

# RURAL ROAD MAINTENANCE TRAINING MODULES FOR ENGINEERS & CONTRACTORS

## Success stories

Since large and medium-sized contractors are generally not interested in small maintenance work in remote areas, routine maintenance such as cleaning of drains and culverts, dressing of shoulders, cutting of shrubs and trimming of grass, maintaining road signage, surface patching and pothole repair can gainfully be done by small contractors from the local community or by the villagers themselves through community contracting. This type of work does not require specialised skills or heavy equipment and generates income for and ownership by the users. Besides, if carried out regularly, it slows down the rate of deterioration of roads thus allowing less frequent resurfacing while ensuring that roads remain passable/ motorable through out the year.

In a pilot project in Himachal Pradesh, Performance Based Maintenance Contracts (PBMC) are used to involve small contractors for routine maintenance. Another option of such pilot project in Himachal Pradesh small Performance Based Maintenance Contracts are being executed through small contractors with the stipulation that only local community shall be engaged for off-carriageway maintenance and, in addition,

PILOT PROJECT	
Performance-Based Maintenance Contracts	
Himachal Pradesh	
2 Pilot Projects	Kandaghat Block, Solan District
2 Pilot Projects	Dharampur Block, Sloan District
1 Pilot Projects	Kunihar Block, Solan District
1 Pilot Projects	Solan Block, Solan District
Uttarakhand	
1 Pilot Projects	Raipur Block, Dehradun District
PBMC with Community Contracting	
Himachal Pradesh	
2 Pilot Projects	Solan Block, Chamba District

at least minimum 20% of this local community engaged shall comprise female workers. It is observed that the maintenance of such pilot roads is far better than that of other roads and a person travelling on these pilot roads is immediately struck by the difference in the level of maintenance. Although only 5 months have elapsed since the introduction of these pilots on the ground but the feedback is an indicator of the initial success of these pilots.

In Meghalaya, community involvement in road maintenance is planned by signing a contract with the local community to undertake off-carriageway maintenance task. This Pilot also has immense potential for positive potential.

## The road ahead

- To ensure Rural Roads Asset preservation, there is a need to appreciate the importance of regular and timely maintenance.
- The training modules will need constant adaptation on the basis of feedback from participants as well as revision to include new technologies in road construction and maintenance. The modules for contractors in particular would be translated into Hindi or other regional languages, shortly.
- Job creation and skills development can be enhanced through selection of small contractors for maintaining roads through Performance Based Maintenance Contracts as well as through the hybrid system of PBMC model using local community for the off-carriageway component of the maintenance works. Encouraging small local contractors to undertake such maintenance contracts and their engaging local community to perform these tasks would go a long way in providing employment opportunity to the local public, as well as help in development of skills in these activities.
- More investment in rural road maintenance will boost the business of small, local contractors with spin-off effects on rural employment and mitigation of out-migration.



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Ministry of Rural Development



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Organization



NRRDA

IMPACT ASSESSMENT STUDY OF IMPROVED RURAL ROAD MAINTENANCE SYSTEM UNDER PMGSY





# Rural Road Maintenance Training

The Pradhan Mantri Gram Sadak Yojana (PMGSY) has played a major role in improving accessibility to markets and essential services for people living in far flung villages in India by constructing and upgrading about 4,50,000 kms of rural roads since its inception in 2000. Contracts given under this scheme provide for high quality construction and maintenance by the contractor for a period of five years after which the responsibility for maintenance is handed over to the State road agency. The benefits in terms of social and economic development, as a result of investment made for increased and improved road network, can be sustained only if these assets are properly maintained on a regular basis over time. To achieve this the training of field engineers, contractors and their staff is essential.

## The partners

The International Labour Organisation (ILO) under the Employment Intensive Investment Programme (EIIP) has partnered with the National Rural Roads Development Agency (NRRDA) of the Ministry of Rural Development (MoRD), to build the technical and managerial capacities needed for proper maintenance of rural roads. As part of a two-and-a-half-year programme that began in February 2013, the ILO has designed and delivered training for master trainers for further imparting training to engineers and contractors involved in road maintenance works in the States of Bihar, Himachal Pradesh, Jharkhand, Meghalaya, Punjab, Rajasthan, Uttarakhand and Uttar Pradesh, being the participating states under, World Bank supported Rural Roads Programme II. The ILO has also assisted these states in imparting further training to engineers and the contractors' personnel, in the field.

## Achievements

Two sets of nine training modules each were developed to enhance the technical and managerial skills of the engineers of the State road agencies and of the technical staff of the contractors who carry out road maintenance. An in-house cadre of master trainers has been formed to roll out these courses with a view to reaching all the engineers employed by the State road agencies concerned as well as large, medium and small contractors, including those based in the communities that are serviced by PMGSY roads.

In a short span of about six months training using these modules have been rolled out at the state levels to impart maintenance training to a total of more than 6000 persons in the eight States.



## Training Modules for the Field Engineers

Module	Objectives
<b>Module 1:</b> Introduction	<ul style="list-style-type: none"> <li>To know why maintenance is important</li> <li>To know classification of road maintenance</li> <li>To know each components of the road</li> <li>To know the standards applicable for rural road maintenance works</li> </ul>
<b>Module 2:</b> Technical Consideration and implementation arrangements	<ul style="list-style-type: none"> <li>To Be able identify different forms of contracts</li> <li>To be aware of the options available under community contracting</li> <li>To under the force account system</li> </ul>
<b>Module 3:</b> Financing rural road maintenance	<ul style="list-style-type: none"> <li>Process of assessing funds requirement</li> <li>Various funding options available for maintenance of rural roads</li> <li>Preservation of existing road assets</li> <li>Optimal utilization of available funds—prioritization of works</li> </ul>
<b>Module 4:</b> Planning, inspection, reporting and monitoring	<ul style="list-style-type: none"> <li>To understand maintenance management cycle</li> <li>To be able to conduct road inventory and condition survey</li> <li>To know the road priority index</li> <li>be able to plan and organize their maintenance works in a systematic and efficient manner</li> <li>To be able to monitor maintenance works</li> </ul>
<b>Module 5:</b> Appropriate setting out techniques	<ul style="list-style-type: none"> <li>Use various basic setting out aids</li> <li>Set out side drains</li> <li>Check that the side drains are cleared for free flow of water</li> <li>Set out mitre drains and find the end of excavation</li> <li>Set out road cross-section of road</li> </ul>
<b>Module 6:</b> Hand tools, equipment and construction materials	<ul style="list-style-type: none"> <li>To be able to identify various hand tools and equipment used for road maintenance works</li> <li>To understand the importance and advantage of good quality hand tools</li> <li>To be able to identify the various soil types</li> <li>To be able to conduct field test to determine the suitability of the construction materials used in road works</li> </ul>
<b>Module 7:</b> Routine maintenance work method	<ul style="list-style-type: none"> <li>To be able to identify the cause of the deterioration of the road components</li> <li>To be aware of types of road maintenance</li> <li>To be able to identify best intervention options available for the routine maintenance activities</li> <li>How each of the routine maintenance activities are implemented</li> <li>What the performance indicators of each activities are</li> </ul>
<b>Module 8:</b> Occupational health & safety, environmental issues and decent work	<ul style="list-style-type: none"> <li>To be able to identify the occupational health issues and mitigation measures</li> <li>To be able to identify the safety issues at road maintenance worksites and mitigation measures</li> <li>Temporary road signs used during road maintenance works</li> <li>To be able to identify the environmental issues arising out of road maintenance and mitigation measures</li> <li>To be aware of laws in place in India concerning Health, Safety and Environmental issues</li> </ul>
<b>Module 9:</b> Contract Management	<ul style="list-style-type: none"> <li>To understanding of the procurement procedure of works</li> <li>To manage work contracts more efficiently</li> </ul>

## Training Modules for the Contractors Technical staff

Module	Objectives
<b>Module 1:</b> Introduction	<ul style="list-style-type: none"> <li>To know why maintenance is important</li> <li>To know classification of road maintenance</li> <li>To know each components of the road</li> <li>To know the standards applicable for rural road maintenance works</li> </ul>
<b>Module 2:</b> Technical Consideration and implementation arrangements	<ul style="list-style-type: none"> <li>To be able identify different forms of contracts</li> <li>To be aware of the options available under community contracting</li> <li>To under the force account system</li> </ul>
<b>Module 3:</b> Construction measurement and basic calculations	<ul style="list-style-type: none"> <li>To be able to use correct measurement units</li> <li>To be able to calculate areas</li> <li>To be able to calculate volumes</li> <li>To be able to calculate slopes and gradients</li> </ul>
<b>Module 4:</b> Planning and work organization	<ul style="list-style-type: none"> <li>To be able to assess the impact of planning</li> <li>To be able to develop tools for planning, reporting and control of maintenance works</li> <li>To be able to plan and organize their maintenance works in a systematic and efficient manner</li> </ul>
<b>Module 5:</b> Appropriate setting out techniques	<ul style="list-style-type: none"> <li>Use various basic setting out aids</li> <li>Set out side drains</li> <li>Check that the side drains are cleared for free flow of water</li> <li>Set out mitre drains and find the end of excavation</li> <li>Set out road cross-section of road</li> </ul>
<b>Module 6:</b> Hand tools, equipment and construction materials	<ul style="list-style-type: none"> <li>To be able to identify various hand tools and equipment used for road maintenance works</li> <li>To understand the importance and advantage of good quality hand tools</li> <li>To be able to identify the various soil types</li> <li>To be able to conduct field test to determine the suitability of the construction materials used in road works</li> </ul>
<b>Module 7:</b> Routine maintenance work method	<ul style="list-style-type: none"> <li>To be able to identify the cause of the deterioration of the road components</li> <li>To be aware of types of road maintenance</li> <li>To be able to identify best intervention options available for the routine maintenance activities</li> <li>How each of the routine maintenance activities are implemented</li> <li>What the performance indicators of each activities are</li> </ul>
<b>Module 8:</b> Occupational health & safety, environmental issues and decent work	<ul style="list-style-type: none"> <li>To be able to identify the occupational health issues and mitigation measures</li> <li>To be able to identify the safety issues at road maintenance work sites and mitigation measures</li> <li>Temporary road signs used during road maintenance works</li> <li>To be able to identify the environmental issues arising out of road maintenance and mitigation measures</li> <li>To be aware of laws in place in India concerning Health, Safety and Environmental issue</li> </ul>
<b>Module 9:</b> Costing and Tendering	<ul style="list-style-type: none"> <li>To understand tendering process</li> <li>To be able to calculate unit rates</li> <li>To understand the tendering process</li> </ul>

Training Record by State	Training Record by State			
	Trainers	Engineers	Contractors	Total
Bihar	75	460	280	815
Himachal Pradesh	28	824	101	953
Jharkhand	16	310	88	414
Meghalaya	76	394	340	810
Punjab	24	213	8	245
Rajasthan	59	884	261	1,204
Uttarakhand	9	517	80	606
Uttar Pradesh	54	760	422	1,236
<b>GRAND TOTAL</b>	<b>341</b>	<b>4,362</b>	<b>1,580</b>	<b>6,283</b>

## Course content and Objectives

The course for engineers focuses on planning, monitoring of road conditions and supervision of work done by contractors whereas the course for the staff of contractors develops technical skills for the different types of maintenance. Both courses have components that are taught in the classroom as well as on-site. Some topics such as the standards applicable for rural road maintenance works, forms of contracts, planning and organization of maintenance works, hand tools and machines required, appropriate setting out techniques and quality control of construction materials and their suitability to local conditions are common to both sets of modules. In addition, the course for engineers includes rules concerning occupational safety and environmental protection, road and drainage design, administering budgets and raising funds and performance indicators of routine maintenance while the course for contractors deals with understanding the causes of road deterioration, the difference between routine, periodic and emergency maintenance, the tendering process and practical aspects of measurement and unit calculation.

## Benefits of training

The detailed training modules covering various aspects of maintenance have generated intense interest amongst both the engineers and the contractors as to the importance of proper and timely maintenance of the rural road network. There is now awareness that regular maintenance of the roads would result in lesser damage to the roads leading to savings in maintenance costs both in the short term as well as the long term by way of slowing down the normal deterioration process thereby ensuring an increased time interval before resurfacing is required to be carried out. With constrained budget for maintenance, there is now a growing realization that regular maintenance of both the carriageway as well as off-carriageway of the roads can simply not be ignored.

