

Development of a National Design Manual, Standard Specifications and Bidding Documents for Low Volume Roads in Ethiopia

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Presentation Outline

- I. Background Information.
- II. Organization of the Road Sector In Ethiopia
- III. Ethiopian Road and Bridge Manuals and their Use
- IV. The Reasons For LVR Documentation & Pre-requisite
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- VII. Conclusion

Location	North Eastern Part of Africa/Horn of Africa
• Area of Country	▪ Above 1.1 Million sq km. (the world's 27 th largest country)
• Terrain condition can be classified	<ul style="list-style-type: none"> ▪ Flat and rolling ▪ High Plateau and mountainous ranging between (2000-4000) meters above sea level (Ras Dashen 4620) ▪ There is also extensive low land area (Dallol Depression) i.e. 110 m below sea level
• Climatic Condition	▪ Arid , tropical and Temperate rainy Varies from 35 to 10 ° c
• Rainfall	▪ From 0 up to 2000mm+
• Population	▪ The second-most populous in Africa (80 million)
• Nation/Nationality	▪ More than 70 ethnic group
• Language	▪ More than 70 Languages

II. ORGANIZATION OF THE ROAD SECTOR.

1. Management of Low Volume Roads

Period	Responsible Organizations
1951-1974	Imperial highway Authority (IHA)
1974-1977	Ethiopian Roads Authority (ERA), Rural Roads Coordinating Division of ERA The Agricultural sector (< 100 v pd)
1977-1993	Ethiopian Transport Construction Authority (ETCA), Rural Roads Coordinating Division of ERA The Agricultural sector (< 100 v pd)
1993-Present	Ethiopian Roads Authority (ERA), Regional Roads Authority (< 100 v pd) Wereda Road Desks (< 100 v pd)

2.THE ROAD SECTOR PROGRAM OF ETHIOPIA (RSDP) (1997-2010) Road Network

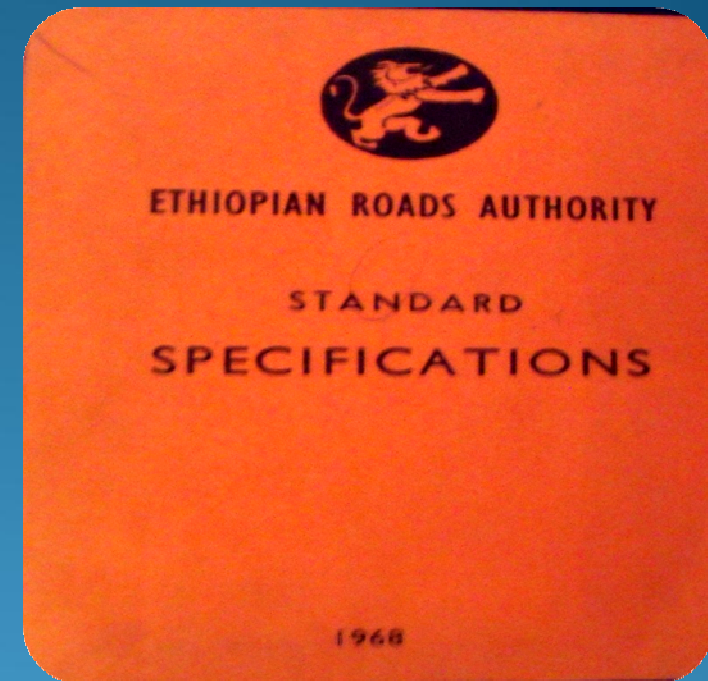
RSDP	Year	Road Network in km.		
		Asphalt	Gravel	Rural
RSDP - I	1997-2002	3708-4053	12162-12564	10680-16680
RSDP - II	2002-2007	4053-5452	12564-14628	16680-22349
RSDP – III	2007-2010	5452-7476	14628-14373	22349-26944
Percentage of Rural= $\frac{26944}{48,793} = 55.2\%$; Unpaved = $\frac{41317}{48,793} = 84.7\%$				

3. (RSDP) CONT. Road Density & ACCESSCEBILITY (1997-2010)

Indicators	1997 Start RSDP - I	2007 End RSDP - II	2010 End RSDP - III
Road Density1/1000sq. km	24km.	38.6km.	44.4km.
Road Density1/1000 population	0.46km	0.55km.	0.58km.
Prop. area more than 5km from all weather road	79%	68%	64.2%
Average Distance to all weather road	21km.	13km.	11.3km.

III. ETHIOPIAN ROAD AND BRIDGE MANUALS AND THEIR USE

- Standard Specifications 1968
- ERA 2002 Design Manuals



Other Documents

- Typical Cross sections recommended grades and drainage provision for rural roads (RR50,RR30 and RR10)
- Labor based manuals

2. Specific Opportunities Sought for efficiency

- Obtained from experience and research executed on low volume roads.
- Application of traditional design approaches to LVR prove conservative Inappropriate and costly

Opportunities included :

- Application of appropriate design standards(Geometry , Drainage pavement..)
- Alternative options for road surfacing
- Options to extend the performance of earth roads
- Application of innovative construction techniques and methods.
- Greater Use of local labour

IV. The Reasons for LVR Documentation & PRE-REQUISITE

1. Reasons

- Traditional engineering/road engineering is challenging in the face geographical and climate diversity
- **Network:** Majority LVR.
- **Accessibility:** only 37% of the sub-districts(Kebeles) are accessible; only 27% of the total population live with in 2km from all section roads.
- Governments Strategic Growth and Transformation Plan (GTP) priority given for access

... Cont.

- The existing manuals are appropriate for much of main trunk and link roads hence costly
- LVR roads should be responsive to the influence end of environment rather than traffic related deterioration.
- Opportunities that would provide lower cost engineering solutions are missed.
- Previous recommendation and techniques cannot be implemented due to absence of design and manual standards and specification

3. Pre - request to develop a LVR manual

- Supportive government Policy growth and transformation plan(2010-2015)
- Awareness on the need for change in approach and introduction of new and innovative technologies
- Operational Environment (public sector agencies and private sector towards commercialization , technology options)
- Maintenance Environment(modification to existing maintenance specification, documents and practices)

V. Scope and Content of Low volume Roads Manual

1. Scope

- Caters for paved Before the Implementation of Road Sector and unpaved roads carrying up to 300vpd.
- Adaptable to roads administered by different levels(ERA , Regions , weredas)
- Spot improvement to total rural road design
- Emphasis on Complementary Interventions



2. Structure /content of low volume Roads

- Part-A (Purpose, Scope and structure of manual, philosophy and approach to LVR Design, preparation of tender/contract/engineers estimate)
- Part - B introduction ,application and use of the National Standards(geometric , drainage , materials and pavement Design Standards)
- Part - C complementary interventions (separately emphasized)
- Part - D explanatory Notes road Standards(detailed information to Part - B)
- Part - E explanatory Notes Drainage structures(detailed information to Part - B)

3. Complementary interventions (C)

- Close attention to maximize road provision benefits to the community(e.g. increase participation, minimize resettlement)
- Its not just building roads but adding value to the community.
- Concepts and practices summarized (Planning, Design and implementation under different categories)
- To be implemented through road projects or road works contract.
- Targeted communities with in the road corridor and are affected by the road users and works.
- To take into account socio-cultural/environmental impacts
- Generally it includes almost anything that contributes to the community

VI. Principles and Approach for LVR Manuals

- Institutional framework (easy application and adaptation by clients concerned)
- End user Requirements (a manual in itself will not change anything) (Needs equivalent specification, engineering detail and bidding document)
- Consultation (involvement of the local industry Workshops, peer groups)
- Complementary interventions
- Mechanisms for future updating
- Promoting implementation (production of documents alone cannot solve all challenges it represents about ten percent of the challenge)
- To make sure that industry is ready/trained to use correctly.
- AFCAP/DFID to continue their role.

VII. Conclusion

- Appropriate and cost effective low volume road technology needed(Manuals , specifications , bidding documents)
- Critical elements are identified(policy , appetite for change , operational environment and desire for maintenance)
- Approaches and principles (framework, end user-manual preparation alone will not be a solution the balance of effort should insure using the manuals correctly, Consultation , uptake)
- ERA extends the benefit of its experience and lessons leaned to other similar authorites

Thank You