity of roads alone and leave the construction activity to other bodies/cells such as KRDCL and KSHIP. For instance, Karnataka State Highway Improvement Project (KSHIP) is a Special Project Implementation Unit (PIU) in the mainline PWD. The main functions of KSHIP are upgrading 991.38 km of State highways and major maintenance work of 2,268.50 km of State highways, costing around Rs. 2,030 acres (mainly funded by World Bank). KSHIP functions like a corporate entity with adequate financial freedom.
The Task Force for Road Works setup by Government of Karnataka in September 2000 felt that there is no synergy between the road maintenance activity and building maintenance activity, without building construction. Therefore, it is recommended that the buildings related activity be separated from PWD.

As an efficiency augmenting measure, there is a need to make a distinction between public provisions and public production. In case of PWD, while Government should provide, it need not always produce the entire service. Greater efficiency can be achieved if some of the services are contracted out to the private sector for production. In PWD, it is possible to explore several areas that can be entrusted to the private sector for greater efficiency.

c. The areas of outsourcing could be:

- Surveys and investigation,
- Quality control,
- Guest houses,
- Vehicles of the department, and
- Gangmen for maintenance

2.6. Karnataka Road Development Corporation Limited (KRDCL)

KRDCL, which is the wholly owned enterprise of the State Government, was created in July 1999 for the development of road infrastructure in Karnataka. It is governed by a Board, which is the final decision making authority. Main functions of KRDCL include:
➢ building roads and bridges,
➢ facilitate BOT entrepreneurship and collection of tolls
➢ to take up priority works, and .
➢ to borrow funds for the above.

The Corporation has taken up mini works and the important ones are:

i) Construction of 147 bridges on the various State highways and major district roads of the State.

ii) Maintenance of 7,038 kilometres of State highways,

iii) Strengthening and four-Laning of existing Bangalore Mysore State Highway in different phases, etc.

Most of the road construction activity is undertaken by KRDCL and KSHIP, leaving behind only the maintenance of the road network (State highways and MDR) to PWD staff. The improvements and maintenance of national highway is taken up by PWD staff under National Highway Zone with funds from Government of India.

Vehicular traffic in Karnataka irrespective of inadequate infrastructure facilities has increased phenomenally in the recent year. In 1990-91, the number of motor vehicles were 14, 33,000 and this increased more than four-fold to 48,76,000 in 2003-04. Motor vehicles per lakh of population have touched 6,879 in 2001-02 much above the all-India number of 5,723 but below that of Kerala, Tamil Nadu and Maharashtra.
2.7. Resource Allocation on Road Development

Inefficiency in resource utilisation stems from the processes followed in the Government towards decision making and disbursement of funds. While funds do flow through the government, in case of the corporations/PIU, the funds are in the nature of a dedicated account and there is no uncertainty in terms of flow of funds. In the case of department, processes are too cumbersome, flow of funds is erratic, and disbursement of funds is influenced by several other considerations as can be seen from Table 2.4. It can be noted that in case of State funded works, only 40 per cent of the Letter of Credits (LoCs) sought are released whereas in the case of NABARD, almost the entire amount was released.

The increased in growth in the traffic volume and the ever increasing loads cause greater distress on the road pavement, calling for higher outlays for the maintenance and development of the road network. Proper maintenance is essential to provide desired quality of riding and performance. The budgetary allocations both at national and State level always fall short of the requirements.
Table 2.4

Distributed of Funds under Different Schemes (2000-01)

<table>
<thead>
<tr>
<th>Month</th>
<th>LoCs Sought (Rs. in lakhs)</th>
<th>LoCs Released (Rs. in lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State</td>
<td>NABARD</td>
</tr>
<tr>
<td>April 2000</td>
<td>273.1</td>
<td>700.0</td>
</tr>
<tr>
<td>May</td>
<td>258.0</td>
<td>900.0</td>
</tr>
<tr>
<td>June</td>
<td>253.0</td>
<td>500.0</td>
</tr>
<tr>
<td>July</td>
<td>278.5</td>
<td>700.0</td>
</tr>
<tr>
<td>August</td>
<td>490.5</td>
<td>500.0</td>
</tr>
<tr>
<td>September</td>
<td>475.0</td>
<td>600.0</td>
</tr>
<tr>
<td>October</td>
<td>446.0</td>
<td>525.0</td>
</tr>
<tr>
<td>November</td>
<td>529.0</td>
<td>350.0</td>
</tr>
<tr>
<td>December</td>
<td>521.0</td>
<td>600.0</td>
</tr>
<tr>
<td>January 2001</td>
<td>821.0</td>
<td>900.0</td>
</tr>
<tr>
<td>February</td>
<td>856.5</td>
<td>500.0</td>
</tr>
<tr>
<td>March</td>
<td>1985.0</td>
<td>500.0</td>
</tr>
<tr>
<td>Total</td>
<td>7182.6</td>
<td>7275</td>
</tr>
</tbody>
</table>


a. **The existing sources of financing are as under:**

- Government budget including sovereign borrowings,
- Central road fund,
- Fee/toll on bridges,
- Market committee fee, and
- Other levies/surcharge.

The plan outlays and expenditure on roads and bridges showed a quantum jump from Rs. 953 crore during Ninth Five Year Plan period (1997-2002) to Rs. 3949.46 crore in the Tenth Five
Year Plan period (2002-2007). In the annual plans of the Tenth Five Year Plan which was lower in the First Annual Plan 2002-03 at Rs. 602.39 crores was raised to Rs. 1,074.94 crore in 2003-04 and little less than this in 2004-05 at Rs. 1,057.89 crores. Similarly, in respect of outlays were enhanced progressively. But, as observed earlier, these are far inadequate to meet the ever increasing traffic volume in the State. This is revealed also in the budgetary allocation of the State. In Karnataka, budgetary allocations are not adequate to meet the growing demands. Budgetary allocations of the State in the last five years is shown in Table 2.5

**Table 2.5**

**Budgetary Allocation-PWD: Government of Karnataka**

*(State Highways and Main District Roads)*

<table>
<thead>
<tr>
<th>(Rs. in Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Allocation</td>
</tr>
<tr>
<td>Expenditure</td>
</tr>
<tr>
<td>Non Plan Allocation</td>
</tr>
<tr>
<td>Expenditure</td>
</tr>
</tbody>
</table>


Clearly, there is a need to enhance budgetary allocations on road developments. It is estimated that the funds needed to maintain the existing network in Karnataka are about Rs. 9,100 crores at 2000-01 price level. Thus, the budgetary allocations are quite insufficient to meet this demand.
In order to meet the ever-increasing demand for maintenance and to expand the road network, there is need to tap all possible sources of finance-public, private and foreign. It is, therefore, recommended to create a separate road fund for the State. The funds raised from every source may be credited into this fund.

- Levy of cess on transport related items-petrol, diesel, various engine oils, CNG used as fuel by automobiles, tyres and tubes, motor vehicle spares, etc.

- Toll on roads and bridges-developed out of dedicated fund.

- Special cess on the use of the roadway by agencies like electricity, telephone, water supply, sewerage, Internet service providers, cable operators, etc.

- Betterment levy on land and property where there is value addition due to formation of new roads.

- Commercial exploitation of land adjoining highways-hotels and resorts, service facilities, workshops, truck terminals, etc.

- Private participation and development of roads construction of bypasses, bridges, improvements of road on BOT, BOOT, BOST, BT, BOO, BOLT, etc.

- External aid-World Bank, ADB, OECF, borrowing from domestic financial institutions.

- Fines and penalties levied on vehicles carrying overload.
➢ Certain contribution/levies by industries such as cement manufacturers, vehicle manufacturers, etc.

➢ A cess on activities such as ore carrying, movement of granite blocks, etc. that causes higher distress to the road pavement.

➢ Open market borrowings by bonds, debentures.

➢ Road cess on first time registration in the State.

➢ Highway Infrastructure Savings scheme similar to NSCs, KVPs, etc.

It is advisable to give top priority for improvement in road maintenance standards in the State by making the required investment. A part of this expenditure may be recovered from the beneficiaries or the road users, by charging special levy or cess on petroleum products, tyres and automobile parts. This is in tune with the present day concept of user or beneficiaries to pay for the services.

The National Highway Act 1956 and Karnataka Highway Act 1964 have been amended to permit private entrepreneur to undertake National Highway and State road projects on build own and transfer (BOT) basis and recover the investments through tolls. Policies have been framed both by the Central and the State Governments extending financial support to investors. New road links such as bypass roads and major bridges may be opened for private sector under BOT system.
b. Towards Better Governance

New thinking on several counts are necessary if major shifts in road development and maintenance are to be scaled up. Capacity building and human resource development on a continual level is a must for development of any organisation. Side by side, one has to improve the capability for efficient delivery of programmes and this would need attention on several fronts, first being the FWD and KRDCGL departments, directly concerned with roads.

Secondly, some alternative strategy is also worth experimenting. For sustained improvement in implementation of projects, development of contracting industry in the highways sector on healthy lines is imperative. A major push in the direction of improving the contracting industry in India came in 1985 when for the first time, the Government of India, while seeking loan assistance for roads from the World Bank (WB) accepted to adopt international competitive bidding (ICB) procedures for the highway projects forming part of the loan package. In order to encourage modernisation and mechanisation (both these words were considered synonymous), size of the project was kept at Rs. 100 to Rs. 150 million at that time. State PWDs and NHAI have huge road upgradation programmes in their hands. The volume of works envisaged is 5 to 6 times the current capacity of contractors in the highway sector. It will, thus, be necessary to create conditions of growth for domestic contractors and support from foreign contractors.
Thirdly, some changes in construction technology are also necessary. India's road construction technology was essentially labour-oriented till the 1980s. The strategy then suited the needs to absorb the unemployed in road construction and maintenance, working with small size of contract packages, and loaded with a policy of import-substitution, which prevented the State-of-art equipment to be imported into the country. The economic reforms introduced in 1991 have enabled a major impetus to import world-class road making equipments. The tightening of the specifications facilitated the use of modern equipment. The use of vibratory rollers for compaction has become common. Electronic sensor controlled. Asphalt pavers have replaced the old technology mechanical pavers.

Fourthly, there is a need for consistency in the quality of road construction and incorporation of quality aspects in the organisations and agencies entrusted with the task of road construction has assumed paramount importance. Adoption of ISO 9000 systems has a good impact on quality, productivity and cost reduction. Both the government departments and the private sector contractors and consultants are progressing in acquiring such certifications as a demonstration of their determination and resolve in supplying quality product and/or service.

The Indian Roads Congress have evolved guidelines on quality systems for roads and bridges. To facilitate preparation of appropriate quality system for individual road and bridge projects, application of these guidelines by all those involved in road building activity would lead to achievement of high quality in highway projects.
The major components of quality assurance consist of:

- supplier's quality policy,
- purchaser's quality policy,
- internal quality systems,
- documentation, and
- work culture

2.8. Policy and Vision for the Future

Karnataka is one of the well developed States of India. However, the growth of road network in the State of Karnataka has not kept pace with the requirements. It is a recognised fact that modernisation of infrastructure, specially transportation plays a vital role in enhancing the growth rate of any region. It is important to recognise the fact that road connectivity to rural areas is a must for improving the socio-economic conditions of rural people. The major objectives of the road sector development should aim at creating adequate capacity to match the demand, all weather roads for all villages, modernisation of construction activities and appropriate strategies to maintain the road networks.

The State is borrowing money from external agencies, specially from World Bank to the tune of Rs. 2,300 crore for maintenance and upgradation of State highways. Government of Karnataka has created a Special Cell, known as Karnataka State Highway Improvement Project (KSHIP) as a project implementation unit in the mainline Public Works Department to utilise these funds. Karnataka Road Development Corporation was set up in
1999 to undertake maintenance of 75,000 kilometres of road network and construction of ISO bridges and to borrow money from external agencies. Along with these privatised ventures, the PWD also requires a face lift. It should be made responsible only for road works, delinking from building maintenance activities.

A perusal of Public Works Department expenditure reveals that the meager amounts allocated to training and development of staff is not utilised. In this era of specialisation it is essential to upgrade skill and competence of the staff of the department through refresher courses, long-term training and research. There is no human resource policy followed in rewarding the performers in the department. There is an urgent need to upgrade capacity building and human resource development in the organisation associated with road development.

There is also a need to change the current practices in the contracting industry and construction technology. Quality systems for different components of the road sector need to be reviewed and upgraded. It is felt that quality assurance activity may be outsourced for better quality control. The State does not maintain a well-developed database covering the road network, traffic data, accident records and maintenance information. Development of such a database helps in preparing long-term maintenance management plans. Being an IT hub in the country, the State can develop such a database very easily.

In order to derive optimal benefits from scarce resources it is essential to develop master plans for roads in each district, based on the guidelines developed by Indian Roads Congress. Combining
all the district master plans could develop a perspective plan covering a time period of 20 years. It helps in prioritising the road construction activities in different districts based on the resource availability.

There is a necessity to augment the resources for highway projects by allowing private sector participation in highway projects. It is estimated that to maintain the existing road network in Karnataka, about Rs. 9,000 crore are required at 2001 price level. Furthermore, a number of additional levies on transport related activities such as additional cess on petrol/diesel, motor vehicle spares, etc., could be considered. It is felt that a Karnataka Road Fund may be created and all the revenues generated for the road development may be transferred to this fund. In order to encourage professionalism for the road sector this fund may be managed by a group of experts drawn from different stakeholders.

The vision for the State should be to raise the road coverage to around one km per one sq. km area. Such a vision should be targeted in the next 10 years, ahead of other developments.

2.9. Railway Transport

Railways occupy the premier place amongst modern means of transport. They are most advantageous in the movement of heavy and bulky traffic, like the raw materials in industry over long distances. Trains are run on exclusive tracks, hence they can maintain a high average speed up to and about 50-60 miles per hour. The speed of road vehicles is limited to 30-35 miles per hour, because the safety of other vehicles using the road would other
wise be endangered. The carrying capacity of a railway is very large and adequate to meet the demands of heavy and intensive traffic. As railways is subject to the law of increasing returns, the greater the traffic, the cheaper the railway service likely to be.

The challenge of air transport to the railways over long distances is only confined to high class passenger and goods traffic where speed is no consideration. Inland waterways and coastal steamer also compete with railways in the movement of bulky goods. For short distance traffic, road transport is a serious competitor to the railways.

There has been a close connection between the State and railway systems in all the countries because of their public utility nature. Railways provide an essential service to the community and the economic development of regions is very largely depended on the provision of cheap and the efficient railway services. Moreover, railways, by virtue of their power of providing an essential service, hold a virtual monopoly and thus the State has to guard against the abuses of discrimination by railways. Further, without government section, it might not be possible to construct a railway line at all, because the land over which tracks are laid down has to be acquired from the owners under special government orders. The State may also have to help in the provision of the heavy capital outlay which is increased in producing railway services. The capital investment of the Indian Railways in 1969-70 amounted to Rs. 3259 crores. However, once railway begins operating, it has an advantage over their means of transport in as much as it is subject to the law of increasing returns.
a. Rail Infrastructure in Karnataka

One of the critical sectors which determine the pace of economic development of a State is the basic transport infrastructure, of which rail network is very important, perhaps next only to roads. Karnataka as a State has an unique geographic position as it is linked by major metro cities \textit{viz.} Chennai in the extreme east, Hyderabad in north, and Bombay on western side; besides, Karnataka has a coastal belt with an average width of 50 to 80 kms and covers a distance of about 267 kms from north to south with Mangalore as a major commercial port and nine other minor/intermediate ports. Bangalore, one of the fastest growing cities in the world, is the preferred investment destination for many multinational and global business houses. Karnataka has emerged as an educational hub in the country, attracting students and teachers from allover the country. It has also recently, becomes a hub of employment opportunities for various backward areas of the country. For a State that is so networked, transport connectivity is essential. The northern parts of the State are rich in mineral resources, especially iron ore. It is against this backdrop that the development of rail infrastructure for Karnataka State assumes increasing significance.

b. Recent Policy Development and Impacts

The three major factors that have influenced the growth and development of railways, which in turn had a major impact on the economy of the State and will continue to do so in the future, are the following:
active participation of the State government in major railway projects

the uni-gauge policy of Indian Railways, and

formation of South Western Railway.

In September 2000, Government of Karnataka entered into a Memorandum of Understanding with the Ministry of Railways to form the Karnataka Rail Infrastructure Development Company Ltd., (K-RIDE) with "the specific objective of developing and financing rail infrastructure projects in the State. K-RIDE has since been incorporated and a business plan prepared. Among the projects taken up by K-RIDE that would play an important role, in development in the years to come some are highlighted as follow

Hassan-Mangalore gauge conversion project (185 kms- at the cost of Rs. 312 crore). This line provides critical linkage to the New Mangalore port for movement of iron ore, general cargo (about 4.66 million tonnes per year), and POL.

Sholapur-Gadag gauge conversion: Connectivity to heritage and tourists centres like Bijapur, Hampi, Aihole, Badami, Pattadakal and Koodalsangama. GoK and MoR are jointly implementing this 134 crores project that is expected to be completed by 2005 to handle a cargo traffic of 2.33 million tonnes per year.

Conversion of part of the line between Sholapur and Bijapur (94 kms.) was completed in 1998 and balance 190 kms. stretch from Bijapur to Gadag remains to be converted.

New line between Kottur and Harihar: (65 km, Rs. 124 crores): The cost sharing is between GoK (2/3) and MoR (1/3). The project when completed will provide a direct line
for moving iron ore from Bellary and Hospet to Mangalore port.

- Doubling of Bangalore-Kengeri-Ramanagaram line (4.5 kms. Rs. 91 crores): One-third cost being borne by Railways and two-thirds by Government of Karnataka.

- Hospet-Guntakal doubling (115 kms. Rs. 154 crores): This is expected to handle iron ore traffic of about 12.67 million tonnes per year.

- New line between Hubli and Ankola: (167 kms... Rs. 998 crore) The projected traffic for this line after commissioning is expected to be about 11.72 million tonnes per year.

Besides these K-RIDE projects, as many as 43 rail overbridges and rail underbridges have been sanctioned on cost sharing basis with Government of Karnataka. In addition, there are as many as at least 5 new projects under consideration.

South Western Railway was created as a new railway zone consisting of 3-divisions at Hubli, Mysore and Bangalore and with headquarters at Hubli. It has provided a major impetus in the development of the Railway over the State, covering 2,559 BG and 492 MG kilometres touching 5 States viz. Karnataka, Andhra Pradesh, Tamil Nadu, Maharashtra and Goa. With its head quarters at Hubli, it is expected that this will also enable to reduce the regional disparity within Karnataka. A large number of gauge conversion projects have already been initiated after the creation of this new division. About 25 gauge conversion projects have been either completed or in progress, whereas 25 projects have been identified with a total of 2,645 kilometer lengths to be taken up in due course.
c. Impact of Gauge Conversion on Rail Traffic

The impact of gauge conversion, in terms of traffic handled, over the three divisions in Karnataka has not been uniform. Being passenger traffic oriented division, having no major freight loading station in this jurisdiction no major freight change has been observed in Bangalore Division, attributable to gauge conversion.

Mysore Division which is a small division in terms of traffic handled recorded significant impact in respect of operating indices. A comparison of 1985-86 and 2002-03 situation (Tables 2.6 and 2.7) indicates that:

- The wagon balance has dropped by 32 per cent, because of 95 per cent improvement in wagon turnaround.
- The wagon kms have also improved by 9.62 per cent.

Table 2.6
Performance prior to Gauge Conversion (Mysore Division)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wagon Balance</td>
<td>2273</td>
<td>2206</td>
<td>2197</td>
<td>2195</td>
<td>1948</td>
</tr>
<tr>
<td>Wagon Turnaround</td>
<td>4.3</td>
<td>4.2</td>
<td>4.3</td>
<td>3.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Throughput</td>
<td>1595</td>
<td>1531</td>
<td>1596</td>
<td>1584</td>
<td>1349</td>
</tr>
<tr>
<td>NTKMs</td>
<td>756</td>
<td>754</td>
<td>804</td>
<td>847</td>
<td>746</td>
</tr>
<tr>
<td>Wkms</td>
<td>63.8</td>
<td>68.2</td>
<td>74.6</td>
<td>74.7</td>
<td>62.5</td>
</tr>
<tr>
<td>Loading</td>
<td>92</td>
<td>90</td>
<td>109</td>
<td>92</td>
<td>76</td>
</tr>
<tr>
<td>EKMs (Steam)</td>
<td>105</td>
<td>122</td>
<td>119</td>
<td>132</td>
<td>145</td>
</tr>
<tr>
<td>EKMs (Diesel)</td>
<td>453</td>
<td>452</td>
<td>433</td>
<td>447</td>
<td>451</td>
</tr>
</tbody>
</table>

Table 2.7

Performance of Post Gauge Conversion (Mysore)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wagan Balance</td>
<td>688</td>
<td>885</td>
<td>1050</td>
<td>1227</td>
<td>1114</td>
<td>1192</td>
<td>1581</td>
<td>1548</td>
<td>1523</td>
</tr>
<tr>
<td>Wagon turnaround</td>
<td>2.6</td>
<td>2.8</td>
<td>2.9</td>
<td>2.9</td>
<td>2.5</td>
<td>2.4</td>
<td>3.0</td>
<td>2.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Throughput</td>
<td>736</td>
<td>962</td>
<td>1015</td>
<td>1350</td>
<td>1694</td>
<td>1695</td>
<td>1357</td>
<td>2218</td>
<td>2348</td>
</tr>
<tr>
<td>NTMs</td>
<td>1061</td>
<td>172</td>
<td>994</td>
<td>1050</td>
<td>1312</td>
<td>1585</td>
<td>1232</td>
<td>1653</td>
<td>-</td>
</tr>
<tr>
<td>WKMs</td>
<td>88.7</td>
<td>85.3</td>
<td>82.0</td>
<td>85.0</td>
<td>104</td>
<td>120</td>
<td>102</td>
<td>116</td>
<td>120</td>
</tr>
<tr>
<td>Loading</td>
<td>44.1</td>
<td>59.0</td>
<td>97</td>
<td>122</td>
<td>105</td>
<td>136</td>
<td>167</td>
<td>197</td>
<td>246</td>
</tr>
<tr>
<td>EKMs</td>
<td>476</td>
<td>510</td>
<td>525</td>
<td>420</td>
<td>555</td>
<td>557</td>
<td>588</td>
<td>556</td>
<td>545</td>
</tr>
</tbody>
</table>


- The locomotive utilisation (EKM) has shown an improvement of 30 per cent.
- The total quantum of traffic handled has also improved substantially and increase of 125 per cent. This is despite the fact that BG wagons carry one-third more freight.
- The number of wagon releases has increased by 49 per cent. The number of wagons moved (i.e. throughput) over the divisions has also increased by 47 per cent.
- As far as loading is concerned, the best loading done during MG was 5.83 1.1 tonnes in 1987-88 as against 1.67 tonnes in 2002-2003—an increase of 130 per cent.

The Hubli Division showed maximum change as the division's growth was drastically handicapped by its meter gauge infrastructure as can be seen from Tables 2.8, 2.9 and 2.10. Till the
completion of broad gauge conversions, the Hubli division was very seriously affected in its traffic handling. Once the conversion was over, it resulted in a phenomenal growth in traffic in the Hubli division, as can be seen from the indicators such as

Table 2.8
Freight Loading (Hubli Division)

<table>
<thead>
<tr>
<th>Year</th>
<th>Loading in MT</th>
<th>Year</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-95</td>
<td>2.749</td>
<td>2000-01</td>
<td>6.615</td>
</tr>
<tr>
<td>1995-96</td>
<td>2.444</td>
<td>2001-02</td>
<td>7.788</td>
</tr>
<tr>
<td>1996-97</td>
<td>3.225</td>
<td>2002-03</td>
<td>8.524</td>
</tr>
</tbody>
</table>


Table 2.9
Passenger Services (Hubli Division)

<table>
<thead>
<tr>
<th>Year</th>
<th>Loading in MT</th>
<th>Year</th>
<th>Loading in MT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mail/Esp. Pass</td>
<td></td>
<td>Mail/Esp.</td>
</tr>
<tr>
<td>1994-95</td>
<td>3620 5577</td>
<td>2000-01</td>
<td>8700 18716</td>
</tr>
<tr>
<td>1995-96</td>
<td>5934 9710</td>
<td>2001-02</td>
<td>8964 18689</td>
</tr>
<tr>
<td>1996-97</td>
<td>7623 10984</td>
<td>2002-03</td>
<td>9222 18865</td>
</tr>
</tbody>
</table>


Table 2.10
Earnings (Hubli Division) (Rs. In Lakhs)

<table>
<thead>
<tr>
<th>Year</th>
<th>Earnings</th>
<th>Year</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-95</td>
<td>11073</td>
<td>2000-01</td>
<td>36551</td>
</tr>
<tr>
<td>1995-96</td>
<td>12057</td>
<td>2001-02</td>
<td>41712</td>
</tr>
<tr>
<td>1996-97</td>
<td>14747</td>
<td>2002-03</td>
<td>42473</td>
</tr>
</tbody>
</table>

- Loading went up from 2.7 metric tonnes to 8.5 metric tonnes and an increase of 214 per cent.

- Passenger service improved steadily after gauge conversion and went up from 9,197 to 28,087 in 1994-95 to 2002-2003 an increase of 205 per cent.

- The total earnings went up from Rs 11,073 to 42,473 lakhs and an increase of 280 per cent.

As far as passenger traffic is concerned, the number of passengers carried by the South Western Railways went up from 14.3 million in 1994-95 to 26.9 million in 2001-02 indicating an increase of 88 per cent.

d. Future Directions

While surveys for gauge conversions and new line construction have been conducted and many projects are underway, it would be essential to ensure that execution is completed in the shortest possible time. The Indian Railways are facing a resource crunch with dwindling budgetary support and reducing freight earnings. While State sharing of financial resources has helped to mitigate this problem to some extent. It may be judicious to consider the possibilities of private participation in some of these projects. Already Konkan Railway Corporation is operating in about 200 kms along the coastal line of Karnataka. As mentioned earlier, many of these projects would benefit export and movement of goods from interior areas. Hence, possible partners for these sections would be iron ore exporters, coffee growers and other commodity exporters.
As far as the problem of Bangalore city is concerned, immediate action to introduce metro rail system is necessary. The growth of population in Bangalore urban area, from just about 16.64 lakh in 1971, having gone upto 56.87 lakh in 2001 is indicative enough to make a case for a rapid rail network inside the city. A good suburban rail network (either underground or elevated like in Chennai) could help considerably traffic congestion without disrupting the road network. The Government of Karnataka has commissioned a study for evaluating the feasibility of commuter rail services for Bangalore. In terms of the study, the estimated cost of development works for operationalisation of commuter rail services is estimated at Rs. 1025 crore, which includes cost of the land also, and to be implemented in the phased manner. The dialogue on the proposal for cost sharing is going on with the Ministry of Railways and Union Ministry of Urban Development.

The Government of Karnataka is funding the implementation of ROB/RUB projects in the State on a 50:50 cost sharing basis with the Ministry of Railways. The Ministry of Railways has sanctioned 38 projects in the State. The Infrastructure Development Corporation Ltd (IDCL) has been providing advisory assistance to Hassan-Mangalore Rail Development Corporation (HMRDC) for implementation of the Hassan-Mangalore gauge conversion project including technical assistance to HMRDC in coordination with Government of Karnataka, banks and equity investors for mobilising the necessary funds for the project and management of the company’s finances. The project which is in advance stage is nearing completion. IDCL has also prepared a business plan for implementation of the development of rail link to
Devanahalli Airport. The business plan which has been reviewed has been accepted by the technical committee and is awaiting the approval of the State Cabinet whereupon it would be posed to the Ministry of Railways.

2.10. Water Transport

Water transport is the cheapest kind of transport because the permanent way has already been provided by nature i.e., seas and rivers, canals. Artificial water ways are however, expensive to construct, but much less than railways. Moreover, water offers low resistance to ship sand boats, usually about one fifth of the average resistance met by trains of railways. This low resistance makes for lesser fuel costs, lower risk of damage to cargo and lower insurance costs. A ship can carry heavier loads much more effectively than any other type of transport. The biggest railway wagon cannot carry more than 50 tonnes. But an average sized steamer can easily carry 1,000 tonnes of cargo.

Water transport is best suited for carrying heavy goods of low value when the time of transit is not important, because this form of transport suffers from slowness of speed. Seas, rivers and canals in some regions of the world, freeze during the winter season, making navigation impossible. In hot countries, during the summer, rivers and canals may not have enough water for safe navigation.

The type of vehicles utilised for navigation will naturally depend upon the type of voyage it undertakes. Big steamers of 20,000 to 80,000 tonnes are used for international navigation,
while coastal ships are 5 to 10 thousand tonnes. In inland traffic over canals and rivers, sailing boats or barges of various designs and capacities are used according to local conditions.

2.11. Air Transport

Air transport has the advantage of fast speed and unbroken journeys over land and Sea. It is still, however, in a growing stage and suffers from limitations of high cost of services, dependence on atmospheric conditions and greater risks. This form of transport is suited for long distance, where speed is essential. Hence, its main function at present is that of providing express passenger services and carrying mails and perishable goods.

2.12. Ports and Airports in Karnataka

In Karnataka State, the coastal belt with an average width of 50 to 80 km covers a distance of about 267 km from north to south encompassing 3 districts viz., Uttara Kannada, Dakshin Kannada and Udupi. It has a total of 10 ports. The ports in Karnataka need further development and a New Port Policy has been formulated to meet this objective. The New Port Policy emphasises the strategic location of the Karnataka coast, halfway between Gujarat and Kerala on the Western Coast line. It also stresses the need to develop export-oriented and maritime industries like ship building. Integration of the growth of fisheries with port development is also emphasised in port policy. The Government has decided to seek private investment for the development of ports. Annual Plan allocation for the development of port and inland water transport has however seen a decline. Port-wise traffic handled also shows a
declining trend (Table 5.23). Expenditure under Annual Plan 2002-03 was Rs 7 crore whereas annual outlay for 2003-04 is Rs. 6 crore. Both Mangalore port and Karwar port get an allocation of Rs. 2.5 crore in the current Annual Plan. Port-wise traffic handled by the major ports are shown in Table 2.11. A sum of Rs. 60 lakhs has been provided in the Annual Plan 2003-04 for the development of railway over and under-bridges on State highways and major district roads.

Table 2.11


<table>
<thead>
<tr>
<th>Port</th>
<th>2001-02</th>
<th>2002-03</th>
<th>2003-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karvar</td>
<td>556</td>
<td>545</td>
<td>550</td>
</tr>
<tr>
<td>Malpe</td>
<td>09</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Mangalore (old)</td>
<td>182</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td>Other Ports</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>748</td>
<td>676</td>
<td>683</td>
</tr>
</tbody>
</table>


Bangalore International Airport Project has achieved some important milestones during 2004-05. The Bangalore International Airport Limited (BIAL) successfully concluded the Concession Agreement with Government of India in July 2004 after protracted negotiations and discussions with Government of India for over two years. This is considered to be a major breakthrough for this project as this is the first such agreement for public-private partnership venture in the aviation sector of the country. The other achievements include: (i) handing over of forest land of 1,394 acres 20 guntas for forest department to KSIIIDC, (ii) KIADB successfully
acquired an extent of 2,649 acres of private land and handed over the same to KSIIDC in August 2004 and Revenue Department has also transferred an extent of 403 acres to KSSIDC through mutation. Thus, a total of 4,266 acres of land has been assembled for this project, (iii) executing the land lease agreement between KSIIDC and BIAL for agreeing to lease an extent of 3,884 acres, 25 guntas to BIAL in January 2005, (iv) State support agreement providing for State financial support of Rs. 350 crores for the project apart from other concessions was executed in January 2005, (v) all other major project agreements such as EPC agreement, OMS agreement, CNS/ ATM agreement and financing agreement have been concluded (vi) amendment in the shareholders' agreement has been finalised, (vii) ICICI bank has sanctioned a rupee term loan of Rs.743 crores to BIAL for financing the project, (vii) National Highway Authority of India have finally agreed to provide Trumpet Inter-change from National Highway 7 to meet an access road to the airport site, (viii) with an achievement of financial close the project is expected to take-off immediately and the airport is expected to be ready in a period of 33 months from then.

As regards the development of minor airport and regional air services the Bajpe Airport at Mangalore is on the improvement and upgradation path with a new runway under construction. At the Hubli Airport, Airport Authority of India (AAI) is providing night landing facilities in order to commence night air services between Hubli and Mumbai. Proposal for setting up the airport at Gulbarga is under the consideration of Government of India. The Mysore Airport also will be re-operationalised and upgraded.
2.13. Significance of Transportation

Effective transportation is indispensable to economic progress. Mining, manufacturing, trade and banking and agriculture are also necessary, but these activities, like many others, for moving goods and people from place to place, economic and social activities can be carried on in a limited way only. Using a mobility index that combines available data on transport facilities and movement of passengers and freight, Wilfred Owen finds out that immobility and poverty go together. The countries with low per capita had a mobility index for freight and passenger transport in single digits, whereas this index was significantly high in countries with high per capita income. Indeed, a more recent study finds out that every one-percentage growth in the Indian economy presumes a growth of 1.2 to 1.4 per cent in the transport sector.

2.14. Economic Functions of Transportation

Transportation is an economic function that is to; it serves along with other productive functions in the production of goods and services in the economy.

➢ Creation of Utility: Production has been defined as the creation of utility, i.e., the quality of usefulness. Transportation creates the utility of place and to a lesser degree, that of time.

➢ As a cost of production: since transportation is a part of production, an increase in its efficiency helps in reducing the cost of producing goods and thus reduces their prices. Cheaper transportation has both direct and indirect effects
on cost of production. Directly, reduction in transport rates to overall lower production costs by lessening the outlays for assembling raw materials and shipping finished products by reducing the expense of travel. Indirectly, cheaper transportation tends towards lower cost of production by making possible more efficient extraction and manufacturing, through promoting the division of labour and large-scale production.

- Specialisation and division of labour: Transportation enables society to enjoy advantages of specializations of resources, and the benefits of labour by making it possible for products to be brought from great distance, thus avoiding the necessity for local production for all conceivable commodities of need. Each economic region can thus concentrate upon the goods and services for which it is best adapted either through natural resources endowment or through historical development. It, thus, leads to a better economic of available resources.

- Large-scale marketing. Closely associated with the forgoing fact that transportation helps to expend the size of market. No modern large scale producer could operate if he will have to serve only the local market. Obviously, a large-scale production is possible when the market extends to the whole nation and in a few cases to the whole world.

- Consumption of wealth: Transportation is also related to consumption of wealth. It increases the quality and variety of consumable goods, thereby stimulating wants. There is
more production because of the decrease in the cost of production brought about by transportation. A greater variety occurs, when transportation enables a community to enjoy even those goods that could not be produced in the immediate vicinity.

➢ Transport and exchange: Transport breaks the monopolies of areas and saves people from exploitation. On the other hand, it also ensures by carrying surplus goods to scarcity areas and, thus, balances demand and supply at both the places. By introducing fair competition in exchange, it stabilizes prices and brings uniformity of rates in different areas.

➢ Land utilization: Transport opens new avenues of economic activity, ensures effective use of dormant local resources and improves the productivity of land. A good system of transport also ensures effective utilization of inaccessible places such as forests, hills, deserts, valleys etc.,

➢ Agriculture: The role of transport in the field of agriculture cannot be over-emphasised. It increase the production and productivity of agriculture by providing facilities for improved seeds, manure fertilizers, marketing storing, financing, machines, tools and technical advice.

➢ Creation of employment: Transport has opened a large number of employment avenues. The manufacture of ships, locomotives, wagons, automobiles and other vehicles and production of their parts and accessories are to-day done by the largest industries in the world, employing labour and
capital on vast scale. Besides, the services provided by rail, road, water and air ways provide employment to millions of persons.

- Public utility concern: A Public utility concern is one which is of great public importance. Transport, like public utility services such as water supply and electricity, post and telegraphs, is also of great public significance.

### 2.15. Social and Political Functions of Transportation

Transportation performs many social and political functions.

- Transportation raises the standard of living, improved housing, clothing, food and recreation.

- It helps break the barrier of isolation by promoting social interaction and thus promotes culture and intelligence, especially in a country of the size and population of India.

- It promotes national unity as it promotes homogeneity among the people. Another reason is that it creates a need for political unity, by making the different parts of country economically interdependent.

- It helps in the strengthening of national defence. It is an important agency which helps in the mobilization of the entire resources of a country in the event of war and peace.

- In modern world, transport along with energy is the basic infrastructural requirement for industrialization. The developed countries have accepted its importance in their programmes of economic development. Transport provides
a vital link between production centres, distribution areas and the ultimate consumers. It also exercises a unifying and integrating influence upon the economy. Transport immensely helps in maintaining internal law, order, administration and justice. Internal security against anti-social elements and violent activities can never be assured in a country without efficient and prompt service of transport and communication. The timely police and military aid, service of fire-brigade etc., all require good transport system in a country.

International political relations are growing. The regular exchange of people, goods and views on the international front has strengthened political friendship amongst various countries of the world. They can help each other in times of political and economical emergencies.

Transportation has an indispensable role in providing medical assistance to the public. Modern transport facilities made it possible to provide emergency medical assistance to the people in remote areas of the State.