

Lessons Learnt in
Best Practice of
Road Maintenance
& Repairs

AMANDLA CONSTRUCTION





Points of discussion

- ✓ Pre-planning
- ✓ Factors that influence the final product
- ✓ Lessons Learnt

Project Planning

Pre-supply meeting

- ✓ Mix designs
- ✓ Sampling
- ✓ Testing and acceptances
- ✓ Paving levels and thicknesses
- ✓ Transport of material (trucks in good working condition and asphalt properly covered with tarpaulins)
- ✓ List of contacts and lines of communication

Risks and risk register

- ✓ General Health & Safety (Site Specific)
- ✓ Plant breakdowns
- ✓ Existing services
- ✓ Insitu conditions
- ✓ Standby or full-time mechanic

Method Statements

- ✓ Complete, agreed and signed off.
- ✓ Speaks to site specific conditions and specifications.
- ✓ Discussed with the Engineer and Asphalt Team.
- ✓ Plant required

Sabita Manual 5

- ✓ Read SECTION F
- ✓ Free to download
- ✓ Lesson: Read it again!

Factors to consider that influence the final product

- ✓ Material properties of mix types
- ✓ Layer thickness
- ✓ Weather conditions
- ✓ Temperature of Asphalt
- ✓ Type of plant used and rolling patterns
- ✓ Condition of existing pavement



Weather conditions

- Weather conditions play a massive role in achieving the required compaction requirements.
- Sabita Manual 22 – Hot Mix Paving in Adverse Weather
- Consider compaction window time for rolling and paver speed

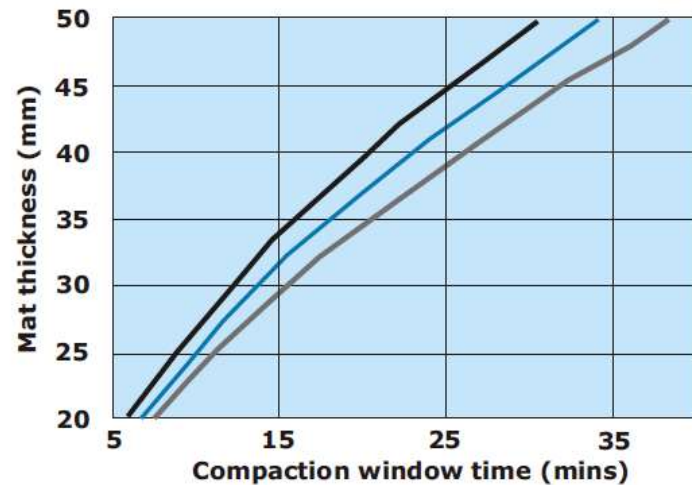
| Uncontrollable | Controllable |
|--|----------------------------|
| Temperature of base | Thickness of mat |
| Air temperature | Lay down temperature |
| Wind velocity | Water deposited by rollers |
| Other weather conditions (rain, cloud, shade from trees, buildings or bridges) | |

Measuring road temperature:



Estimating compaction window time

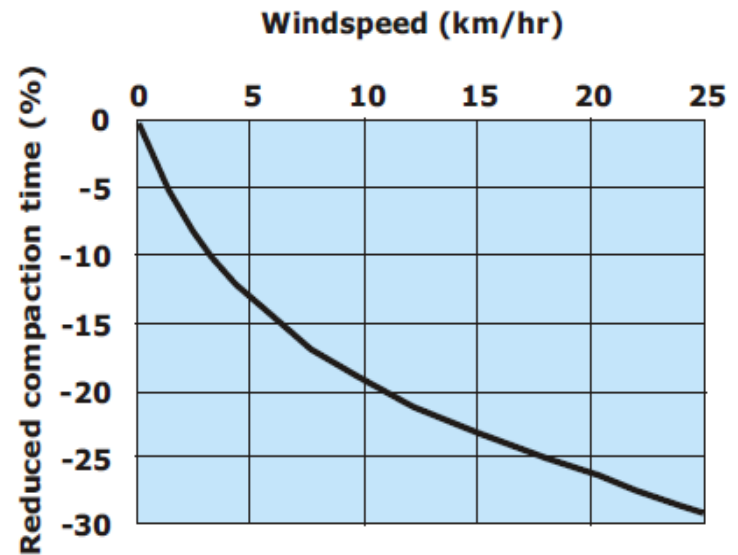
Mat thickness versus compaction window time for typical ambient and asphalt temperatures



Windspeed = zero
Mat temp behind paver = 135°C
Cut-off temp. for compaction = 80°C

| | |
|---|------------------------|
| — | Air 10°C; Base 10-150C |
| — | Air 20°C; Base 20-30°C |
| — | Air 30°C; Base 30-50°C |

Reduction of this compaction window time due to differing wind speeds



*tables from Sabita Manual 22

Temperature of Asphalt

- ✓ Check temperature at the back of the truck before tipping ($\pm 150^{\circ}\text{C}$)
 - ✓ Check temperature in the hopper (min 140°C)
 - ✓ When doing patch work try leave little or no asphalt in the hopper, especially when travelling between patches.
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Rolling patterns

- ✓ Road rehabilitation generally includes lots of patch work which vary in size.
 - ✓ Selecting rollers will depend on the size of the patches as well as the programmed production.
 - ✓ No matter the size of the patches, good rolling practices should still be adhered to.
 - ✓ Patch work requires added attention to detail, densities need to be checked more regularly and monitored closely (will go into more detail under the next section).
 - ✓ Checking joints should be continuously done with a 3m straight edge.
 - ✓ Sabita Manual 5 goes into detail on compaction and rolling patterns.
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Condition of pavement structure:

- ✓ The construction and performance of asphalt surfacing (whether for rehabilitation or on newly constructed base) is dependent on the condition and bearing capacity of the underlying pavement.
- ✓ A stiff pavement structure is required to provide sufficient support to compact the asphalt to the specified density.





Best practice and lessons learnt



Compaction

- Its common practice to put a PTR over a pavement prior to paving.
 - Even If there is no visible movement with the PTR, using vibratory rollers may cause capillary action, increasing moisture content in the layers below decreasing bearing capacity.
 - Compaction needs to be monitored after each roller pass after initial breakdown rolling is complete.
 - If material breaks under PTR, ie. Compaction reduces, then the underlying material is moving. This is not always visible but shows in the Troxler and core results.
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Compaction continued..

- Vibratory compacts from bottom up, make sure its set to high frequency.
 - Static compacts top to bottom.
 - If during vibratory compaction density cannot be achieved, static compaction may be better option.
 - Trying to over compact to get density will generally cause more issues, especially if the mat drops below 110 °C
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Surface unevenness

- ✓ A correction layer is recommended
 - ✓ Better rideability.
 - ✓ Mitigate differential compaction.
 - ✓ Rollers will bridge over the high spots – causing differential compaction and/or settlement.
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Design reports/pavement investigations:

- In many cases design reports, FWD's (Falling Weight Deflectometer) and other investigations to determine the condition of the pavement structure for road rehabilitation contracts are done several years before the work gets done.
 - This results in a high probability that the current pavement condition has deteriorated even further post initial investigations.
 - It is therefore of utmost importance that experienced site staff and Engineers are present during rehabilitation works.
 - If in doubt, immediately request further tests on the insitu material to be carried out. ie. Poor CBR due to substandard base course and subbase layers.
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