

PMGSY - Roads to Prosperity



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Guidelines

Principles and Objectives

- The Pradhan Mantri Gram Sadak Yojana is a special central intervention as part of a poverty reduction strategy. Though rural roads are a State subject, the Central Government is providing financial assistance as a Centrally Sponsored Programme.
- The primary objective of the Programme is to provide connectivity to unconnected habitations in rural areas by means of all-weather roads. Habitations with a population of 1000 and above



Assam

- shall be eligible in the first phase, and those with a population of 500-1000 shall be eligible in the second phase.
- In respect of the Hill States (the States in the North East, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttaranchal), the desert areas as identified in the Desert Development Programme and the Tribal Areas (Schedule V), the objective is to connect habitations with a population of 250 and above.
- The programme envisages single connectivity. If a habitation is connected to another habitation by an all-weather road, no further work can be taken up under the PMGSY for that habitation.
- The programme provides for the upgradation of the existing Through Routes to prescribed standards to enable full farm-to-market connectivity.

Planning for Rural Roads

- In each district, the District Panchayat has approved its District Rural Roads Plan indicating the existing road network system and also the roads proposed for connecting the unconnected habitations to the existing road network, in an economical and efficient manner.

Making of Rural Roads





Management and Monitoring

Because PMGSY depends on clear and detailed procedures, with inbuilt time and quality parameters, monitoring and management of the programme is not only systematic but also highly amenable to computerization. An on-line (internet based) computerized software has been operationalised by C-DAC, an Agency of Ministry of IT, with the intention of

- Creating a database of rural roads.
- Tracking annual proposals from preparation of project to completion of works.
- Making available a simple and transparent accounting system.
- Ensuring maintenance management.

The basic principles of this On-line Monitoring and Management System (OMMS) are that: -

- Data is entered at point of origin, i.e. at PIU level.
- The same data is available in processed form at SRRDA and NRRDA levels with facility to drill down to basic units i.e. 'road and 'habitation'.
- MIS outputs are tailor-made to suit PIU, SRRDA and NRRDA needs and eliminate paper reporting.

The OMMS has been created as a transparent (to citizen) website based information system with access to all stakeholders: PIUs, SRRDA, STA, SQC, NRRDA, NQM etc. to enable pooling of data emanating from a variety of sources. The effective working of the institutional structure implementing PMGSY and the successful and continued operationalisation of the OMMS are very closely bound in a symbiotic relationship. OMMS is available at www.pmgsonline.nic.in.



Kerala



Karnataka

- Out of this Plan, the District Panchayat has identified a Core Network consisting of some of the existing roads as well as all the roads proposed for new connectivity under the programme, in order to provide at least single access to all connected/eligible habitations. The Core Network is the basis for all planning in the rural roads sector.
- The rural roads of the Core Networks have been classified into 'Link Routes' which end in habitations and 'Through Routes' which connect many link routes to the market centre.
- The District Rural Roads Plan and Core Network have been finalized by the District Panchayat in consultation with the Intermediate Panchayat/ Panchayat Samiti and elected representatives.

Annual Proposals

- Each year the list of road works to be taken up under the PMGSY is finalized by the District Panchayat, in accordance with the funds allocated to the district by the State Government. The District Panchayat shall finalise the list through a consultative process involving the lower-level Panchayati Raj institutions and elected representatives. It must be ensured that the road works are part of the Core Network and that new connectivity is given primacy as per the order of priority.
- In a District where unconnected eligible habitations still remain, proposals will be made for connecting



Himachal Pradesh



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West Bengal

such habitations. The rural Through Route associated with such proposed links may be taken up for upgradation or renewal based on a condition survey, provided the road is over 6 years old and its condition is less than 'good'.

- In a district where no unconnected eligible habitations remain, upgradation of rural Through Routes can be taken up in the following priority:-
 - *Priority I*: WBM Roads.
 - *Priority II*: Other Fair Weather Roads.
 - *Priority III*: Through routes at the end of their

design life, i.e. over 10 years old, whose condition is 'poor' or 'very poor'

- Inter-se prioritization of roads of a District will be done on the basis of population, to prepare Comprehensive New Connectivity Priority List (CNCPList) and Comprehensive Upgradation Priority List (CUPList).
- In plain areas, the population of all habitations within 500 metres radius shall be counted for purpose of determining population size. In hill areas the radius shall be 1.5 km of path distance.

Contractor does not maintain quality or fails to deploy the requisite equipment & machinery and key personnel or establish site laboratory for testing.

Maintenance

All the works of new connectivity are contracted out for routine maintenance for 5 years along with the

construction contract. After the completion of construction work, the contractor is required to attend to the rain cuts, shoulders, drains, CD works and potholes etc. for 5 years and keep the road in good serviceable condition under normal traffic and climatic conditions.

The payment for maintenance will be made separately to the contractor by the State Government.



Hand Feel test for WBM



Field Laboratory & Quality Control Register- Assam

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Stages in Construction of Rural Roads

Quality Control

Quality starts with proper survey and design. Under PMGSY, the designs are scrutinized by State Technical Agencies (STAs) to ensure scientific design catering to local soil, terrain, climate and traffic requirements in the most economical manner.

Quality during construction being equally important, a three tier quality control mechanism has been devised the first tier consists of the contractor's field laboratory, where tests are to be carried out as per prescribed Quality Control Hand Book at various stages of the work, under supervision of the Programme Implementation Unit (PIU). The second and third levels consist of randomised inspection by independent Quality Monitors employed by the State Nodal Agency and National Rural Roads Development Agency respectively.

The majority of the tests are carried out to determine the workmanship including compaction of the various layers, and the nature and quality of the various granular and other materials used.

The motto in PMGSY is that relentless testing and merciless quality control is the only guarantee of a well constructed road.

Contract Management

PMGSY not only provides for transparent and purposeful tendering to get competent contractors, but once the work is awarded to the Contractor, it also ensures that the contract is managed professionally to get the requisite



Field Laboratory- Jharkhand

quality. Before the work is started, the Contractor has to prepare a work programme and deploy the necessary machinery and equipment for construction. The Contractor is also required to engage engineers and other personnel. The contract can be terminated if the

- Exceptions to the schema outlined above can be made for roads that link the village Panchayat headquarters, market centres or educational, medical or other essential services or notified tourist destinations.
- Under the PMGSY, the proposals of the MPs are to be given full consideration. A list of unconnected habitations (with population) in each District, along



Rajasthan

with a list of roads identified to connect them as part of the Core Network, should be sent to the MPs. It is incumbent on the District Panchayat to ensure that, while framing the proposals, full consideration is

given to the proposals given by the MPs within the framework of the Guidelines.

State Level Organisation

- Each State Government has nominated a Nodal Department, which has overall responsibility for the implementation of the PMGSY in the State. The State Government has nominated a State level agency (generally called State Rural Roads Development Agency or SRRDA) to receive the funds from the Ministry of Rural Development.
- The SRRDA is responsible for overall management and accounting, and its staff includes a Financial Controller, Empowered Officer, State Quality Coordinator and IT Nodal Officer. The Programme Implementation Unit (PIU) at District level, each headed by an engineer not below the rank of Executive Engineer is operationally responsible to the SRRDA.
- Each State Government has set up a State-level Standing Committee (headed by the Chief Secretary) to vet the Core Network and the annual project proposals to ensure that they have been formulated in accordance with the guidelines. The Committee is responsible for close and effective monitoring of the programme, and oversees the timely and proper execution of road works.



Clearance of Proposals

- After approval by the District Panchayat, the proposals are forwarded through the PIU to the SRRDA. The agency vets the proposals in accordance with the guidelines and places them before the State-Level Standing Committee.
- The State-level Standing Committee scrutinizes the proposals to see whether they have adhered to the Guidelines and whether the recommendations of MPs have been taken into account.



Tamil Nadu

- After clearance of the State-level Committee, the Detailed Project Reports (DPR) are prepared for

each proposed road work, and the design and estimates are got scrutinized by a State Technical Agency (STA) nominated by the Ministry of Rural Development.

- At the stage of preparation of DPR, the PIU organizes a 'Transect Walk' in collaboration with the Gram Panchayat to finalise the alignment and sort out land and other issues.
- The SRRDA consolidates the proposals from each PIU after verifying that they have been duly scrutinized by the respective STAs and forwards the State annual proposal to the National Rural Roads Development Agency (NRRDA), the agency of the Ministry of Rural Development for management of the PMGSY.
- The NRRDA examines the proposals from the SRRDA to ensure that they are in line with the programme guidelines, that they have been duly verified by STAs and that the proposals have been entered in the Website database. The proposals from the State are considered by an Inter-Ministerial Empowered Committee, chaired by Secretary, Ministry of Rural Development. The representatives of the State Governments are invited to attend the meetings.



Cross Drainage & Protection Work- Meghalaya



Hill Protection Work- Himachal Pradesh



Culvert with adequate protection- Tamil Nadu



Side Drainage in built-up areas - Andhra Pradesh

Stages in Construction of Rural Roads



Cost Effective Vented Causeway- Madhya Pradesh

Surface Drainage, Side Drainage, Cross Drainage and Protection Works

Proper Cross Drainage is an important requirement for constructing a long lasting road. Integration of side drains with cross drains is also to be ensured. The drainage along and across the road has to be proper, so that water does not erode the road structure. Drainage has to be planned as part of road design. In the case of

Hill roads, catch water drains must be provided and integrated with cross drains. Drainage of the road surface itself is extremely important. This is achieved by providing a gentle slope of 3% (depending upon the surface) on either side of the central line of the road. This slope is called Camber, and it has to be uniform along the length of the road except at curves, where the outer surface is raised (super elevation) to balance the centrifugal forces on the vehicle.



Haryana

Tendering & Execution of Works

- After formal clearance by the Ministry of Rural Development, the SRRDA tenders the cleared works as per the Bidding Document of the State Government approved by the NRRDA.
- Tenders are called from qualified contractors with proven capacity to execute such works with due attention to quality and time. The contractor has to deploy appropriate machinery and equipment and set up a Quality Control Laboratory at site. Each contract is to be completed in 9-12 months.

Quality Assurance

- Every contractor has to follow the "Specification of

Rural Roads" published by IRC and Quality Control Handbook prescribed by NRRDA. All the mandatory tests are performed and record is kept in the Quality Control Registers maintained by him at the field Quality Control Laboratory. At least 50% of the tests are to be done in the presence of the PIU engineers.

- Each State Government has appointed a State Quality Coordinator (SQC) of the rank of Superintending Engineer or above. He deposes independent State Quality Monitors (SQM) every month to check and report on the quality of the execution. All defects pointed out are required to be removed immediately by the contractor.
- NRRDA deposes National Quality Monitors (NQM), who are retired Chief/ Superintending Engineers. NQMs inspect road works in order to guide PIUs to improve contract management and technical quality of the works.
- In case a road under construction is found to be unsatisfactory, the defect has to be rectified or removed by the contractor.
- In case a road is found to be unsatisfactory on completion, action is initiated against the contractor/engineer at fault.

type, stabilized soils and soil aggregate mixes, blended if necessary, with coarser materials, so as to provide a surface that is suitable for withstanding both traffic loads and rainfall. The key parameters determining suitability

are the Plasticity Index (PI) which determines the resilience of the surface to traffic load and Liquid Limit (LL) of the material, which determines if the surface becomes slushy after a rainfall.



Dry Rolling of WBM in confinement - Madhya Pradesh



*Wet Rolling WBM-
Tamil Nadu*

Stages in Construction of Rural Roads

Survey, Planning and Design

To construct a good road, adequate survey, proper planning and design are required. The alignment of the road has to be decided to ensure proper road geometrics, gradient and effective drainage. A rural road generally consists of basic formation (embankment or cut-formation) and pavement over which the traffic moves. The top 30 cm layer of the formation is compacted more rigorously and is called sub-grade.

The design and composition of the layers of the road above the sub-grade is determined on the basis of traffic and rainfall conditions. Generally if the traffic is very low, as would be the case of link roads connecting to population below 1000, and the annual rainfall is below 1000 mm, an unsealed surface (gravel etc.) is adequate. If the number of commercial vehicles is higher, then a sealed road may be required. In such a case, the pavement consists of a number of layers; the type of layer and their thickness is determined by the nature of ground, strength of soil and also the traffic intensity. These layers are sub-base course (compacted granular

material like gravel and sand etc.), base-course (watered, rolled and compacted metal and screening, generally called Water Bound Macadam or WBM) and surface course (thin bituminous layer). These layers are constructed to distribute loads and stresses caused by traffic from the upper layers to a wider area of the sub-base course and sub-grade. The road surface is sealed with a bituminous surface to keep out water and prevent the layers from raveling.

Design of Unsealed Roads

Unsealed Roads, normally known as Gravel Roads, are designed so as to limit the compressive stress on the sub grade imposed by traffic loads and the amount of deformation undergone by the layers. The thickness and the composition of different layers in the pavement are determined with respect to sub-grade soil strength and expected traffic in the design life period. When the roads are unsealed, they would be left with a gravel base which also acts as Surface Course. When properly treated, unsealed roads offer good riding surface, though they may not be dust-free.





Maintenance

- All PMGSY roads are under 5 year defect liability of the Contractor and maintained by him under a contract for the 5 year period. Funds for the maintenance contract are provided from the State Budget. In case of rural Through Routes, a further 5 year Zonal Contract is to be entered into at the end of the initial 5 year period.

Convergence

- Road connectivity is not the goal. It is the means to ensure that essential public services like health, education, employment, access to markets etc., are available to all citizens. State Government agencies and Panchayati Raj Institutions will ensure that all related programmes focus on providing these services to habitations connected under PMSGY, so that the multiplier effect of rural road connectivity is fully exploited.

Feedback

All feedback and complaints may be made to the State Quality Coordinators of the State concerned.

This pamphlet gives only some of the important provisions of the Yojana. The PMGSY Guidelines issued by the Ministry of Rural Development may be consulted for further information.



Assam

Please visit the PMGSY websites at:-
www.pmgysy.nic.in (Ministry of Rural Development)

www.pmgysyonline.nic.in (National Rural Roads Development Agency)

Stages in Construction of Rural Roads

Wearing Course

After the WBM layers have been constructed, the surface and wearing course, which forms the surface of the road is constructed. For rural roads, this layer is generally a two coat Surface Dressing (SD) or Premix Carpet (PMC) with Seal Coat. In Surface Dressing, hot Bitumen is sprayed on the brushed WBM Surface and small size metal aggregate (chips) are spread out evenly and rolled using road roller. In PMC, the aggregate and Bitumen are hot mixed and laid at a temperature of about 125° C and rolled using a road roller.

'Cold Rolling' may also be done using Bitumen emulsion which can be worked at atmospheric temperature.



Planned Operation: Mini hot mix Plant and Roller



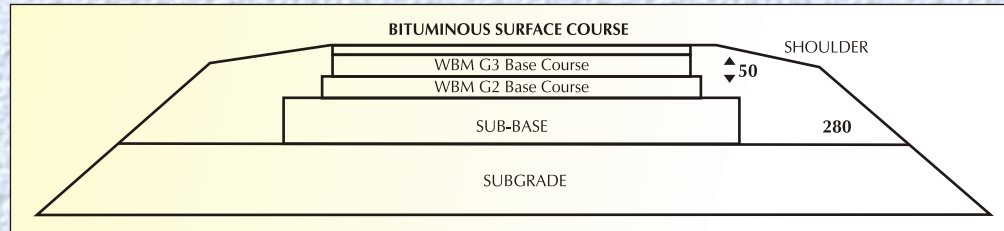
Rolling of Premix Carpet - Rajasthan



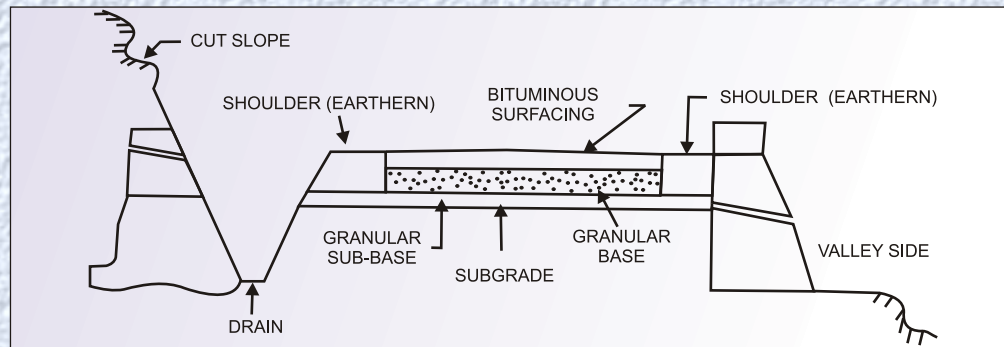
Cleaning of WBM and Laying Premix Carpet - Rajasthan



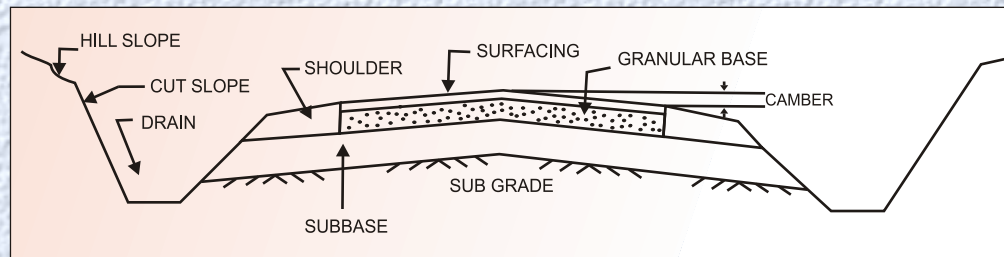
Road in Embankment



Road in Side Hill Cut



Typical Cross Station of Rural Road in Hill Cut



A proper design essentially consists of determining the right type and thickness of these layers, in the most economic way for design life of 10 years, based on the soil, terrain, climate and traffic conditions along the road.

Stages in Construction of Rural Roads

Construction of Granular Sub-base and Base Layers

After the laying and compaction of the Embankment, a sub-base layer of granular material (sand, gravel or stone, slag, concrete, etc. in crushed form) is laid and compacted properly. Metalling of the Road by base

(crushed rocks, possessing adequate strength, hardness, toughness, durability and of the right shape) which is spread over the road surface and compacted dry by repeated passing of a road roller. After this dry rolling of metal, screening material (to fill the spaces between the metal pieces) is added and again the dry rolling is done. After sufficient compaction, water is added and the wet rolling is carried out with road roller to achieve the full compaction. If required, the binding material is also added to avoid raveling of the metal. The strength of the layer to sustain the traffic load comes from the interlocking of the metal pieces achieved by the compaction. A number of WBM layers with progressively smaller sized metal may be done depending on the strength of the sub-grade soil and traffic intensity.



Aggregate Laying in Camber - Madhya Pradesh

course layers of Water Bound Macadam (WBM) is then carried out systematically. WBM is constructed by spreading and compaction of coarse and fine aggregates. The coarse aggregate is generally metal

Where it is economical, Wet Mix Macadam (WMM) can be used in place of WBM, since WMM comprises of laying and compaction of controlled premixed granular material (stone aggregates), and provides better strength.

Construction of Unsealed Roads

Construction of Unsealed Roads are on same lines to that of sealed roads except that they stop with the construction of gravel sub base and base. The material for unsurfaced roads include natural soils of a certain

Stages in Construction of Rural Roads

Road Geometrics

Every Road in the Programme has to conform to the prescribed Geometric Standards laid out in Rural Roads Manual. The width of the road is determined on the basis of expected traffic. While the carriageway width would generally be 3.75 m, in case of link routes to habitations with population less than 500, since traffic is likely to be very low, carriageway width may be kept as 3.0 m. Curves on the road should be gentle enough to allow traffic to move at prescribed speed limits, with adequate

sight distance. All this requires careful surveys at planning stage.



Tamil Nadu

▲
Compacting of Earth
▼



Spreading & Compacting Earth



Madhya Pradesh



Adequate Roadway and Carriage Way-Tamil Nadu



Well designed curve and super elevation



Madhya Pradesh



Well-designed intersection – Himachal Pradesh





Gujarat



Tamil Nadu

Good Geometrics



Orissa

Stages in Construction of Rural Roads

Earthwork and Sub-grade

An embankment is generally constructed wherever required, to raise road level to avoid later damage to the road by surface water and ground water. Height of the embankment is decided on the basis of the ground profile and should be generally 0.6 m above the High Flood Level (HFL). Good soil for embankment is laid in layers and compacted using Road Rollers. Fly ash can also be used for embankment construction.

The Sub-grade is the top 30 cm thickness of the earthwork which is constructed by using better selected



Spreading earth - Tamil Nadu

soil and compacted with higher effort. Complete and proper compaction is crucial to building a long lasting



Site clearance - Tamil Nadu

road. While creating an embankment, in addition to the road width, shoulders are also provided and compacted to protect the road and provide additional width to allow vehicles to pass each other.



Cutting and Stacking - Himachal Pradesh