Appropriate Standards for Bituminous Surfacings for Township Roads

Gerrie van Zyl

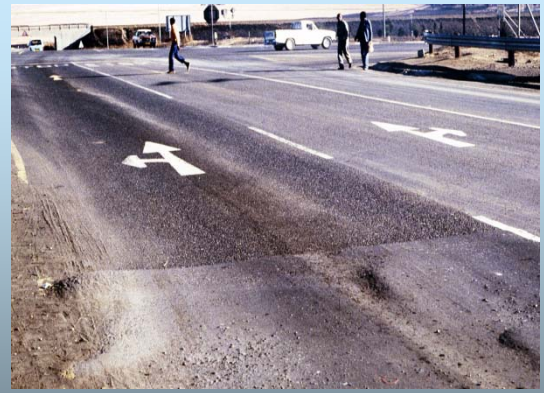
Existing documentation

- **SABITA Manual 10**
  - 3 year study 1992– 120 road sections
- **TRH3**
  - Incorporated Manual 10 + other experience in SA
  - Both initial surfacings and resurfacing types & binders

Traffic Actions

... selection of appropriate seal types

- **Turning/ Braking**
  - ❑ Sand
  - ❑ Double
  - ❑ Cape
  - ❑ Asphalt/ Epoxy
  - ❑ Blocks
  - ❑ Concrete



Gradient

... selection of appropriate seal types

- **Shoving**
  - Braking, curves
  - Thickness
  - Base type
- **Erosion**
  - Kerbs?
- **Constructability**

... selection of appropriate seal types

... selection of appropriate seal types

... selection of appropriate seal types

Maintenance Capability

... selection of appropriate seal types

- **High – Thinner surfacings**
- **Low – Thicker surfacings**

Chemical additive to base + thin sand seal

... selection of appropriate seal types

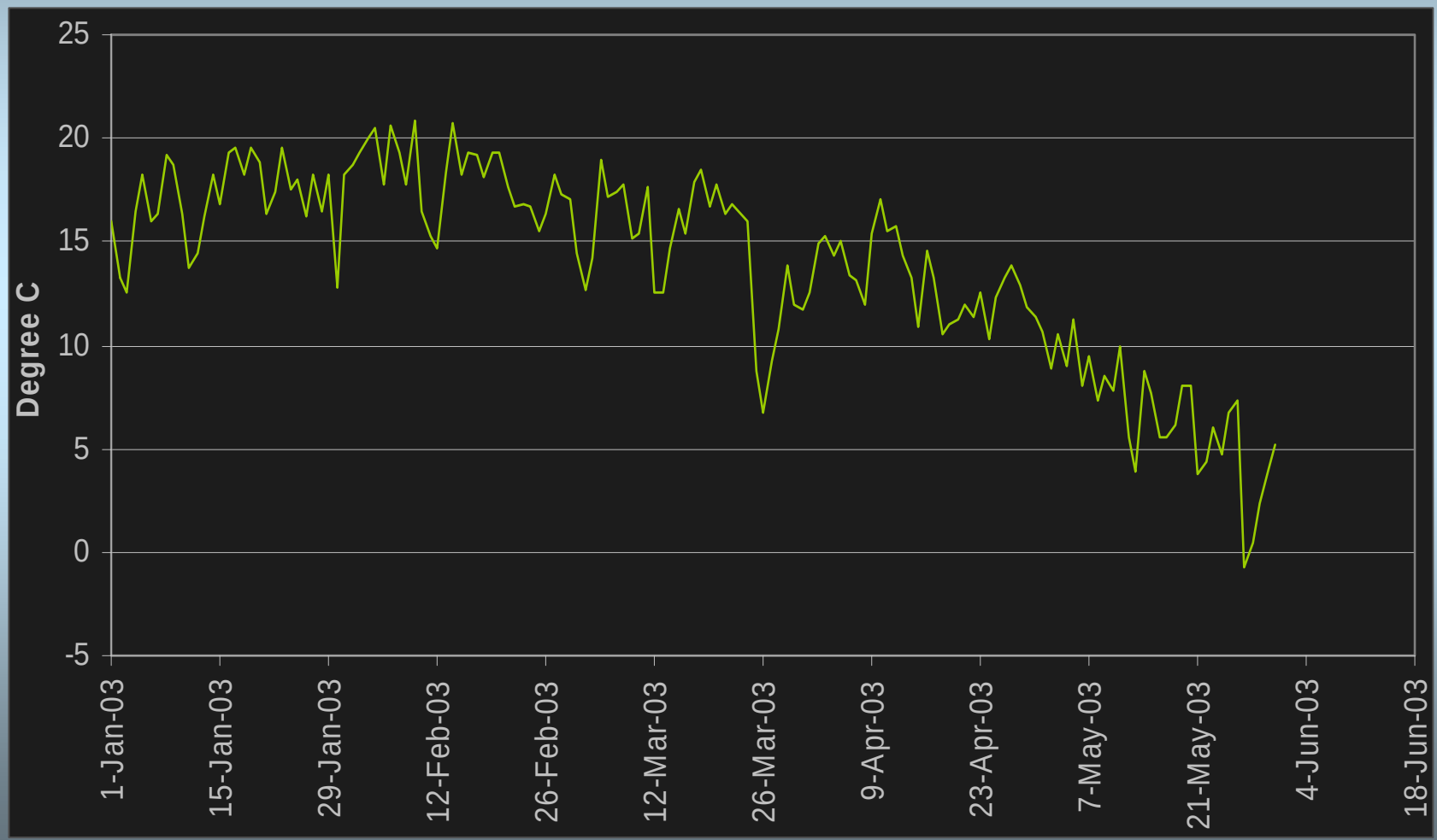
Environment

... selection of appropriate seal types

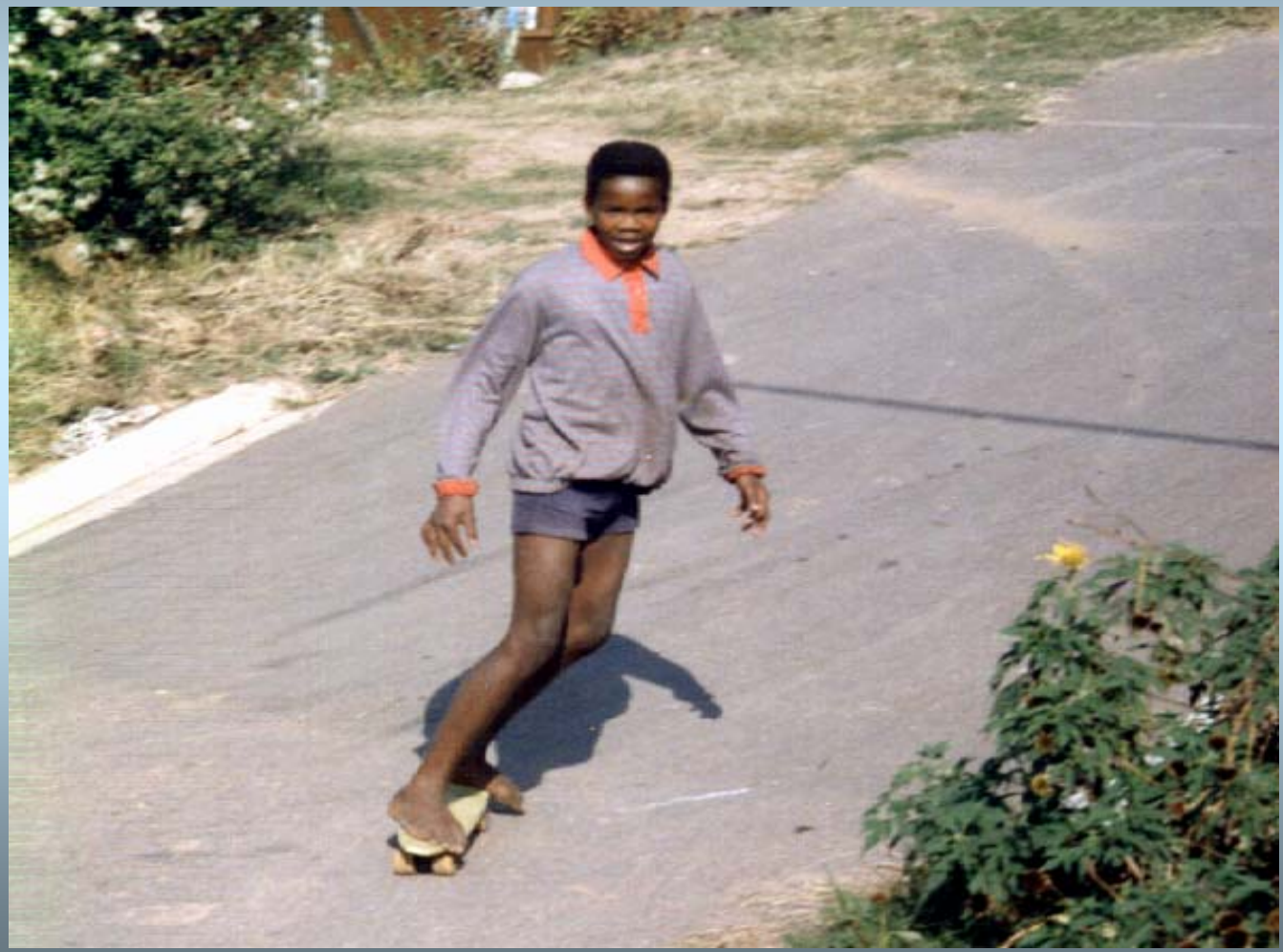
- **Climate & time of construction**
- **Stresses**
- **Social needs**
- **Speed of access/ traffic accommodation**

Minimum Temperature

... station 589591



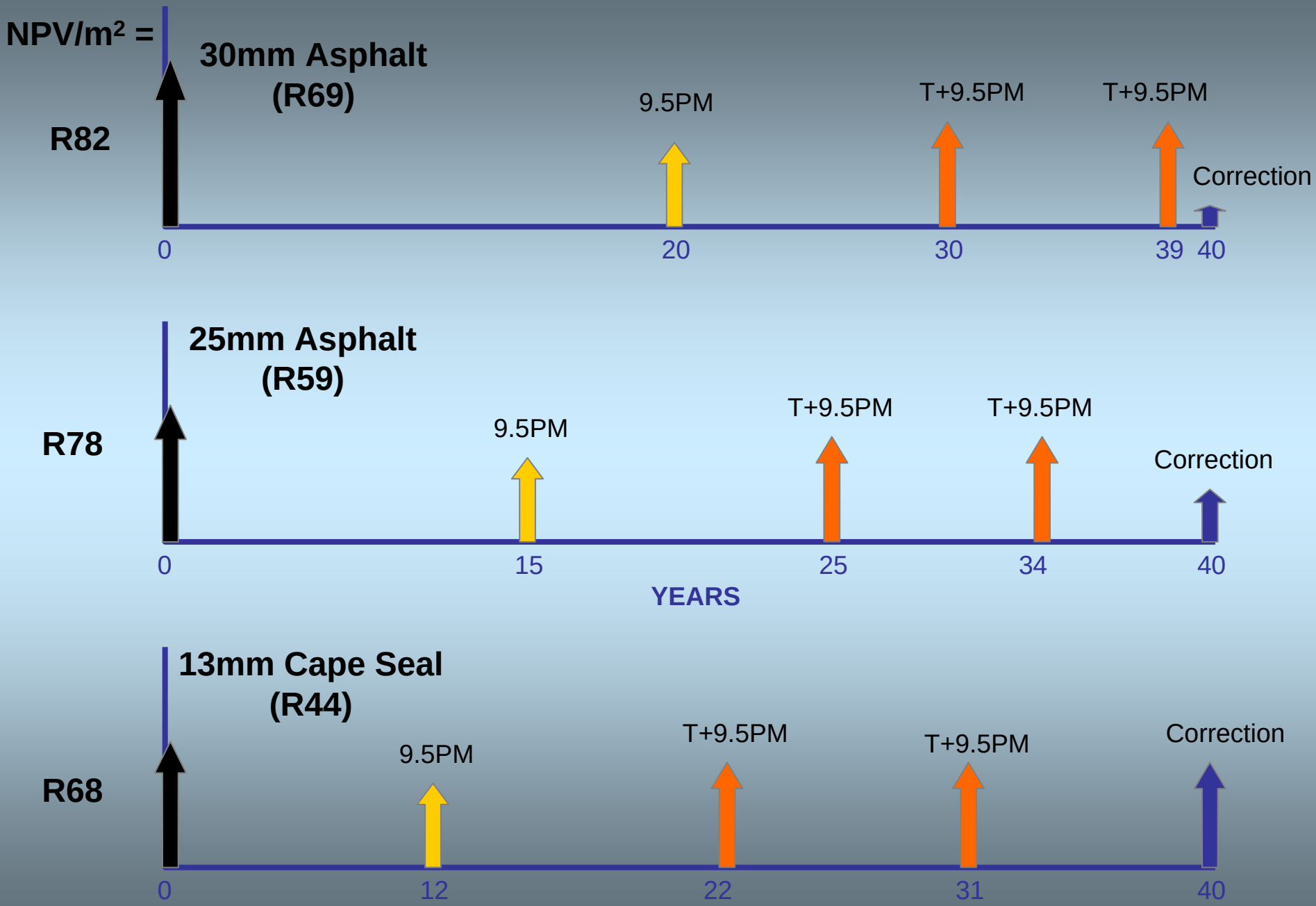
... selection of appropriate seal types

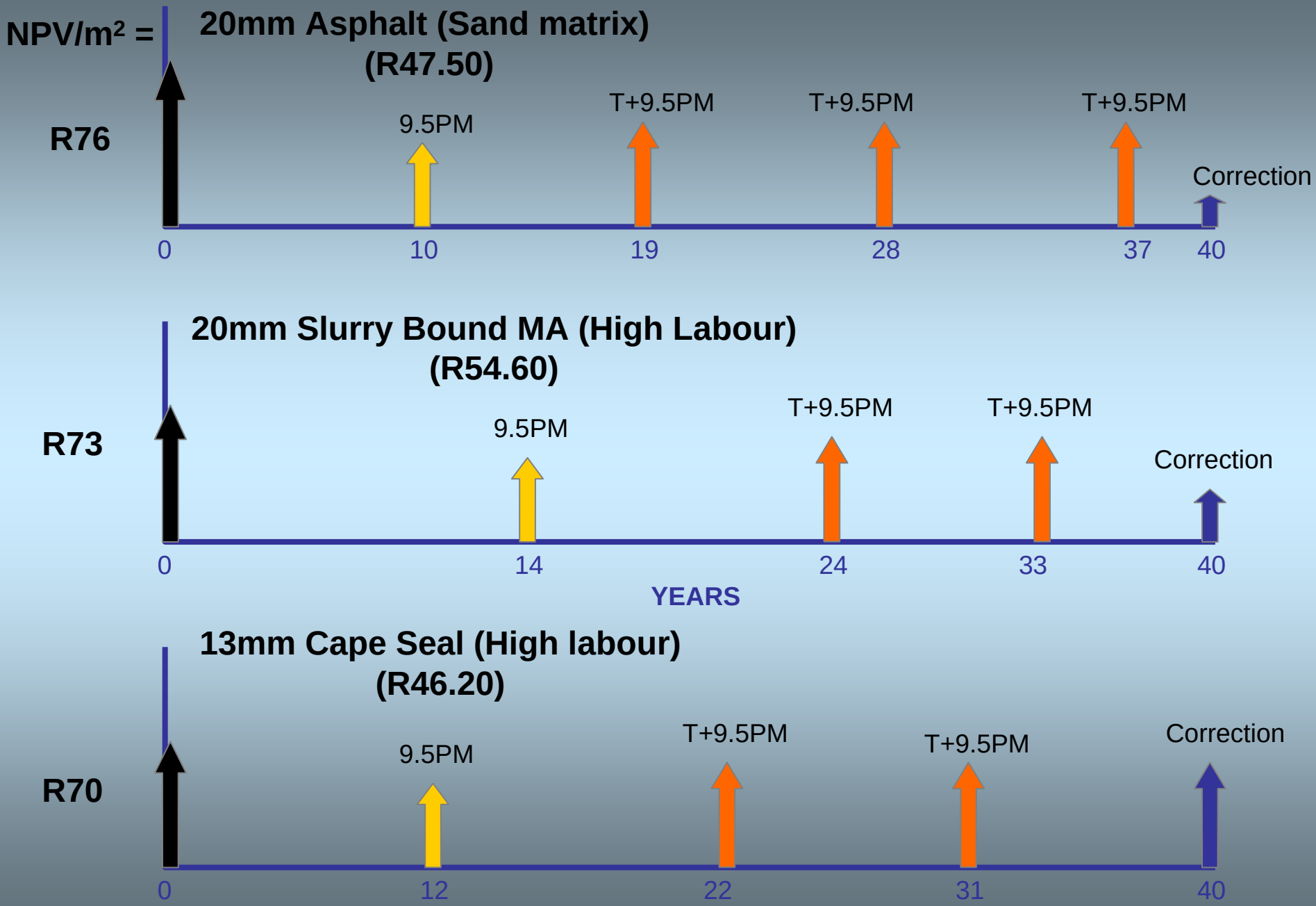


Costs / Economy

... selection of appropriate seal types

- **Material availability**
- **Reduced standards ?**
- **Expected performance**
  - Terminal level dependant on requirements
- **Lifecycle strategies**


NPV/m² =
30mm Asphalt
(R69)
R82
9.5PM
T+9.5PM
T+9.5PM
Correction
0
20
30
39
40
25mm Asphalt
(R59)
R78
9.5PM
T+9.5PM
T+9.5PM
Correction
0
15
25
34
40
YEARS
13mm Cape Seal
(R44)
R68
9.5PM
T+9.5PM
T+9.5PM
Correction
0
12
22
31
40


NPV/m² =
20mm Asphalt (Sand matrix)
(R47.50)
R76
9.5PM
T+9.5PM
T+9.5PM
T+9.5PM
Correction
0
10
19
28
37
40
20mm Slurry Bound MA (High Labour)
(R54.60)
R73
9.5PM
T+9.5PM
T+9.5PM
Correction
0
14
24
33
40
YEARS
13mm Cape Seal (High labour)
(R46.20)
R70
9.5PM
T+9.5PM
T+9.5PM
Correction
0
12
22
31
40

Material Availability / Standards

... selection of appropriate seal types

- **Local materials**
- **Hardness, PSV, grading**
- **Applicability of design**
- **Risks – stick to LVR**

New Construction: Initial seals

TRH3 – Table 4-1

TURNING ACTIONS	RECOMMENDED SURFACING TYPES FOR INITIAL SURFACING									
	S3	Slurry Seal	S1	S2(9)	S2(13)	13mm Cape Seal	S2(13/6)	19mm Cape Seal	S2(19/9) S2(19/6)	Asphalt
Rural with occasional heavy vehicles	√	√a	√	√	√	√	√	√	√	√
Residential - developed	x	√a	√b	√	√	√	√	√	x	√
Residential -developing	x	√a	x	x	x	√	x	√	x	√
Urban with occasional heavy vehicles	x	√a	x	x	x	√	√b	√	x	√
Urban with many heavy vehicles	x	x	x	x	x	x	x	x	x	√

a -Good performance has been noted in several cases. The use of modified binders and trials on site can reduce risks in these situations. Typical problems expected are bleeding and loss of skid resistance

New Construction: Initial seals

TRH3 – Table 4-4

MAINTENANCE CAPABILITY OF ROAD AUTHORITY	RECOMMENDED SURFACING TYPE FOR INITIAL SURFACING									
	S3	Slurry Seal	S1	S2 (9)	S2 (13)	13mm Cape Seal	S2 (13/6)	19mm Cape Seal	S2(19/9) S2(19/6)	Asphalt
High (Can perform any type of maintenance whenever needed)	√	√	√	√	√	√	√	√	√	√
Medium (Routine maintenance, patching and crack sealing on regular basis, but no MMS#)*	x	a	c	b	b	√	√	√	√	√
Low (Patching done irregularly, no committed team, no inspection system)	x	a	x	x	x	√	c	√	c	√
None	x	x	x	x	x	x	x	x	x	√

a -Good performance has been noted in several cases. The use of modified binders and trials on site can reduce risks in these situations. Typical problems expected are bleeding and loss of skid resistance

New Construction: Initial seals

TRH3 – Table 4-3

GRADIENT	RECOMMENDED SURFACING TYPE FOR INITIAL SURFACING									
	S3	Slurry Seal	S1	S2(9)	S2(13)	13mm Cape Seal	S2(13/6)	19mm Cape Seal	S2(19/9) S2(19/6)	Asphalt
< 6 %	√	√	√	√	√	√	√	√	√	√
6 - 8 %	b,c	a,d	b,c,d	c,d	a,c,d	d	c,d	d	c,d	√
8 - 12 %	a,b,c	x	x	c,d,e	a,c,d,e	d,e	c,d,e	d,e	c,d,e	√
12 - 16 %	x	x	x	x	a,c,d	a,d	a,c,d	a,d	a,c,d	√
> 16 %	x	x	x	x	x	x	x	x	x	x

a -Not on stabilized base-courses constructed with fine material.

d -Not if communal water systems are present, since these result in detergents being washed onto the road with consequent erosion of the bitumen.

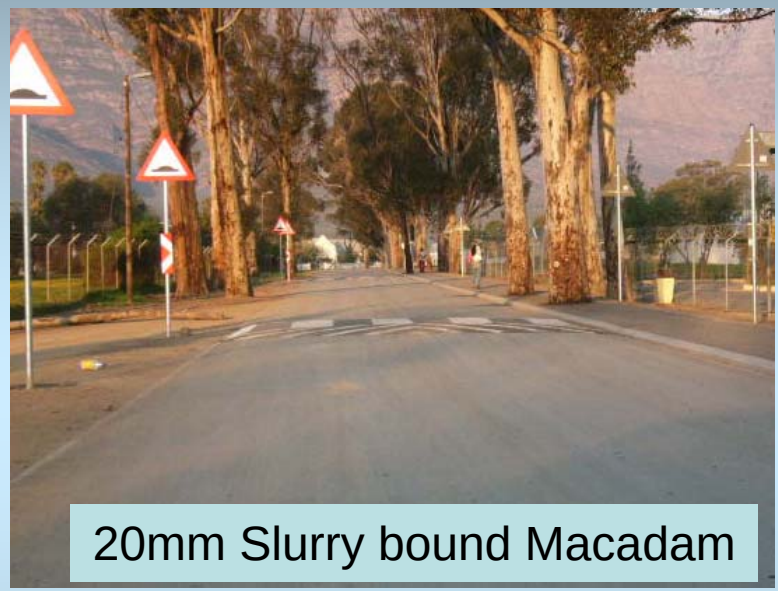
e - Not on gradients above 10 per cent if channelling of flow is expected

TRH3 – Table 4-1

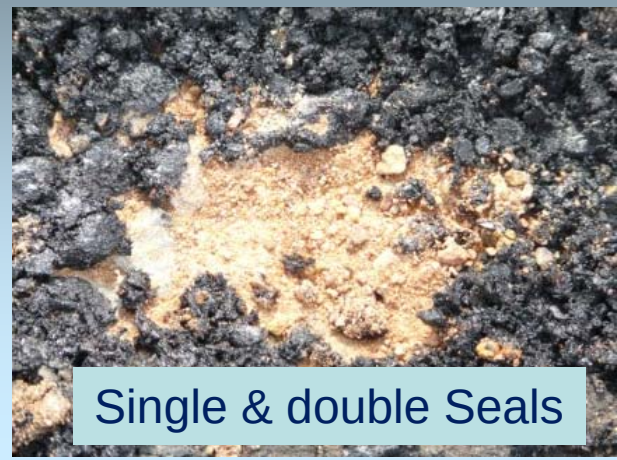
TRAFFIC VOLUME (elv/lane/day)	RECOMMENDED SURFACING TYPES FOR INITIAL SURFACING									
	S3	Slurry Seal	S1	S2(9)	S2(13)	13mm Cape Seal	S2(13/6)	19mm Cape Seal	S2(19/9) S2(19/6)	Asphalt
< 750	√	√	√	√	√	√	√	√	√	√
750 - 2000	x	√	√	√	√	√	√	√	√	√
2000 - 5000	x	x	√a	√a	√a	√	√	√	√	√
5000 - 10000	x	x	x	x	√a	√	√	√	√	√
10000 - 20000	x	x	x	x	x	√a	√	√	√	√
20000 - 40000	x	x	x	x	x	x	√a	√a	√	√
> 40000	x	x	x	x	x	x	x	√a	√a	√

a - Good performance has been noted in several cases. The use of modified binders and trials on site can reduce risks in these situations. Typical problems expected are bleeding and loss of skid resistance

Numerous examples of good performance



Continuous poor performance



Reasons

- **Wrong surfacing type & binder (Selection and adjustment)**
- **Poor construction**
  - Base
  - Surfacing
- **Design**

Need

- **Update SABITA Manual 10**
  - Urban & rural ?
  - Incorporate/ refer latest appropriate detail on LI Surfacings
  - Incorporate/ refer SADC LVSR manual
  - SAT seminars on thin asphalt – performance
  - Incorporate impact of base quality
  - Incorporate maintenance effects and guidelines
  - Storm-water drainage ?
- **RPF Resolution**

End