Review, Update and Compilation of Work Norms and Technical Specification for DoLIDAR

August 2014
# Table of Contents

**Volume I**

1. **INTRODUCTION**
   1.1 Background ................................................................. 1
   1.2 Objective of the study .................................................. 2
   1.3 Scope of Work ............................................................. 2

2. **METHODOLOGY** .......................................................... 4

3. **REVIEW OF THE EXISTING NORMS AND SPECIFICATION** ................................................. 4
   3.1 Collection of Existing Norms and Specification .......... 4
   3.2 Collection, Study and Review of Documents ............... 4
   3.3 Comparison of Existing Norms ................................. 5

4. **MEETING WITH THE CLIENT AND OTHERS** ................................................................. 6
   4.1 Rural Road Related Issues ........................................... 6

5. **DRAFT/ FINAL REPORT** .................................................. 6

6. **FINDINGS** ................................................................. 7
   6.2 Recommendation ...................................................... 8

7. **Reference** ................................................................. 10
Acknowledgement

This study report on the ‘Study, Revision and Updating of Technical Specification and Work Norms for Labour & equipment Based Construction Work of Agricultural and Rural Roads as well as inclusion of new norms and specification of all sectors such as Roads, water supply, Buildings, Irrigation, Bridge & Suspension ‘ is an outcome of an agreement between RTISWap of DoLIDAR and Er.Kishor Shakya.

During the course of study I have undertaken a vigorous and intensive study of all related norms and specifications prepared for all infrastructure development in Nepal by different Departments under respective Ministries of Government of Nepal. I also have interacted with Senior Engineers of Department Of Local Infrastructure Development and Agriculture Roads (DoLIDAR), Departments of Roads (DoR); Department of Irrigation (DoI); Department of Water Supply and Sewerage (DWSS); Department of Urban Development and Building Construction (DUDBC) and other relevant organizations and collected their views for making the output of this study fruitful, realistic and more practical with logical values derived from the field works.

I would like to express heartfelt gratitude to DoLIDAR and DTO Engineers, Senior Engineers of DoR; DOI; DWSS and other organizations for providing their valuable time and suggestions for preparation of this report.

I would also like to thank Senior members of DoLIDAR, Mr. B Upadhayaya (DG); Mr. R K Sapkota (DDG); Mr. J K Shrestha (DDG); Mr. G B Basnet (SDE); Mr U S Shah (SDE); Mr. M Bhattrai (SDE); Mr. T P Pant (SDE); Mr. K B Katuwal (SDE) and Mr. S P Pandit (SDE) in providing their valuable suggestions in preparation of this report. My sincere thanks goes to Er.M K Shrestha; Er D P Sitaula and Er L B D Shrestha from RTI SWAp; RAP3 programme for their valuable suggestions and guideline for this study.

I would like to express heartfelt gratitude to SDE Mr. G.B.Basnet for providing guidance and valuable suggestions during the study period of this study. We would like to express heartfelt gratitude to Director General Mr. B. Upadhayaya for giving us the opportunity to perform this kind of highly technical and responsible job of DoLIDAR. Lastly, I would like to thank team members of the study group (Er Sudarshan Lal Shrestha; Er. Rabindra Dawadi and Er. Amrit Acharya) for their hard work and serious devotion without which this report would have not been completed.
Executive Summary

Department of Rural Access and Agriculture Roads (DoLIDAR) has been working in seven sectors of Infrastructure Development Works: i) Local Transportation, ii) Housing Building and Urban Development, iii) Water Supply and Sanitation, iv) Small Irrigation and River Control, v) Micro Hydro and Alternative Energy, vi) Solid Waste Management, and vii) Social Infrastructure. DoLIDAR, is providing service in the rural and interior/remote area of the country in 75 districts by carrying out all civil engineering infrastructures works as listed above through respective District Development Committee supported by District Technical Offices.

At present, DoLIDAR is using its ‘Technical Specification’ and ‘Work Norms’ published in 1999 (2055 B.S), which is purely labour based construction work for Agricultural and Rural Roads and borrowing the specification and work norms from respective departments of GoN for the infrastructure development works other than roads.

Department of Rural Access and Agriculture Roads (DoLIDAR) in co-ordination with Rural Access Program 3 (RAP3) supported by Department for International Development (DFID) has initiated to review, compile and compare the norms and specification required for the construction of all the infrastructure development work developed by seven sectorial development departments of Government of Nepal.

Collection of available norms and specifications from the respective departments is made and reviewed and compiled herewith in this report. Comparison of norms prepared by DoLIDAR is made with DoR norms and DoLIDAR norms are updated accordingly. Pros and cons of the existing DoLIDAR norms are detailed in the findings with justifications for the updated work norms as per the present practice in this report. Some new norms for the item of works as, Otta seal; Providing and laying geo-textile; Landslide Clearance; Maintenance of Road; Gabion structure using machine made gabion crate and earthwork with the use of heavy equipment’s are provided in this report. Similarly specification for the item of works for Providing and laying geo-textile; Maintenance of Road; and Gabion structure using machine made gabion crate are also provided in this report.

Recommended is made to use the norms updated in this report for the existing norms for which justifications are made for each and every item of works. Similarly it is recommended to follow the guideline made in Road Maintenance Guideline prepared by RAP3 for the routine maintenance of rural roads. As this method for routine maintenance work is under study and in experimental operation by different programmes. This will eventually help to develop the routine maintenance work norms for the rural road maintenance which will be the practical representation developed from the field work.
1. INTRODUCTION

Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) under the Ministry of Federal Affairs & Local Development (MoFALD) has engaged me to carry out the study, revision and updating of Technical Specification and Work Norms for Labour-Based & Equipment based Construction Work for Agricultural and Rural Roads. The work has been carried out in close contact with and guidance from DoLIDAR. This Draft/ Final Report addressing the detailed study, revision and updating of both technical specification and work norms for labour-based & Equipment based Construction work for Agricultural and Rural Roads including other norms and specification for local infrastructure of rural areas such as Roads, Building, Bridge, water supply, and irrigation.

1.1 Background

The Norms for Rate Analysis for Construction Works, 2041 is the first and foremost norms developed and published by the then Ministry of Physical Planning and works which was in use in all Departments under different Ministries of Government of Nepal to carry out the construction for all the infrastructure development works. The norms developed in B.S 2041 is based on and comply with the Standard Specification for Roads and Bridge Works published in 1973 AD (2030 B.S) which was revised and upgraded in B.S 2058 (AD). This norms was revised twice; first in B.S 2046 and second in B.S 2050 by Ministry of Physical Planning and Ministry of Water Resource respectively. After the revision of the norms developed in 2041 twice it was realized that further development of the norms and specification are required for the specific civil construction works that were carried out by different departments to provide respective service to the people through infrastructure development within the country. Considering the 2041 Norms as the key norms for common activities of civil engineering works all the Departments under respective Ministry developed their own norms and Specification separately for their specific nature and specialized works. Keeping in view of the above requirements all the Departments under the respective Ministry of Government of Nepal who are involved in infrastructure development works developed their own specification as well as norms as per their requirements for construction of civil works. As the result of that Department of Roads has developed and published ‘Standard Specifications for Road and Bridge Works’ in 2058 and produced ‘Norms for Rate Analysis’ in 2065; Department of Irrigation published English version of main norms (i.e. construction norms, 2041) which was revised in 2050 with some additional item which are specific for the construction of works related to irrigation purposes, e.g tube well drilling in unconsolidated formation; similarly Department of Urban Development and Building Construction has developed and published ‘Specification of Building Construction (Civil) Works’ and norms in 2069 covering additional activities such as doors and windows for building construction works.

DoLIDAR with the assistance from ASIAN DEVELOPMENT BANK through International Labour Organisation (ILO) has prepared ‘Technical Specification’ and ‘Work Norms’ and published in 1999 (2055 B.S). which is prepared for labour based construction work for Agricultural and Rural Roads. As per GoN declaration, DoLIDAR has been working in seven sectors of Infrastructure Development Works: i) Local Transportation, ii) Housing Building and Urban Development, iii) Water Supply and Sanitation, iv) Small Irrigation and River Control, v) Micro Hydro and Alternative Energy, vi) Solid Waste Management, and vii) Social Infrastructure. DoLIDAR, is providing service in the rural and interior/remote area of the country in 75 districts by carrying out all civil engineering infrastructures works as listed above through respective District Development Committee supported by District Technical Offices.

Nepal Road Sector Assessment Study 2012 has raised a key issue that DoLIDAR norms have been regularly disputed and challenged as they are applied in different projects and programmes. Due to massive use of heavy equipment for construction works and lack of proper norms for the same, it became a source for malpractices at the district level in construction works. As a result, many districts have their own set of ‘informal norms’ which are based on purely individual perceptions of the productivity levels and often decision were made in a certain ‘percentage’ of the labour/manpower.
based cost. It also stated that there are some gaps in specification that influences on the specified quality of works through Users’ group using hand tools and contractor using machine for activities like compaction etc. Similarly, there are gaps of non-coverage for new construction materials and adopting new technologies, particularly to meet new emerging standards. Based on the above ground, RTI SWAp RAP3 Frame Work Document has recommended to “Develop specification and norms on labour based technology (LBT) construction approach incorporating heavy equipment”. It is also stated that this should be supported by action research to assess productivity levels particularly for heavy machines.

As per RTI SWAp RAP3 Framework Document recommendation for technical harmonization, DoLIDAR has recently revised Rural Road Standard with the assistance of RTI SECTOR Maintenance Pilot Project which was published in January 2013. Most of the design parameters have revised and changed the standards e.g. design speed, road width, gradient, etc. Therefore, specification and norms need to be reviewed and upgraded with changed standard.

In present practice, DoLIDAR has been using sectorial norms and specification developed and published by relevant departments, main norms of 2041 with subsequent revision of norms and specification published by the DoLIDAR for labour based construction work of Agricultural and Rural Roads. Although many studies were conducted by DoLIDAR on norms and specification, for comprehensive review and update of existing norms, with attention to incorporate the uses of heavy equipment and compilation of norms of different sectors has not been carried out. However; DoLIDAR initiated to take over the responsibility to furnish reviewing the existing norms, by incorporating norms for road maintenance, use of machine for earthwork excavation and compilation of norms and specification prepared by different Departments.

The assignment can be done in two ways: one option could be to follow proper action research method to find out the norms based on experimental data and another option could be to generalize norms based on existing practices carrying out in different projects and programme and to follow up by quick field check for a selected activities. First option is the best approach but the negative side of it is that it requires longer period to furnish the job, which may take 1 to 2 years. Whereas, second option is the simplest one and can perform within reasonable time period. On the other hand this approach should work well for provisional type of norms preparation and simultaneously can also address the urgency of DoLIDAR. In fact, specification and norms revision are continuous process; next revision can be carried out based on action research method to refine the provisional norms.

1.2 Objective of the study

The main objective of this assignment is to establish and compile complete set of specification and norms of all relevant sectors in a single folder to maintain uniformity for effective and efficient works. The other specific objectives are as follows:

i. For common activities, eliminate or clarify the duplication of specifications and norms produced by different sectorial agencies.

ii. Establish and compile the road maintenance specification and norms

iii. Establish and compile the machine norms and specification for road works excavation.

1.3 Scope of Work

The scope of work to be carried out by the consultant team includes but may not be limited to the following.

Desk study: A desk study should be carried out collecting relevant existing norms and specifications used by different sectorial agencies within and outside the country, which might be relevant with these assignments.
• The Consultants review the existing documents; reconfirm the gaps highlighted by previous studies. Review the trend of norms and specification development in DoLIDAR and in other sectorial agencies.
• Review whether available norms and specification are adequate to meet the scope of works required for all seven sectors, which has been looked after by DoLIDAR.
• Review the approaches outline in ToR and develop the methodology to obtain the set objective.
• A desk study report will be prepared and submitted, highlighting the findings and proposed methodology with work schedule.

Establishment of Machine norms for Earth Works Excavation

• The consultant will propose simple quick method to establish provisional machine norms, considering urgency to avoid duplications and misappropriations of works being reported in many instances due to lack of machine norms.
• Collect different norms, method of measurement and specification have been practicing by different projects, DDCs/DTOs and other sectorial agencies e.g. Mid Hill Highway Project of DoR.
• Analyse the above practices, generalise the ad-hoc norms in uses and develop suitable norms and method of measurement for designed specification to suit the DoLIDAR’s works standard.
• To gain confident on the established norms; selects at least one suitable on-going project and work for each activities, where these norms can be quickly verified at field. Validate the accuracy, suitability and workability of established norms; method of measurement and if needed re-adjust and refine to fit with designed specification.
• Submit Draft Report

Establishment of Road Maintenance Norms and Specification

• Collect data and specification that have been utilised in different type of road maintenance from relevant projects including RTI SECTOR Maintenance pilot (SWAp), DoLIDAR and other sectorial agencies
• Collect feedback from different stakeholders about required work activities for road maintenance and modality to be followed.
• Review the existing norms, specification and practices of maintenance in DoLIDAR and in other sectorial agencies. Find out and propose relevant work activities required for different types of road maintenance in LRN sector especially for earthen, gravel and black topped roads.
• Analyse available data and feedback from different projects; develop relevant norms and specification for implementation of different type of road works activities required for maintenance.
• Submit Draft Report

Compilation of different sectorial Norms and Specification:

• Identify the works activities required to implement seven different sectors under DoLIDAR based on existing sectorial norms and specification developed and published by concerns authorities such as Department of Roads, Irrigation; water supply; Housing etc.
• Analyse whether existing specification of work activities are relevant and sufficient to implement seven different sectors of DoLIDAR.
• Identify whether there are any common norms and specification among different sectorial documents. In case of duplication and confusion on items, analyse the items, clarify and recommend the proper norms and specification to be referred by DoLIDAR.
If there are duplicating norms and specification and are intended to use in different conditions then those norms and specification should be clarified with proper notes against each item and also should refer appropriate conditions of uses. For example norm for ordinary soil excavation in case of DoLIDAR and DoR norms.

- If there is a shortfall of specifications of any items, then consultant shall develop the appropriate specification and append with main volume.
- While selecting and establishing norms and specifications some of the factors like environmental protection, climate changes and recently upgraded or revised ‘Rural Road Standard’ shall be considered.
- Specifications and norms revisions are the continuous process, in practices it is observed that after every 4 to 5 years norms have been updated by concerns authorities. Hence, every sectorial norms compiled in a single folder should be tied up with main sources, so that any update or revision at main sources will be automatically superseded the existing norms and specification.
- Submit Draft Report

**Reporting and coordination**

The consultant will report to RTI SECTOR Maintenance Pilot and upon consultant’s request RTI SECTOR Maintenance Pilot will arrange technical committee meeting at different stages after achievement of each milestone. The consultant will present their finding and progress in technical committee meeting. Technical committee will provide feedback, guidance on the draft norms and specification.

2. METHODOLOGY

The sequence activities carried out during the study period are describe as fellows

- Collection of relevant specification and work norms from concern line agencies, development partners and others.
- Detail review of collected materials.
- Meeting with Client and interaction with related agencies and professionals.
- Detail analysis of the work item norms.
- Review meeting with the Client and experts.
- Review on findings considering issues raised during the discussion.
- Recommendation on updating of norms and specification

3. REVIEW OF THE EXISTING NORMS AND SPECIFICATION

3.1 Collection of Existing Norms and Specification

The Consultant collected all norms used by the different line agencies including DoLIDAR. The Consultant also studied norms and specification prepared by different line agencies of GoN, development partners and related stakeholders involved in rural infrastructure development.

3.2 Collection, Study and Review of Documents

The Consultant reviewed and studied the "Work Norms” and "Technical Specifications” for Labour-based Construction Works of Agricultural and Rural Roads” published by Government of Nepal, Ministry of Federal Affairs & Local Development, DoLIDAR. Also carried out the studied and reviewed the specifications used by various line agencies of GoN (such as Department of Irrigation,
Department of Water Supply and Sewerage, Department of Soil Conservation and Watershed Management, Department of Urban Development and Building Construction). The above line agencies generally follow work norms and specification 2041 revised in 2046 and 2050 developed by Ministry of Works and Transport (at present Ministry of Physical Planning and Works). The Consultant had also studied available guidelines and manuals prepared for rural infrastructure developed by INGOs and Donor Agencies involved in the Development works in Nepal. The Consultant had made interaction with some of the DTOs, donor agencies and officials of Line Agencies of the Nepal Government to obtain their feedbacks for improvement and upgrading of work norms and specification.

Following are the Norms and Specifications publisde by different line agencies which are studied and reviewed during the study period by the Consultant.

2. Nepal Rural Roads Standard 2055 first Revision 2069 published by DoLIDAR.
3. Technical Specification for agricultural and rural roads  Feb 1998 (vol1 to 17) published by DoLIDAR.
4. Department of Water Supply and Sewerage norms (community based rural water supply scheme), 2002 published by DWSS.
5. Bridge Norms in hilly and Terai Design Standard and TOR published by RRRSDP.
6. Standard Specification for Roads & Bridges (Yellow Book) 2058 published by DoR.
9. Code: NBC 000 to 208 published by DUDBC.
13. Civil Norms published by DOI, 2002
15. Design Guidelines for community based community based Rural Water Supply Schemes 2002 (vol 1 to 12) published by DWSS.

3.3 Comparison of Existing Norms

The Consultant thoroughly studied and reviewed various norms and specification. Labour requirement adopted are compared during the analysis.

The norms used by DoLIDAR, and DoR for road works, are presented in comparative chart (for various work items) to identify the difference in labour and material quantities. Basically following norms are compared during the analysis stage:

- DoLIDAR norms developed in 1999.
- DoR Standard Norms 2041, Ministry of Works and Transport with subsequent revision made in 2060.

Comparative analysis between DoLIDAR Norms (1998) and DoR Norms is presented in Annex 3.
4. MEETING WITH THE CLIENT AND OTHERS

Issues Raised in field

A numbers of meeting were organized with Client “DoLIDAR planning section and RTI SWAp RAP3”, in different phase during the study period. Discussions were made for the further step to be carried out for the study. Issues and suggestions were made during the meeting which are listed below and the consultant had tried to incorporate the issues/suggestions in this report. During the meeting Consultant was advised to include all necessary work item in the norms and specifications regarding Rural Roads construction and maintenance. For other nature of infrastructure development works it was suggested to compile the Norms and Specifications developed by respective Departments of GoN in a combined folder with organization wise separators.

4.1 Rural Road Related Issues

List of other work items to be incorporated in rural road works

- Norms for survey and design of roads
- Landslide clearance
- Geo-textile
- Road pavement works (Otta Seal).
- Routine maintenance of roads and bridges

List of norms included in DoLIDAR norms but requiring reviewed

- Earthwork excavation
- Gabion structure
- Road pavement works
- Hard rock excavation

5. DRAFT/ FINAL REPORT

The Consultant prepared and submitted the draft report on the study on 3rd Oct 2013, incorporating the followings:

- Relevant work norms and Specification of DoLIDAR; DOR; DOI; DUDBC; AEPC; DWSS. All useful work item norms used by other related line agencies should be included.
- Persons and documents consulted or referred should be provided as reference.
- Cover page and table of comment should be corrected.
- Nothing has been mentioned about specifications on the work item norms, which are recommended for updating and addition.

On 23rd July, 2014 a presentation was made by the Consultant to prepare the final draft report to the Norms preparation committee. The comments and suggestions made during the discussion during and after presentation are incorporated in this report. Summery of the suggestion and comments are presented in Annex-A

A workshop was organized on 8th August, 2014 to present the final draft of the report and collect the views, suggestions and comments from the participants. The suggestions and comments made during the workshop are carefully dealt and incorporated in this report. The details of workshop is presented in Annex-B
6. FINDINGS

At present the norms developed by DoLIDAR have not incorporated all the works required for the construction of infrastructure development works. Though it is in practice that DoLIDAR is using the Norms and Specifications of respective Departments for respective development work as and when required. The present Norms and Specification developed by DoLIDAR is mainly focused for construction of Rural Roads. For some small irrigation projects DoLIDAR has developed its own Norms and Specification which is approved by the GoN.

The Norms developed by different Departments have some differences in some of the items of works in manpower and material quantities which are common for the construction of infrastructures such as Earth work in excavation, RCC/PCC works, Gabion and Random Rubble masonry works etc.

As earlier mentioned this study is focused on the road works only. It is found that existing DoLIDAR norms do not have Norms for earthwork excavation with the use of heavy equipment. It is also found that the manpower provided for hard rock excavation is in higher quantity in DoLIDAR norms than that in DoR & DoI norms. In addition to the above maintenance norms for Roads and Bridges are not provided in existing DoLIDAR Norms including Norms for Road and Bridge survey and design including norms for use of Geo-textile. Norms for Land slide clearance work is not provided in existing Norms.

It is observed that the labour requirement for each items of work are provided for hill and terai region. Some of the items of work are repeated in the existing norms but references are provided to the previous item of works.

For some of the items of works in existing norms requires updating regarding manpower and quantity of materials. For this some of items of works are updated and changes are made regarding manpower and material quantities.

The item of work for surface dressing works provided in existing norms does not comply with the guideline made by Transport Road Laboratory Road Note-3 revised in 2000. Changes have been made for this item of works according to Road Note -3 which is taken from Departments of Road’s Norms. The specification for this Item of works also needs updating as per TRL road Notes-3.

It is observed that there is some lag in the norms prepared for survey and design of road. Geotechnical Engineer or Geologist, Hydrologist, Environmentalist and structural engineers including Highway engineer are required during field survey and design of roads, which are not incorporated in the norms prepared for survey and design of Road.

The specification for the otta seal surfacing is provided in Special Specification prepared by DoLIDAR, but the norms for this item of work is not available in the existing norms. Similarly norms of items of works for landslide clearance, felling and uprooting of bamboo including road maintenance works and use of geo-textile are not provided in the existing norms.

It is observed that most of the development works carried out by the respective departments use the DoR norms and specification for those items of works which are common for the development works. For the specific work they have prepared their own specification and norms. DoI have their own specification which are project specific and norms which is English version of DoR norms published in 2041; DUDBC and DWSS have their own norms and specification. Micro Hydro has their specification, norms which are also project specific.
Solid waste Management has no norms and specification, but they are using DoR norms and specification.

6.2 Recommendation

Besides existing norms some of the new work items, useful for local level infrastructure works specially for road works, were identified during the study periods, which are included in this report. Since the local government (DDC and VDC) is being involved in various types of infrastructure works, additional works items and specifications, which are not included in existing norm, were discussed during the meetings, interactions with the client. The Client insisted to include norms of all necessary work items and specifications useful for rural roads construction and maintenance. Considering time constraints the Consultant tried to incorporate maximum number of new work items, which are essential for development works. The recommendation of the consultant regarding survey and design norms and works items norms are presented this draft report.

Proposal by the Consultants for further updating of the Norms:

1. a. In existing work norms, labour requirement are quantified separately for hills and terai which is provided as per the study made during the preparation of existing norms it is recommended to follow the same. Also it is proposed to increase quantities of manpower by 5 % on the top of general norms of civil works in case of mountainous areas more than 2700 m.

   Considering the present GoN standard work item norms for Terai and hill, single norm is proposed for infrastructure development at local level., it is (except design and surveying and where mentioned). The aforesaid norms and specification has been recommended to be updated in consultation with Client and feedback received during various meeting.

   b. After reviewing the norms for survey and detail design of rural roads and survey. It is found that experts as Geologist/Geotechnical Engineer, Hydrologist, Environmentalist and Structural Engineer are not incorporated. These are the expert required for survey and design of roads despite of its standard, whether, it is highway, or district or village road, but number of input of these experts may differ. So it is recommended to update the norms incorporating all the above experts. DoR norms for this item work can be used.

2. It is recommended to use the norms updated in this report for the existing norms for which justifications are made for each and every item of works and presented in separate spread sheet attached herewith in Anmnex ....

3. It is recommended to follow the guideline made in Road Maintenance Guideline prepared by RAP3 for the routine maintenance of rural roads. As this method for routine maintenance work is under study and in experimental operation by different programmes. This will eventually help to develop the routine maintenance works norms which will be the practical representation developed from the field work.

4. New Norms for some items of works as, i) Otta seal, ii) Providing & laying Geotextile, iii) Land slide Clearance; iv) maintenance of road; etc, are add in the existing norms through this report and recommended to use these norms for respective item of works. These norms are prepared according to the DoR norms.

5. The existing Norms prepared by DoLIDAR is for the road works only which is based on the labour intensive works. Since DoLIDAR is working for all the infrastructure
development works, but have no norms and specifications other than road works. Through this report it has been tried to compile the norms and specification of all the infrastructure works. And in present practice DoLIDAR is working for the works other than road by using the norms and specification of the respective departments of govern of Nepal. So it is recommended to make/compile the norms of common items of works which are used commonly in development of all infrastructure work such as all Earthwork items, construction of masonry and gabion structures; cement concrete and reinforcement work. And develop and prepare the other norms for the specialized and specific works as road, building, water supply, irrigation and other separately.

The Consultant would also like to recommend that the finalization of updating of norms should be made after group review. For this purpose a review group should be formed comprising senior engineers working in the concerned field. This group will prepare working material for discussion and series of workshops should be arranged with participants from DoLIDAR, DTO, DDC, Contractors and Consultants involved in rural infrastructure development works to finalize norms and specifications.

Conclusion & Recommendation:

DoLIDAR has taken a great initiation to compile and compare the norms and specification required for the construction of all the infrastructure development work. This effort for reviewing the norms and specification helps to provide consistency in constructing the infrastructure development works in this country. It is a continuous job since the technology is developing day to day which invites to make changes in norms and specification. Through this study by DoLIDAR has opened the door to develop its expertise in construction management for the infrastructure development for all the development partners of GoN.

The existing norms developed by the DoLIDAR is purely labour based for construction of road works with an objective to create the job for local and poor people living in remote area within the road corridor. In this study comparison between the norms prepared by DoLIDAR and DoR has been made and the short falls that are observed is corrected by updating the norms complying to the specification prepared by DoLIDAR. Furthermore norms and specification has been updated as per the present practice. In addition to that some new norms and specifications are developed which are required for construction and maintenance of road and bridge works.

It is once again repeatedly mentioned that norms and specifications for the items of works which are common for all the infrastructural development works should be same and for specialize works it differ as per the nature of works and respective departments who take over the specialized works.

So it is suggested and recommended to get rates for the heavy equipments approved by District Rate Fixation committee in per hour basis of the equipment including remuneration of operator and helper. The basis for rate fixation can be obtained from the equipment supplier or the Construction Entrepreneurs. The fuel component is included in the norms.

Last but not least for the item of works which are common to all seven sector development works it is recommended to use the updated norms for its uniformity in rates in all sector and for those specific works it is recommended to adopt the norms and specification developed by respective Departments of GoN.
7. Reference

4. Specification for Road and Bridge Works, Indian Road Congress on behalf of the Ministry of Shipping and Transport (Road wing), Government of India, 1998.
9. Norms for Rate Analysis (DRAFT), Prepared by NEPECON for Ministry of Works and Physical Planning, Department of Roads, 2060.
18. Rate Analysis, Koshi Project, Bihar, India
19. Rate Analysis of Rural Water Supply and Sanitation Project/FINIDA