

4 GRAVEL ROADS



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- **Major part of Southern African rural road network (roughly 75%). Due to economic constraints this will remain so.**
- **Dr Phil Paige-Green made an excellent study of gravel roads which is encapsulated in TRH20.**
- **I endorse this and recommend it to you.**
- **There are 3 main types :-**
 - Earth Tracks**
 - Earth Roads**
 - Gravel Roads**

FUNDAMENTALS

The requirement of a gravel road is to carry traffic in all conditions as safely as possible while providing an acceptable ride. **As a result sound basic road design principles must be applied.**

Geometrics : Modest alignment.

Drainage depends on climate

Typical width = 7m to 8m

Subgrade conditions : Poor areas must be treated,

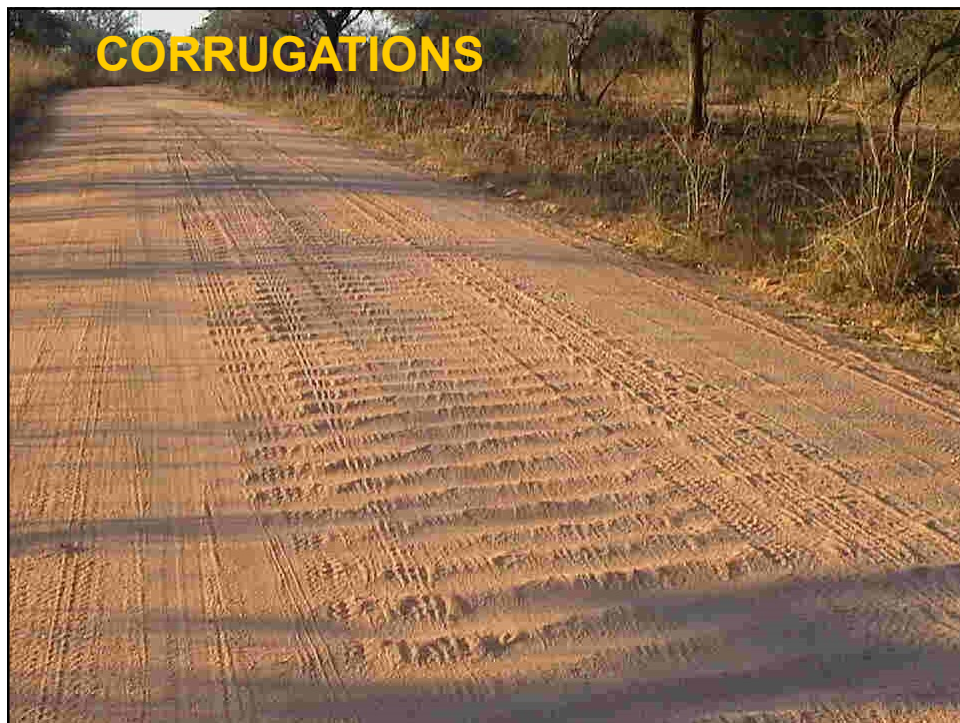
But firsttry out what you have got.

LAYER DESIGN

TYPICAL PROBLEMS

- **Dust**
- **Potholes**
- **Stoniness (rough ride)**
- **Corrugations (sinkplaat)**
- **Ravelling (loose gravel)**
- **Erosion**
- **Slipperiness**
- **Gravel loss**



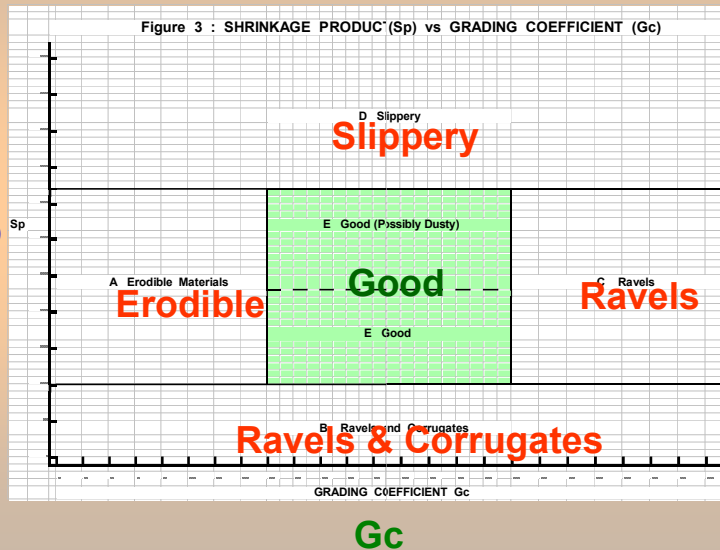




LAYER DESIGN

- ❑ Dr Paige-Green developed a diagnostic plot to assist in predicting gravel performance.
- ❑ The plot is based on two products derived from simple laboratory properties:-
 - $Sp = \text{Linear Shrinkage} \times P_{0,425\text{mm}}$
 - $Gc = (P_{26,5\text{mm}} - P_{2,0\text{mm}}) \times P_{4,75\text{mm}}/100$

LAYER DESIGN



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In a number of regions it is almost impossible to locate gravel that meets all the requirements at an economic haul distance.

- ✓ Do basic lab tests and evaluate by means of Sp/Gc plot.
- ✓ Do not use material which after processing is > 37,5mm.
- ✓ Min CBR = 15.
NB harder material = possibly less gravel loss.
- ✓ Unless subgrade CBR < 5 or stage construction project, it is not necessary to have an SSG layer.
- ✓ While thickness formula is available, in practice we build between 100mm and 150mm.

CONSTRUCTION

- ❖ Clear, shape, water and compact the subgrade – to provide a sound platform.
- ❖ Minor earthworks to improve alignment and allow for essential drainage.
- ❖ Place gravel in uniform thickness, water and compact to at least 93% MDD.
- ❖ Width = 7m to 8m
- ❖ Camber/Crossfall 3%
- ❖ Remove or breakdown +37,5mm oversize.

MAINTENANCE

- ❑ Maintenance is the major cost in operating a gravel road.
- ❑ Three facets
 - Blading / Surface smoothness
 - Reshaping / Repairs / Improvements
 - Regravelling
- ❑ Broom or tyre drag
- ❑ Refer to paper by Adrian Bergh
 - Regularly maintained roads slowly improve in shape and ride. They become easier to maintain and cheaper to operate.
 - Gravel roads with more than 250 vehicles/day should be considered for upgrading.

