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ADDIS ABABA LVR WORKSHOP: Unpaved roads

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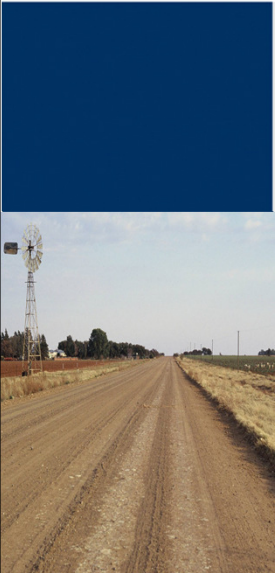
<https://www.afcap.org>

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BACKGROUND

- South African study
 - 1982 – 1988
 - 93 sections in old Transvaal (Gauteng, Mpumalanga, Limpopo and North West) and 17 in Namibia
 - Climatic zones $N < 2$ to $N > 10$
 - 6 material groups
 - 2 traffic categories
- Should cover all eventualities (in any country)



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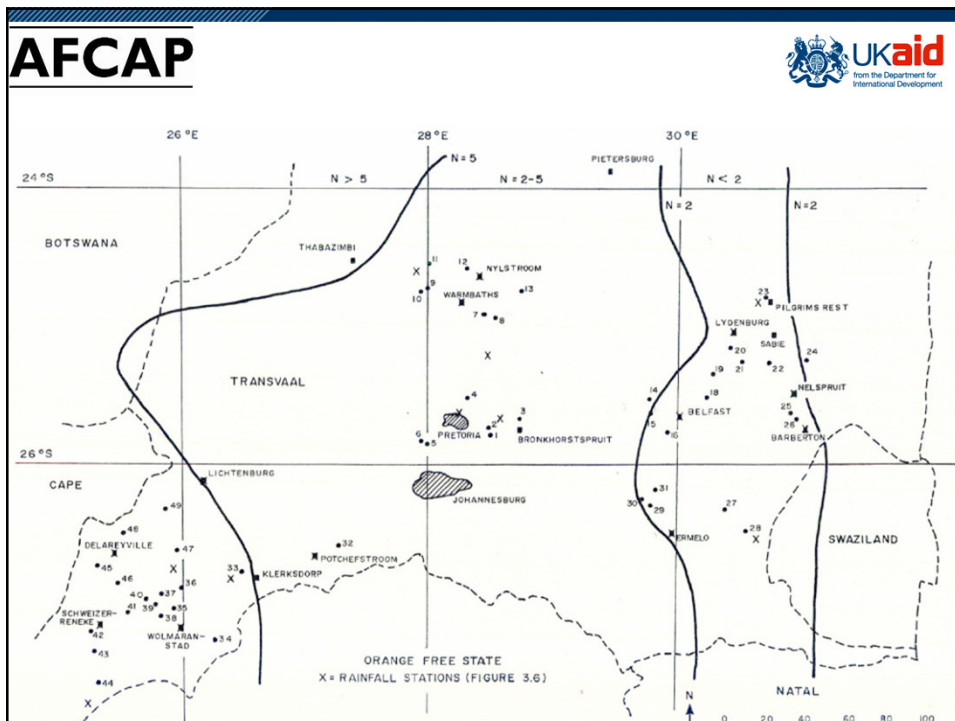
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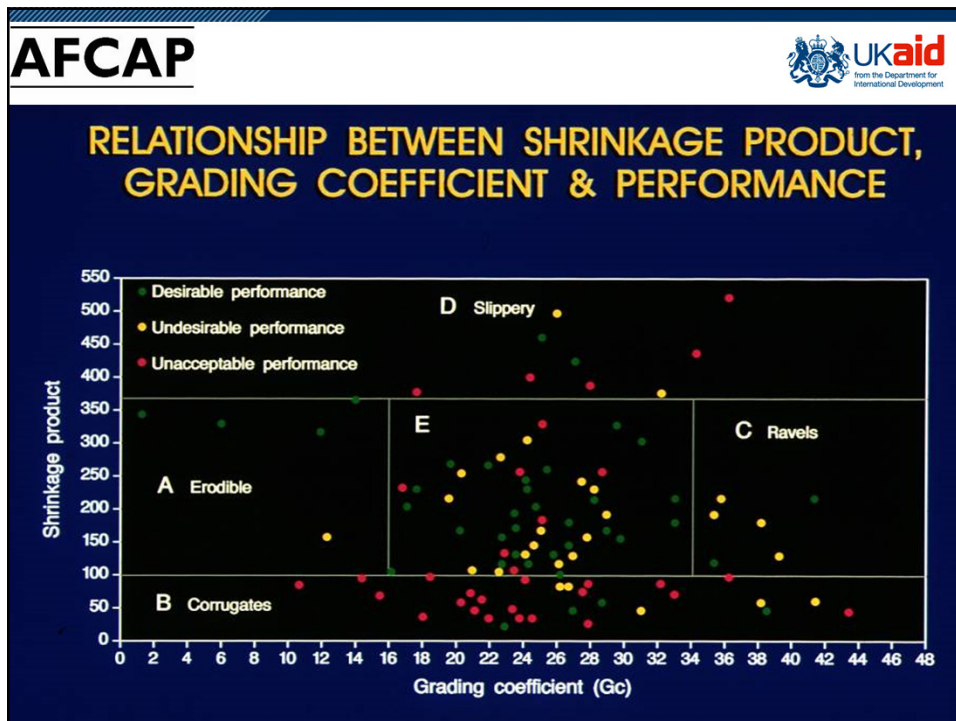
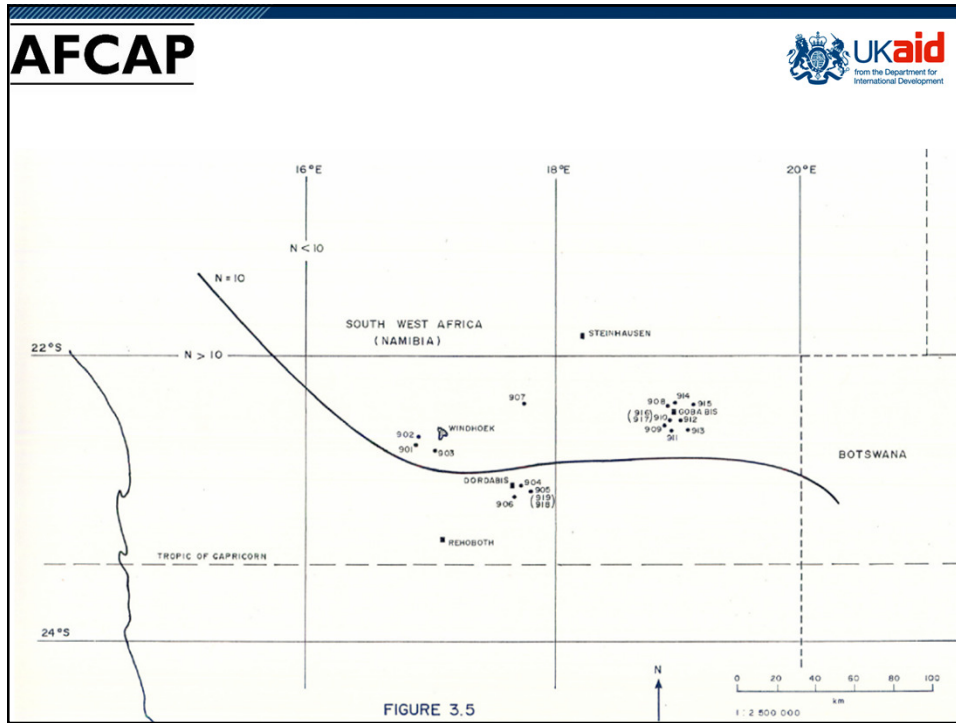


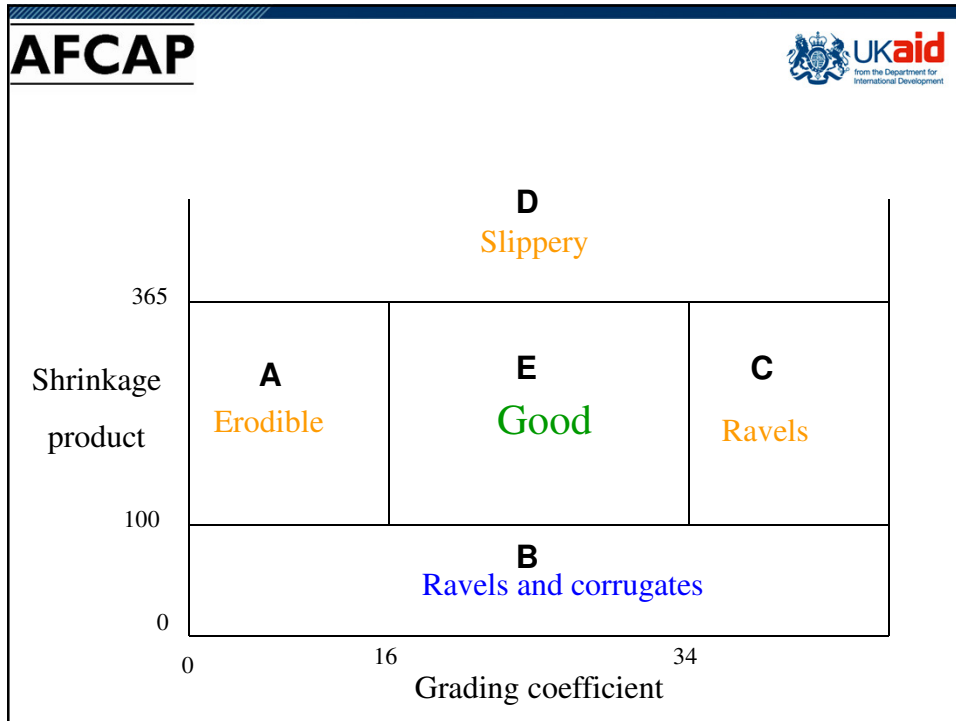
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SURFACING MATERIAL		1 ACID CRYSTALLINE	2 BASIC CRYSTALLINE	3 HIGH SILICA	4 ARENACEOUS	5 ARGILLACEOUS	6 PEDOCRETE
TRAFFIC CLIMATE	< 100 vpd	576 (98/39)	796 (32/34) 1298 (25/16)	625 (57/44) 421 (89/63)	X	210 (92/50) 1008 (37/35)	268 (90/36)
	N < 2 > 100 vpd	1560 (333/75) 219 (115/38)	383 (100/28)	P8-4 (111/14)	X	210 (246/34)	1110 (223/25) 1266 (108/36)
2 < N < 5	< 100 vpd	1439 (5/20)	1561 (61/20)	1886 (69/13)	178 (26/25)	1342 (53/15)	1717 (31/27) 942 (18/7)
	> 100 vpd	024 (427/17) 685 (127/15)	1161 (200/10) 685 (132/14)	420 (197/20)	522 (173/14) P175-1 (148/45)	771 (236/29)	327 (395/22)
N > 5	< 100 vpd	017 (58/25) 433 (53/8)	437 (92/21) 14 (22/27)	1479 (20/26)	1141 (46/24) 508 (61/13)	508 (51/10)	167 (56/15) 1216 (11/22)
	> 100 vpd	502 (112/13)	912 (127/20)	509 (156/16)	611 (100/23)	146 (105/15)	1401 (200/50) 611 (110/30)

NOTE : THE NUMBERS IN EACH CELL ARE THE ROAD NUMBERS WITH THE NUMBER OF VEHICLES/DAY AND PERCENT HEAVY IN PARENTHESES



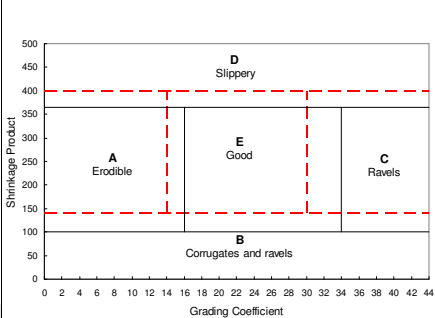






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APPLICATION

- Used in a number of countries in Africa, Middle East, USA, South America, Australia and New Zealand
- Appears to work if interpreted/calculated correctly
- Most people don't normalise the grading for %age passing 37.5 mm to determine GC and SP
- Different test methods
- Correlation study for BS




Grading Coefficient	Shrinkage Product	Category
0 - 16	0 - 100	A Erodible
16 - 34	0 - 100	
0 - 34	0 - 100	B Corrugates and ravels
0 - 16	100 - 365	E Good
16 - 34	100 - 365	
34 - 44	100 - 365	C Ravels
0 - 44	365 - 500	D Slippery

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TRL ETHIOPIA STUDY

- Very different approach
- 34 sections
- Less testing and monitoring
- No Linear shrinkage ??

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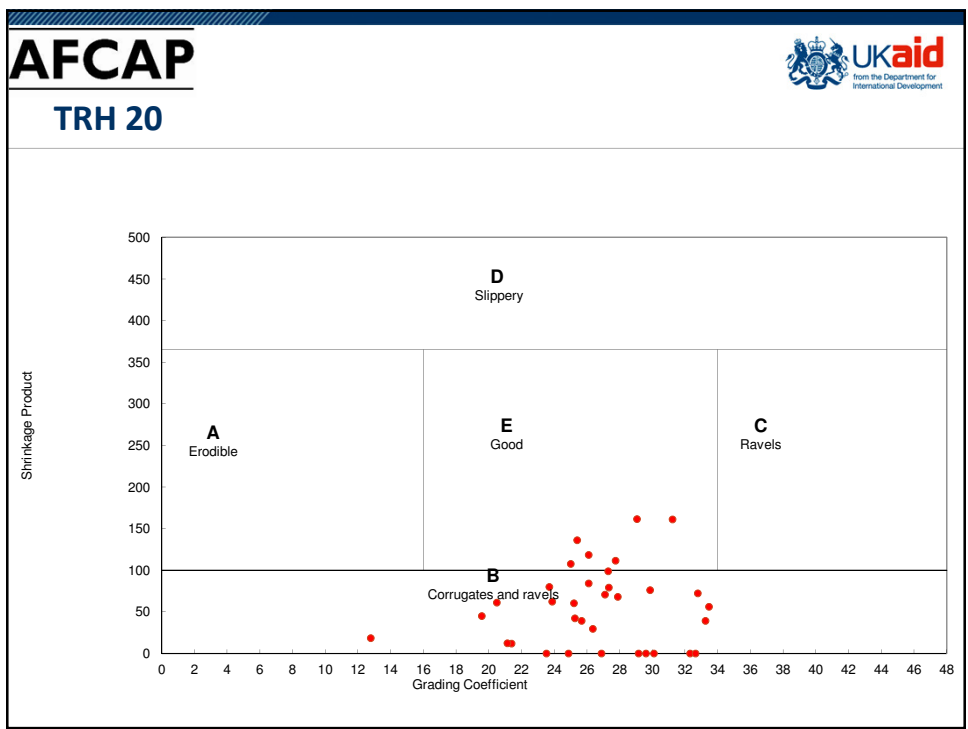
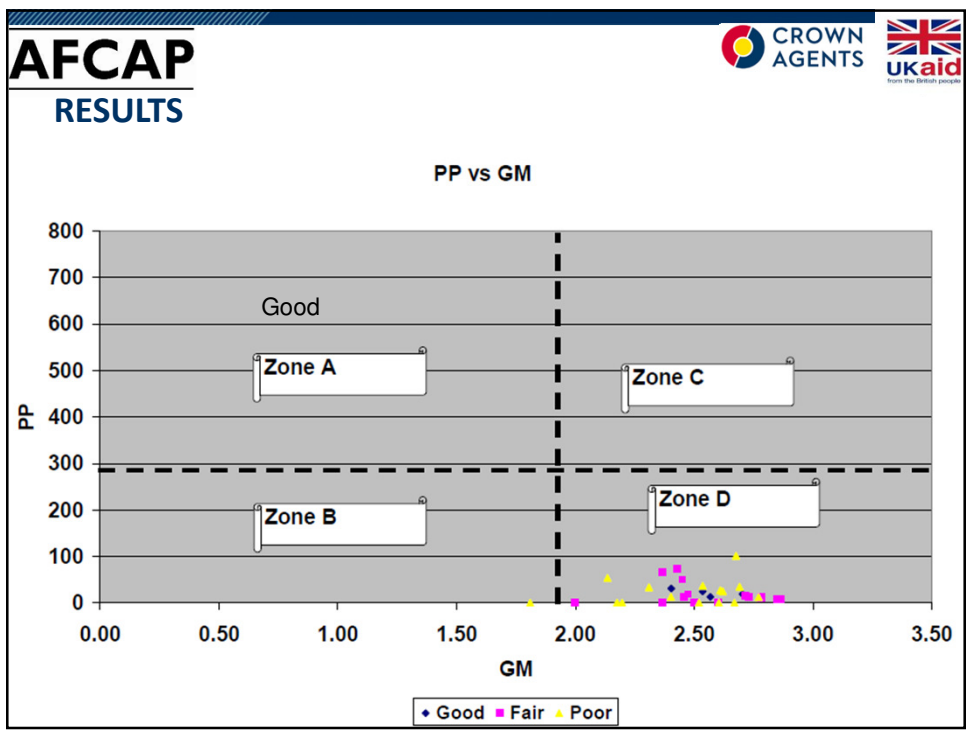
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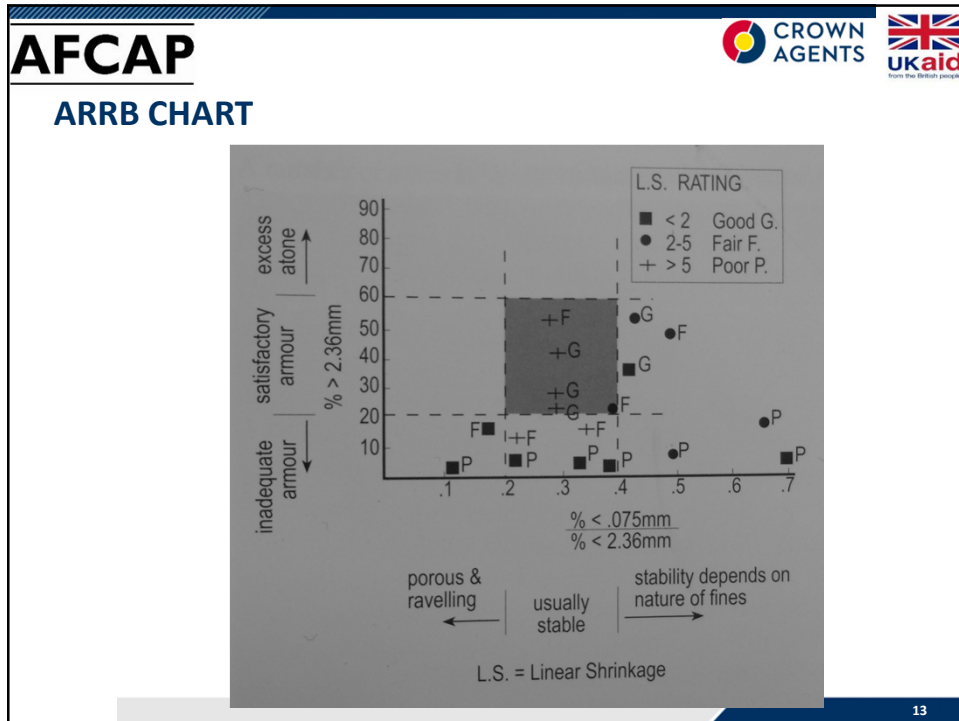
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COMPARISON

Property	SA	TRL
No of sections	110 (300 m)	34 (200 m)
Experimental design	Full factorial with replicates/bias	Random/bias
Rainfall	300 – 1100 mm	730 – 1531 mm
Traffic	10 – 395 vpd	4 – 266 vpd
% heavy	4 - 75	?
Gradient on section	25 > 3%	7 > 3%
PI	0 - 24%	0 – 25%
Monitor	R = 36 GL = 12	R = 3 GL = 3

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- AFCAP** CROWN AGENTS 
- UNPAVED ROAD STRUCTURE**
- All 110 sections of SA investigation were 0 – 150 mm layer WC on in situ
 - Even the low fills were in situ material from side
- 14

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CROWN AGENTS **UKaid**
from the British people

UNPAVED ROAD STRUCTURE



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This slide, titled 'UNPAVED ROAD STRUCTURE', features three photographs. The top-left photo shows a long, straight dirt road stretching into the distance, flanked by green bushes. The top-right photo is a close-up of the road surface, showing a mix of sand and small stones. The bottom-center photo shows a close-up of the soil, which is heavily cracked and dry, with a thin wooden stick lying across the cracks for scale.

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This slide shows three photographs related to soil analysis. The top-left photo shows a hammer being used to test the soil, with a crack visible in the surface. The top-right photo shows a hammer on a darker, more compact soil surface. The bottom-center photo shows a person's hand holding a clump of soil, demonstrating its texture and consistency.