

Low Cost Structures Guideline
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The Presentation

- The Context
- The Challenge
- Why do we need another Guideline?
- Some features of the Guideline
- Future Initiatives?

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The Context

The World Bank Transport Business Strategy (2008-2012) advises:

- 1.2 billion of the world's poor still lack access to an all-weather road
- Between 40 and 60 percent of people in developing countries live more than 8 km from a healthcare facility. Few transport services exist
- In some regions less than 15% of roads are paved

Without effective rural transport systems, the MDGs and **ALL** rural development & poverty initiatives, agriculture & growth are substantially constrained

There are serious concerns that the MDGs may not be achieved, unless radical new initiatives are taken

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The Challenge

Conventional rural road provision usually costs **> US\$100,000/km**

Basic Access could be provided to many rural communities for **<US\$10,000/km**

Using:

- In situ soils to form Engineered Natural Surface
- Improved surfaces for limited problem sections
- **Provision of simple structures**

to provide affordable year round access

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Spot improvement strategy

Example application over a typical rural route

Low Cost Structure or culvert

Surface Options

Engineered Natural Surface (ENS)

Maintenance (Earth Road)

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Why do we need yet another Guideline?

- The existing internationally accepted guidelines are based on the 'traditional' use of reinforced concrete
- Not enough consideration give to the use of **local-resource-based** road works:
 - Local labour (skilled and unskilled)
 - Local materials
 - Local enterprises
 - Local communities and social structures

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Why use Local-Resource-Based methods?

The resource base is very different in developing countries:

- Labour wage rates typically <US£10/day (instead of >US\$100/day in developed countries)
- Credit scarce and expensive >20%p.a. (instead of <10%p.a. and usually available in developed countries)
- Some local materials do not meet normal international guidelines, however can provide affordable solutions
- Local carpentry, masonry skills and local community and enterprise resources usually not mobilized in road works

We cannot directly transfer technology from developed countries



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Why do we need yet another Guideline?

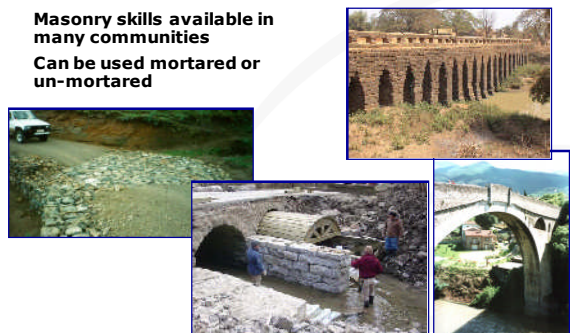
The developing world has abundant examples of BAD PRACTICE in structures provision for rural roads



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Stone: an under-utilised resource

Masonry skills available in many communities
Can be used mortared or un-mortared



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Fired Clay Brick: an under-utilised resource

Especially in areas with lack of hard stone resources
Small scale kilns using agricultural waste can produce engineering quality bricks



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Timber: an under-utilised renewable resource

Low carbon footprint if managed sustainably
Carpentry skills available in many communities



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People: an under-utilised resource

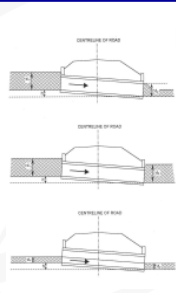
Often ready to be involved in creating and maintaining their own access
Local people, enterprises and communities can be helped with knowledge and support



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Aims of the Guideline

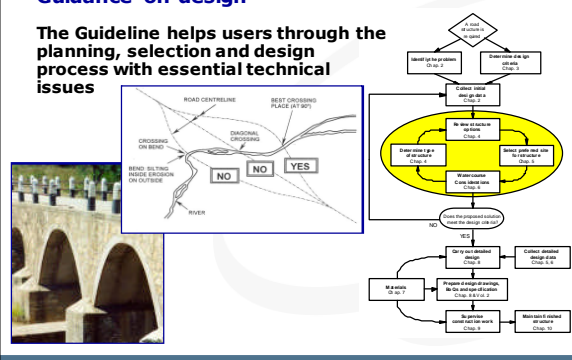
- Concise and complete information in one place
- Provide the engineering background required to
 - Complete planning and assessment
 - Select the correct structure
 - Complete design
- Guidance on costing, construction and maintenance of structures
- Assist in the approval and adoption of low cost structural designs
- Utilisation of low cost labour, local materials & artisans
- Improving economic returns and reducing environmental impacts by using local resources



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Guidance on design

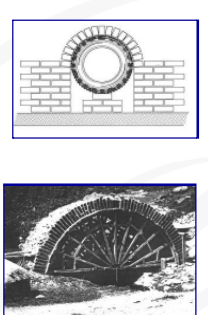
The Guideline helps users through the planning, selection and design process with essential technical issues



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Guidance on construction

Techniques, productivity, specifications etc.

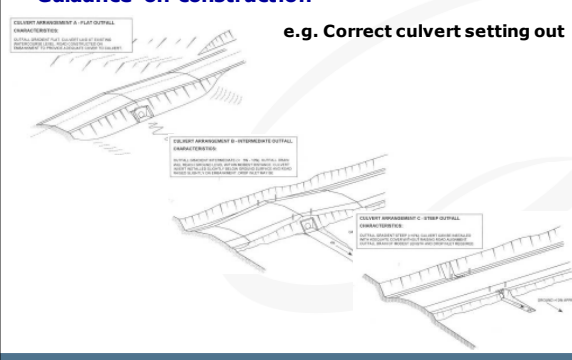


Recommended productivity standards	
Site clearance (brush clearing, tree felling, etc.)	100 - 250m ² / worker day
Removal of tree stumps	1 / worker day
Soil excavation (and stockpiling alongside)	2 - 5m ³ / worker day
Rock (fractured) excavation	0.8m ³ / worker day
(solid rock will require drilling and blasting/splitting)	8.5m ³ / worker day
Loading	8.5m ³ / worker day
Hand-laid by wheelbarrow	7.0m ³ / worker day
0 - 20m	6.5m ³ / worker day
20 - 40m	5.5m ³ / worker day
40 - 60m	5.0m ³ / worker day
60 - 80m	4.5m ³ / worker day
80 - 100m	0.8 - 1.2 lin m / worker day
100 - 150m	1.0m ³ / worker day
Install only 600 or 900mm diameter culvert lines (including excavation and backfill)	
Mix and place concrete	1.0m ³ / worker day
erect masonry work	

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Guidance on construction


e.g. Correct culvert setting out



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Guidance on maintenance

Often neglected until failure occurs - then it is too late!

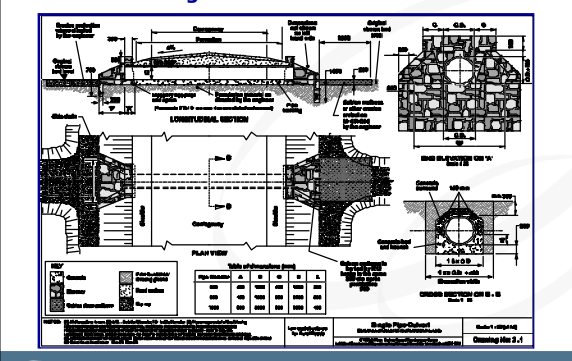


Routine

- Cleaning/clearing
 - sweeping
 - desilting
 - unblocking
 - removal of vegetation and flood/wind borne debris
 (This includes inlets and outlet channels as well as culvert openings themselves)
- Repair of loose/missing connectors and fixings
- Replacement of damaged/missing planks or kerbs
- Painting
- Wood preservation
- Pointing/repair of masonry
- Repair of ramps, marker posts, safety barriers and footings/signs

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Standard Designs



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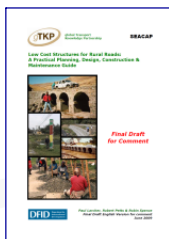
Low Cost Structures Guideline Status

Currently web posted in final draft format on gTKP website:

<http://www.gtkp.com/sectors.asp?step=4&contentID=3319>

Comments/contributions invited by 30 November 2009 latest

Final version to be web posted in January 2010



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The Future

- Challenge: to mainstream this knowledge
- Facilitate incorporation into local standards, specifications, training, academic courses and everyday agency practice and community awareness
- Arrange regular review and updates

But don't just 'leave it on the shelf'!



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Further Information

The following important dissemination forums are supporting Rural Roads & Transport knowledge:



global Transport Knowledge Partnership:
www.gtkp.com

AFCAP Africa Community Access Programme
www.crownagents.com/AFCAP/About-AFCAP.aspx
jeff.turner@afcap.org & rgeddes@africaonline.co.zw

IFRTD www.ifrtd.org

Further information may be obtained from the above websites and the gTKP Rural Transport Theme Champion:
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