CHAPTER XI

SUGGESTIONS FOR IMPROVEMENT OF TRANSPORT NETWORK

There are many drawbacks, in the existing transportation system of Manipur. Much of the transport problems both in urban and rural areas in the plains and hills remain yet unresolved. The road system consisting of the National and State Highways, district and village roads of varied nature and pattern, is not quite suitable for the hilly and mountainous state of Manipur. It leads to transport bottlenecks in many parts of the state especially during the rainy season creating problems to the efficient flow of all kinds of traffic. The state's economy has remained backward for the inefficient transport system. There is, therefore, a dire need of improvement and extension of transport facilities to fulfil the requirements of an ever-increasing traffic volume on the National and State Highways, and urban roads. Improvement and orientation of transport routes should be taken up on the basis of the past and present trends of the traffic movement in its all aspects both at intra-regional and inter-regional levels.¹ The present study analyses the past and existing transportational features, and suggests

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ways and means for the improvement of the existing system of the transport network. The suggestions in the following pages may provide a sound base for transport planning. The suggested improvements in the existing transport networks and construction of new transport arteries will help in connecting the remote villages, even in the densely forested hill sections and interior valleys.

ROAD TRANSPORT

Improvement of the Highway Network: Though road plan was unknown in India before 1943, the first Road Development Plan popularly known as "the NAGAPUR PLAN" was enunciated at the Chief Engineers Conference of Nagapur in the same year. The plan had visualised to the integrated development of the roads and gave a rational classification to the roads according to their function.

The Nagapur Plan was based on the Grid and Star Formula and objectives of the Plan were that in a highly developed agricultural area, no village should be more than 2 miles from a road and 5 miles from a main road. Similarly in a non-agricultural area no village should be more than 5 miles from a road and 20 miles from a main road.
To achieve these objectives, the plan adopted "Grid and Star Formula" to determine the kilometrage/mileage of the roads.

The distributional pattern of road networks in Manipur is far from satisfactory. Only the plain districts have comparatively dense network of roads and the hill district remain partly served by roads.

New Plan

It is no doubt that most part of the state especially the hill districts are highly inaccessible due to the lack of metalled and all-weather roads. The bridges and culverts on most of the roads are narrow, weak and sub-standard, which require extensive strengthening, widening and improvement. Map 44, 45 and 46 show the Master Plan for the State Highways and Major District Roads for the 15-years period, Public Works Department (PWD) has taken up the Seventh Five Year Plan as the First Phase of the 20-years Road Plan which envisage to achieve a total length of 5,640 kms, involving construction of an additional length of 1,785 kms. This will increase the road density from 21 kms to 31 kms per 100 km² of the area. It is planned to achieve a road density of 60 kms per 100 km² by the end of 2001 A.D.
The State has got a road density of only 21 km per 100 sq. km as against the all India average of 55 kms per 100 km². As such even the district headquarters in the hills are not well connected by black-topped roads and other administrative circle offices by all-weather roads.

The road crust of the highways in state is only one-third of the required thickness. Moreover, the existing roads are broken by heavy traffic and are poorly maintained. The State Highways have the average thickness of only 15 cm crust as against the requirement of 45 cm to 50 cm. The major district roads are having only 8 to 10 cm crustal thickness at the best and some of these are only jeepable Kutchha roads. Besides, the new circle offices, sub-divisional head quarters and the health centres are yet to be connected under the 20-point programmes. In the first phase of the 20-years Master Plan for Road Development the important State Highways in the valley will be converted to double lane with requisite standard and standard single lane in the hills. The major district roads, under the plan will be full standard single lane in the valley and single lane with 30 cm crust thickness in the hills.
The salient features of the plan are given briefly as under which envisage extensive widening, lengthening, strengthening and improvement of the roads.

**State Highways**

(i) Conversion of Imphal-Moirang Road into standard double lane with 60 cm crust by March, 1995.

(ii) Conversion of Imphal-Sugnu Road, Moirang-Churachandpur-Singhat Road, Imphal-Yairipok, Imphal-Kangchup, Imphal-Ukhrul and Imphal-Sagolmang roads into standard double lane with 45 cm crust by March, 1995.

(iii) Conversion of proposed Ukhrul-Tolloi-Chingmei Khullen Road, and existing unmetalled Tadubi-Tungjoy Lai-Kharasom Road into standard single lane with 45 cm crust thickness.

(iv) Conversion of Kangpokpi-Tamenglong and Pallel-Chandel roads into standard single lane with 45 cm crust by March, 1995.
Major District Roads (M.D.R.)

(i) Conversion of Lamsang-Khurkhul Road, Pallel turning-Sugnu turning Road, Churachandpur-Sugnu Road into standard double lane with 30 cm crust by 1995.

(ii) Conversion of Sagolmang-Saikul Road, Old Cachar Road (Bishnupur-Luwanglon Khunou section), Thoubal-Mayng Imphal, Thoubal-Yairipok, Sangsak-New Heaven, Sangsak-Phungyar, Moirang-Kumbi-Wangoo-Sugnu, Sugnu-Chakpi-karong, Ukhrul-Tolloi-Chingmeikhullen roads into standard single lane with 30 cm crust.

(iii) Conversion of unmetalled M.D.Rs such as Ukhrul-Kharasom Road, Sangsak-Chassad Road, Old Cachar Road (Khoupum Section), Thingkew-Henglep, Sugnu-Chandel, New Keiphungdai-Phaklong, Maram-Willong roads into standard single lane with 30 cm crust.

(iv) Conversion of Mayang Imphal-Bishnupur, Maram-Willong Road, Singhat-Behang road, Awang Kasom-Chingai Road, Phungyar-Chassad Road, etc. into State Highways with 30 cm crust by March, 1995.
Other District Roads (O.D.R.)

There were 30 O.D.Rs during the Sixth Five Year Plan. These roads in the hills connect large villages and administrative head quarters and in the valley - Small towns and big villages. Bus services ply on most of these roads.

Important O.D.Rs are (i) Andro Road, (ii) Hiyangthan-Nambol Road, (iii) Mahadeva-Tolloi Road, (iv) Pheidinga-Leimakhong Road, (v) Pukhao-Kanglongbi Road, (vi) Thanga-Sendra and Thanga-Keibul Lamjao Road and, (vii) Chassad-Kamjong-Nambasi Road. Besides, 28 O.D.R.s are being taken up during the Seventh Plan period. Important among them are (i) Molnom-Sanakeithel Road, (ii) Siroi Lamkhai to Gamnom, (iii) Phiziliyai to Phuba Maiba Road, (iv) Khunutabi to Machi, (v) Baruni Road, (vi) Lilong-Hiyangthan Road, (vii) Cinam-Wangoi Road, (viii) Nungba-Longpi Road, (ix) Takyel-Chari Road, (x) Thoubal-Charangpat Road, and (xi) Maram Purul Road etc.

Inter-Village Roads

There are a number of village roads in the
outskirts of Imphal and other towns, and notified areas. They serve as important link roads, approach roads and byepasses for the major arterial roads and highways converging into the towns. The plan envisages construction of all-weather villages roads which are to be widened to the full standard with some permanent bridges and culverts.

The Planning Commission has proposed that all the villages above 1500 population and 50% of the villages having population between 1000 to 1500 should be connected by All-weather Roads by the end of 1990. The North Eastern Council (NEC) has proposed to construct various roads in Senapati, Tamenglong, Churachandpur, Ukhrul and Chandel district to connect them with neighbouring states of Nagaland, Assam and Mizoram etc. Map 47) shows the proposed roads of economic importance to be constructed by the NEC.

Some Specific Suggestions

The State Government have planned to the conversion, construction, strengthening, extension and widening of the various classes of roads in the state during the plan period. The road development
plan also conceives construction of an outer ring road along the border and an inner ring road in valley. These objectives and plans are quite sound and suitable for the hilly strategic state of Manipur.

The following suggestions for development of some link roads are based upon the findings of the existing networks through topological indices which normally need either development, construction or improvement to remove the imbalances in the economic structure through planned development of roads.

1. Construction of new roads and improvement of other roads at district level: The tables 11.1, 11.2 and 11.3 show the required number of links or roads and nodes or vertex to be developed. In this connection there should be 33 lines or roads to link 15 transport nodes in Imphal district in the first phase of the plan i.e., in the first 5-year. Similarly 17 edges or lines and 13 nodes in Thoubal District, 13 edges and 8 nodes in Bishnupur district, 18 edges and 13 nodes in Senapati district, 30 edges and 20 nodes in Ukhrul district, 20 edges and 12 nodes in Chandel district, 25 edges and 12
nodes in Churachandpur district and 24 edges and 14 nodes in Tamenglong district have also to be developed. Thus, the total edges in the state will increase to 178 and nodes to 108 indicating a rapid development in transport network. During the 2nd and 3rd five year phases, the number of edges would be increased to 230 and 250, and nodes to 115 and 120 to have a more connectivity and accessibility.

2. Better road surfaces and provision of bridges: The roads have to be widened and strengthened. At present 34% of the State Highways have the width of less than 3.75 m, which have to be brought to full standard of 5.5 m and 7.00 m within the least possible time. Strengthening of the existing section of Tadubi-Tungjoy-Lai-Kharasom (16 kms), Imphal-Ukhrul (21 kms), Tiddim road (10 kms) should be completed by adding at least 2 layers of Water Bound Macadam (WBM) and Black topping. Further the State Highways, which are radiating from Imphal, should be widened and strengthened because of their importance, traffic volume and density. The National and State Highways, and other important roads in and around Greater Imphal area should be widened to four
lane structure to carry different types of traffic. The roads from Singjamei to Chingmeirong on the N.H. 39, Imphal to Tera Keithel on the N.H. 53, and Imphal to Kwakeithel, Imphal to Naoremthong, Imphal to Lamjlong and Imphal to Kongba bazar have to be taken up in the first phase. All the district headquarters are not well connected with each other and mostly have indirect linkage. Hence, the construction of new roads to provide interconnection to each district town should be taken up. Important administrative centres, market centres and large villages both in the hills and the valley, should also be linked by all weather roads with black top surface. The inaccessible parts like Tousem, Haochong, Longpi have no motorable roads, only jeepable roads during the dry season, that too with much difficulty, should be connected with major district roads. Besides, there are many places and centres even without jeepable road during the dry season. There are many wooden bridges over the rivers in between the high hill ranges which are not repaired for the years together and get damaged. This leads cut off of those areas from the rest of the state, converting the accessible parts into
inaccessible. Similarly there are many villages in the interior in Chandel district, which are not connected by jeepable road in dry season, farthest of them can be reached by two day's walk from the nearest jeepable road. Most of the roads are in pitiable condition, not maintained at all for the past many years. About 86% of the villages are 5 kms away from surfaced road in Chandel district, and 80% are 10 kms from a surfaced road in Ukhrul District. The two sub-divisions—Chingai and Kasom Khullen are inaccessible during the rainy days. The sub-divisional headquarter of Henglep and other important villages in the interior forested areas in Churachandpur district remain inaccessible during the rainy days. The Churachandpur-Tipaimukh Road faces difficulties during the rainy days as it is too narrow for negotiating two vehicles from opposite directions as well as its steep gradient. The border villages in the northwestern part of Senapati district are also inaccessible during the rainy season. Thus, many villages in the interior areas, especially in the hill districts, are inaccessible during the rains, while some of them are totally cut off both in the dry and wet seasons because of the road damages and collapsing of bridges. Hence,
plans for construction of new roads to link the remote villages in each district have to be taken up to link them with nearby metalled roads. A few suggestions at the district level for augmenting the transport network is given below.

**Chandel District**

(i) Construction of major district roads to connect important villages viz. Tengnoupal-Sangsak Road to link the villages north of N.H.39, Moreh-Humine Road to connect the border villages north of Moreh, Moreh-New Samtal Road to bring the border villages closer on the south of Moreh, Khunutabi-Machi Road to connect Machi with N.H.39 near Pallel, Serou-Yangdung Road to bring the villages on the south-western part of the district.

(ii) The IVRs connecting Chandel with Wokmu, and Chakpikarong-Joupi-Yangoulen road should be converted into M.D.R.s and be improved to have good connection with many villages and the sub-divisional headquarter.

(iii) The different roads radiating from Chandel should also be improved and widened and the IVRs be extended to link other villages.
(iv) Proper maintenance of roads should also be taken up.

**Churachandpur District**

(i) The existing M.D.R.s, viz, Thinkew-Henglep, and Singhat-Behang roads should be brought to standard single lane road.

(ii) The road from Thanlon to Singjok should be brought to standard to connect the border villages on the south.

(iii) The I.V.R. connecting Singhat with Thanlon and Thanlon with Nungba should be constructed to make the interior villages accessible throughout the year. Thingkew-Henglep Road should be extended to connect Old Cachar Road near Luwanglon Khunou to provide an access to Bishnupur.

**Tamenglong District**

(i) Construction of M.D.R.s to connect Kangchup with Haochong and further with Tamenglong, extension of New Keiphundai-Tousem Road upto Phaklong Khunou and Tamei
Tamenglong-Tousem road via Saramba to bring the remote villages in the interior nearer to the district headquarters.

(ii) Conversion of Tamei-Kuilong, Kuilong-Chalwa I.V.R. into M.D.R., construction of Kuilong-Wilong Road, and Senapati-Kuilong Road to bring the villages in these sections closer to the district headquarters.

(iii) Adequate maintenance of these roads have to be accorded priority.

**Senapati District**

(i) Construction of Kangpokpi-Saikul-Sanakeithel Road, Senapati-Huioni, Senapati-Purul and Maram-Purul roads to connect with Phaibung Khullen, and Humine on the south.

(ii) Construction of Senapati-Kuilong, and Mao-Wilong major district roads to provide easy access to these parts.

**Ukhrul District**

(i) Conversion of Sangsak-Kamjong, Sangsak-
Phungyar, Phungyar-Kasom Khullen, Kamjong-Humine roads into major district roads.

(ii) Conversion of IVR connecting Chingai with the Ukhirul-Jesami Road, and Sangsak-Shampur-Chammu and Humine-Moreh roads into M.D.R.s.

(iii) Construction of O.D.R. from Kharasom- to Tusom Khullen, Chingai-Chammu, Chammu-Kamjong, Kamjong, Phungyar-Nongdam to bring the villages nearer to the district and sub-divisional headquarters.

**Imphal District**

(i) Construction of Gwaltabi-Sawambung-Sekmai-Leimakhong-Kangchup-New Keithelmanbi-Bishnupur, and Nambol-Khumbong-Lamsang M.D.R.s to connect these nodal centres.

(ii) Construction of I.V.R. in the rural areas to connect all the villages with 1000 population.

**Thoubal District**

(i) Construction of Yairipok-Wangjing and Heirok-Machi M.D.R.s to connect the intervening villages with
these nodal towns.

**Bishnupur District**

(i) Construction of M.D.R. from Bishnupur to Mayang Imphal.

(ii) Improvement and extension of various I.V.R.s in the district to connect all the villages.

3. The co-existence of traffic: The problem of co-existence of different types of traffic on all the transport arteries especially the urban roads and National Highways should be resolved by introduction of properly divided traffic lanes as it is divided at some section of N.H. 39 at Imphal.

4. Reconstitution of Organisation set-up: The decline in the passenger as well as the goods service by the Government Transport Agency i.e. Manipur State Road Transport Corporation may be due to many factors. Earlier the corporation had the monopoly over the passenger bus services from Imphal to other states. But this has been relaxed and operation by the private owners have
been permitted. The intra-state bus services have been mostly operated by private owners and transport societies. The operation of the buses on all the routes is not regular except on Indo-Burma Road and Tiddim Roads. While on other routes, there is great irregularity and fluctuation, hence passengers suffer due to overload and long waiting. Stopping of buses are very frequent, hence speedily movement is not possible. Overtaking is very frequent on some roads which occasionally leads to loss of lives. Besides, the various modes of vehicles are also plying at their own will. The two and three-wheelers, for their frequent overload cause accidents and loss of lives of the pedestrians.

Considering the drawbacks of the organization, the Government should reform the earlier transport laws, regulations and traffic rules. There should be separate regional and district level transport authorities to administer the transport sector which should control the punctuality of bus services on all aspects in the interest of the common people.

5. **Statutory Relaxations**: Earlier the State Government had the monopoly over the inter state passenger services
as well as goods traffic. However, this has been relaxed to a great extent these days. The private operators and societies/agencies are allowed to operate their vehicles for inter-State services.

**RIVER TRANSPORT**

There is no navigable river in Manipur, which may be used as lines of movement for both people as well as goods. But rivers were used in the past for transportation of goods and people for short distances in the valley and Barak basin areas, which subsequently declined due to the introduction of various speedy means of transportation on the land. However, in the interior parts of Barak and Jiri river valleys, river transportation still thrives for the lack of good roads. The forest produces are transported by river transport.

**Improving the Barak River Navigation**: For the revival of river transport in the state, it is essential for the state Government to take some conservancy measures. Dredging should be carried out under the control of some technical experts. The flow should be regulated. The few narrower portions within Churachandpur district should be widened to allow power driven ferries to enter to collect the people as well as valuable forest produces
from the interior parts. If these measures are taken up, the Barak river navigation will be revived with help of existing country boats and canoes and power driven boats. It will bring required transformation in the economic structure of the region and outlook of the people.

Air Transport

Due to the absence of rail and river services, there is great need of Air transport because only the road transport could not carry all the traffic in the state. Hence, it may be suggested to have daily services between Imphal and other capital cities and towns of the neighbouring states. The two boeing services operating presently should not be interrupted and curtailed. The Vayudut services should be extended to more places, i.e. Kohima and Aizawl. The air fare should be rationalized for this economically backward state. Imphal airport should be provided with night landing facilities.

Railways

Manipur has an ambitious plan for extension of
railways. At present the rail extension is being provided up to Jiribam, which will certainly bring a welcome change in the economy of the state, particularly of the Barak basin area. Further extension of railway line from Jiribam to Imphal will be a time consuming and costly affair, taking not less than 10 to 15 years. It is, therefore, suggested to introduce local railways in the valley areas viz. from Churachandpur to Gwaltabi via Moirang, Bishnupur, and Imphal, (92 kms), and Sugnu to Kangpokpi via Kakching, Mayang Imphal, Imphal and Sekmai (113 kms) at its first phase of the project (Map 48). Power available from the Loktak Hydro-Electric Project can be used for the operation of these railway services. At its second phase of development, Singhat can be linked with Churachandpur, Gwaltabi with lower Hundung (Ukhrul), so that a total distance of about 172 kms can be reached within 3-4 hours, while a bus would take more than 6 hours from Singhat to Ukhrul. Again Chakpikarong could be connected with Sugnu, and Senapati on the north could be linked with Kangpokpi which will take hardly 3-4 hours from Chakpikarong to Senapati. But a bus would take more than 6 hours. This would save the valuable
time, energy and money of the people, traders and workers in their movement to these distant places. This would also give an easy transportation of goods especially vegetables and fruits from the distant villages within a short time. Ultimately the economy would be totally changed. Besides, inter-town tram services can also be introduced.

Pipeline Transport

At present, consumption of various lubricants and oils e.g. diesel, petroleum and kerosene and of L.P.Gases have increased immensely. Inward transportation of these fuels from the neighbouring states is quite costly affair and time consuming exercise. At present these are transported through Nagaland on the N.H. 39 by trucks and tankers. Sometimes the transportation of these articles as well as food stuffs are blocked by the unwanted abnormal situations in Nagaland as well as within the state territories due to the natural disturbances like landslides, mass solifluc-
tions, sliding of the roads etc. Hence, there is always derth of fuel for movement of vehicles and machineries, and other uses. It is, therefore, proposed to lay the
pipelines for transportation of fuel and L.P.Gases and Natural gases from the neighbouring states of Assam and Tripura. These pipelines should be laid through Jiribam towards Imphal and a suitable site should be selected for disposal of the fuels and gases. Consequently there will be no impact of road blockage. Refuelling or bottling of gas cylinders can be done by establishing a bottling unit/plant at Imphal itself. Once this is done, distribution of these materials among the districts will be easier (Map 49).

Ropeways

Ropeways, in most of the hilly countries of the world, have become very popular these days. Ropeways save energy, time, space and distance. They are used for transportation of both the people and goods.

In Manipur, there are many probable sites for ropeways. The high ranges and the narrow and deep valleys do not permit the easy construction of roadways but are quite favourable sites for laying the ropeways. The N.E.C. also has proposed to link some of the important hill towns viz. Haflong with Tamenglong and Kangchup, and Mao with Kangpokpi and Ukhrul, Jiribam with Barak etc.
by ropeways. Besides it is also proposed to link
(1) Nungba and None with Jiribam, (2) Tamenglong with
Kangpokpi, (3) Ukhrul with Kamjong and Humine on the
eastern border. Besides, Henglep can be linked with
Loktak Project Town and Thingkew and Nungba with Kh-
oupum and Bishnupur. Construction of ropeways(Map 50) will
facilitate transportation of some of the valuable
forest produces, agricultural produces, and fruits
which are widely grown in these hill areas. This
would also give a boost to the hill economy of the
state and will bring prosperity to the people.

Urban Transport

General Principles of Urban Transport Planning: In most
of the urban areas, narrowness of the streets and lanes,
lack of demarcation of traffic portion such as travelled
portion, traffic separators, road mergins etc. are the
problems. These problems cause traffic congestion, acci-
dents, and other traffic hazards in most of the newly
grown unplanned towns. Thus, the principles to be followed
essentially are that the vehicles with different speed
capacities, should be separated from one another in prop-
er order so that one does not constitute a hazard to the
other in their movement.

Another essential requirement of the urban transportation is classification of road according to their functions. The following measures are necessary for the efficient functioning of the city and urban transport.

(I) Organisation of wide networks of primary road.

(II) Street and highway design according to function and contemporary needs.

(III) Prevention of roadside encroachers and illegal occupation of the land on the side of primary and secondary roads.

(IV) Location of parking sites wherever needed.

(V) Elimination of road-side parkings especially in areas of heavy traffic.

(VI) Proposal for the primary trunk road through the town and city.
Another important principle for urban transport is to orient the organisational set up. In this connection the Municipal boards or the town committees should establish a transport development wing to conduct survey on various aspects of transport and traffic to identify the volume, origin and destination, speed, parking, loading etc. This would help in the designing of the transport and traffic planning in the city and towns, and will provide a help to the departments of the Government as well as academic institutions for further research about the transport sector.

With these few general principles of urban transport planning, the following few suggestions can be made to improve the transportation system of some of the towns in Manipur.

**Some Specific Suggestions**

**Imphal**: The heavily congested roads of Imphal need improvement and designing of the road system. The C.B.D., as well as the Thangal and Paona Roads have heavy traffic. Other branches of these roads such as Mahatma Gandhi Avenue and Dharmasala road are also congested with all types
of vehicles and traffic. The National Highway No. 39, which is on the eastern side of the main market area, is also heavily congested with all types of fast and slow-moving vehicles. The other radiating roads such as Uripok-Kangchup road, Tiddim Road, Mayng Impal roads are also heavily traffikied. This congestion hampers the speedy movement. Moreover, the width of the roads are comparatively unsuitable to the increasing volume of traffic. Parking spaces are not properly located. To avoid these difficulties, it is suggested to construct an overbridge or flyover along the Naga nala and Nambul River from Khoynathong point uptoo Keisamthong bridge and further uptoo Pishumthong bridge to divert the NH-39. This diversion will allow speedy movement of vehicles without entering or passing through the congested market areas. It would also provide enough parking spaces for all types of vehicles on both sides of the nala and river allowing the water to flow undisturbed with proper side walls (Map 51). The existing parking sites inside the town area are not suited to the increasing traffic volume. These parking sites could be located on the side banks of Naga and Numbul Nalas. Bus parking sites are located at Deulaland. Tiddim Road, New
Cachar Road, Uripok Road, Mayang Imphal Road, Yairipok Road and Ukhrul Road need immediate widening upto Kwa-keithel, Tera, Naoremthong, Fishumthong, Kongba bazar and Lamlongkeithel respectively to at least double lane with demarcation of each types of traffic, which ultimately will provide easy flow of the traffic.

Churachandpur: In addition to the existing road, it is suggested to improve and widen the roads like (a) Saidan Road, (b) Sielmat approach road, (c) Molvaiphei Road, (d) Gangpimol and (e) Ngathal approach road. Besides, the roads like Saidan to Salbung, Tuibong to Marveng, linking roads of Tipaimukh and Tiddim Road near Bongmol, and south of Don Bosco High School are to be developed. The existing bus parking is very congested. Hence, it is suggested to shift it on the eastern side of the Tiddim Road on a suitable site.

Kakching: In order to provide good transportation facilities, it is suggested to improve and widen the approach roads in the town, like Hospital Road, College Road, etc. Besides it is also proposed to widen the Sugnu Road.
Rural Transport

The villages are not always connected by good roads. During the rainy season the bridges and culverts are sometimes washed away or slid down by torrential streams in the hills. Moreover, the village roads in the hills can not be utilised for the vehicular traffic because of difficult terrain and alignment. These roads and tracts should be improved to allow the vehicular traffic all the year round. In the plain areas, the rural roads should be brought to the standard of all weather roads to allow the bullock carts and the automobiles to move throughout the year. Inter- and intra-village roads should be improved by providing better surface condition and extended to far-flung villages, not yet linked with the arterial roads. Besides and culverts are sometimes kept unrepairsd for months and years together and hence the villagers face difficulties in their movement. There is need for a regular repair programme for bridges and culverts to keep the flow of traffic going on the rural roads. The rural roads
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### TABLE 11.3

**SIMPLE TOPOLOGICAL INDICES FOR TRANSPORT NETWORK DEVELOPMENT**

**THIRD STAGE**

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<th>Cyclomatic</th>
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| Total            | 178   | 120    | 59.00         | .2510      | 1.4833           | .5028           |
should be improved at least to have good connectivity of the villages to the nearest market place or urban centre. The construction of new roads, phase by phase, as stage I, stage II and stage III at district level should be taken up to have a balanced growth of road network in the state.

The measures suggested above for the development of road transport in each and every sector/field require speedy implementation to make the living of the people happier and peaceful. These measures will be immensely helpful to the State Government in planning the road development in this frontier tract of the country.