Road Pavement Forum
Gordon's Bay
10 May 2011

POTHOLE GUIDELINES

CSIR Project Team:

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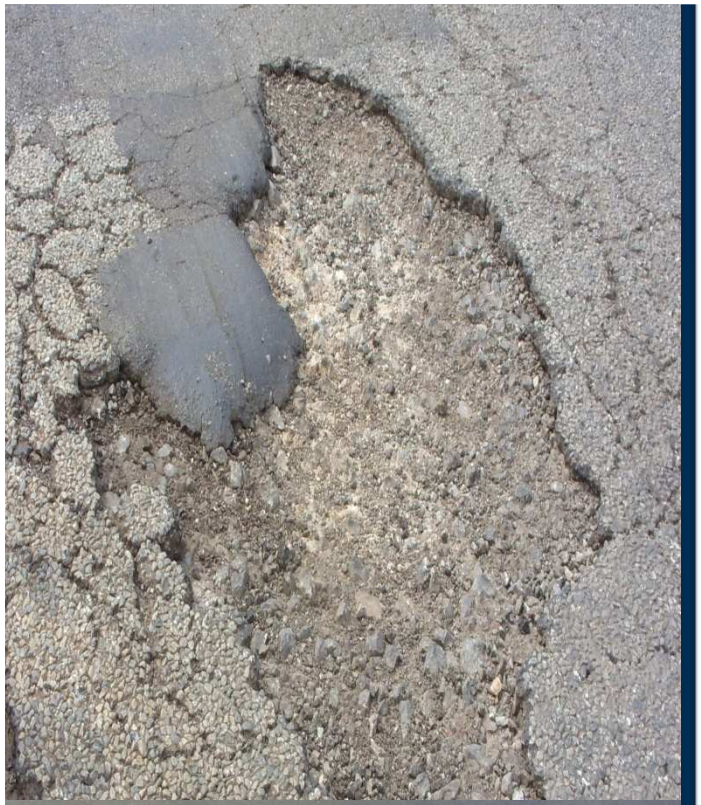


POTHOLES

Background

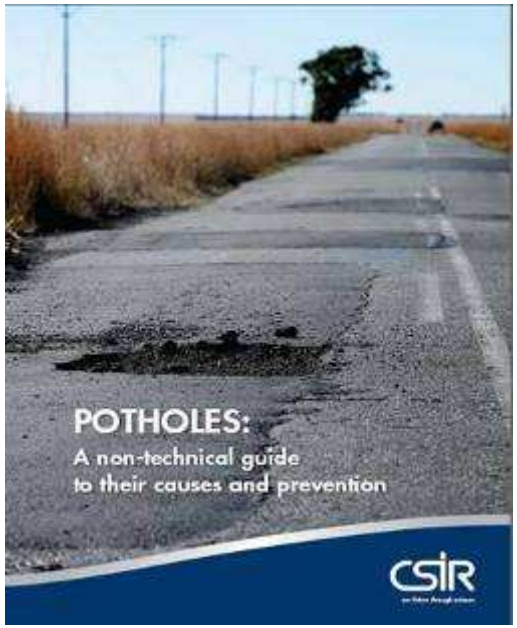
- Value of SA roads – R1 trillion
- Paved roads – R800 billion
- Significant asset that needs preservation
- Lack of maintenance and resulting potholes estimated to cost road users R50 b/year

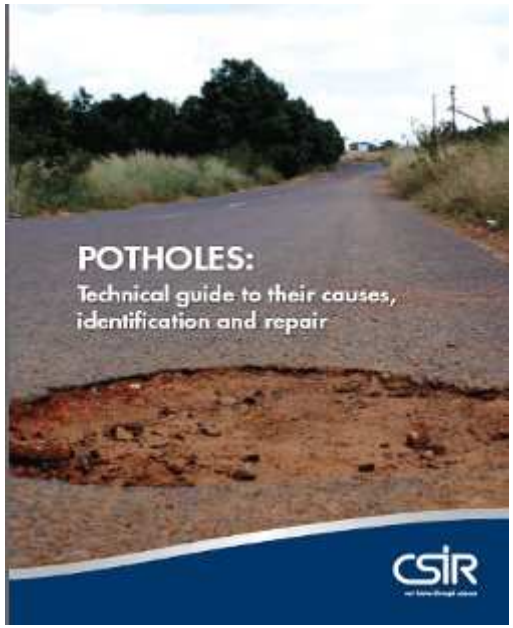
POTHOLES

Why this work ?

- Try to reduce the problem
- CSIR contribution to service delivery
- We don’t fix potholes – research and training

What is covered ?





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POTHOLES NON-TECHNICAL

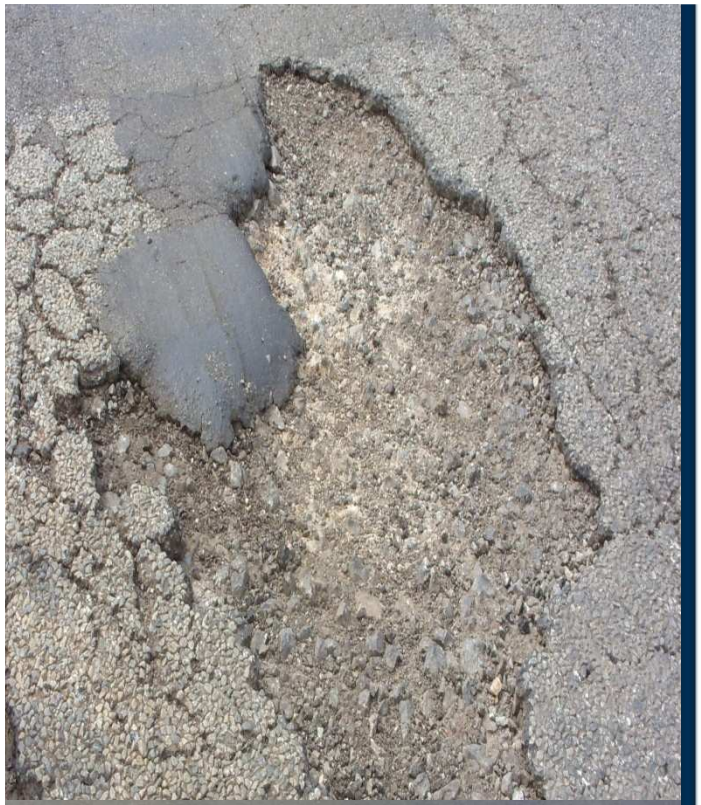
For decision makers

Content

- Brief background
- Causes of potholes
- Prevention of potholes
- Conclusion

Causes

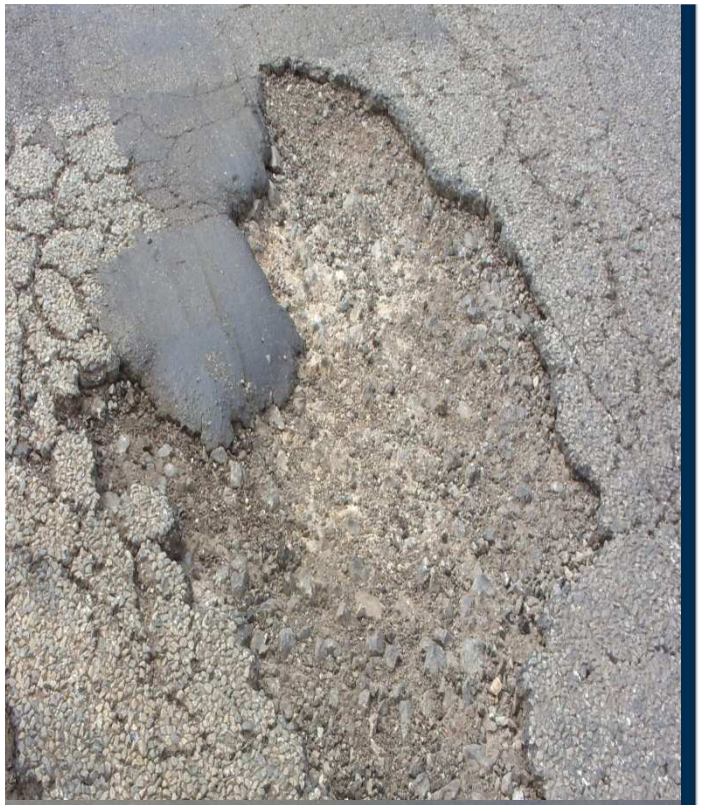
- Interaction of water and vehicles
- Particularly on roads lacking preventative maintenance
    - Unsealed cracking
    - Ageing and drying of binder
- Worsened by the increase in heavy vehicles



POTHOLES NON-TECHNICAL

Summary

- Carry out preventative and proactive (not reactive) maintenance
- Implement a well-controlled maintenance programme
- Attend to roads with old seals (dry bitumen)
- Ensure that cracks in the surfacing are sealed
- Repair potholes as soon as possible (properly)
- Use well-trained teams



POTHOLES TECHNICAL

Aimed at engineers, maintenance supervisors, etc.

Content

- Introduction
- Causes of potholes
- Classification and management
- Repair/correction of potholes
- Quality control
- Conclusions

Highlights

- Considerably more detail than non-technical

POTHOLES TECHNICAL

Causes of potholes

- Differences between asphalt and thin seals
- Actual identification of causes
- Will affect repair procedure

POTHOLES TECHNICAL

Classification

- Innovative part of document

Table 1: Key to decision process for repair of potholes

Key	Defect	Repair action	Go to
1	Surfacing is asphalt		2
	Surfacing is thin bituminous seal		4
2	Pothole is deeper than asphalt wearing course		3
	Bottom of pothole is within asphalt wearing course	*Shallow asphalt (HMA or cold mix)*	
3	Pothole caused by cracking due to fatigue of asphalt	*Deep repair after sub-soil drainage installation*	
	Pothole caused by localised surface water ingress with no associated crocodile cracking	*Medium depth asphalt repair*	
4	Pothole has exposed an unstabilized base		*5*
	Pothole has exposed a stabilized base		*10*
5	Pothole is not associated with cracks		6
	Pothole is associated with cracks		8
6	Pothole affects seal and top of base only (< 50 mm)	*Shallow surface repair*	
	Pothole extends > 50 mm into base		7
7	Pothole affects only the base	*Medium depth repair*	
	Pothole extends below the base		8
8	Pothole does not affect entire pavement structure (only base and subbase)	*Medium depth or deep repair*	
	Pothole affects entire pavement structure		9
9	Pothole is the result of saturated subgrade or support	*Deep repair after sub-soil drainage installation*	
	Pothole is the result of poor material – no evidence of excessive subsoil water	*Deep repair*	
10	Top of base has carbonated and is weak		11
	Top of base has not carbonated excessively and is still strong	*Shallow surface repair*	
11	Pothole is associated with crocodile cracking	*Deep repair*	
	Pothole is not associated with crocodile cracking	*Medium depth repair*	

1	Surfacing is asphalt **..... → 2**		Surfacing is thin bituminous seal **..... → 4**	
2	Pothole is deeper than asphalt wearing course **..... → 3**		Bottom of pothole is within asphalt wearing course **Shallow asphalt (HMA or cold mix)**	
3	Pothole caused by cracking due to fatigue of asphalt ***Deep repair after sub-soil drainage installation***		Pothole caused by localised surface water ingress with no associated crocodile cracking ***Medium depth asphalt repair***	

4	Pothole has exposed an unstabilized base **..... → 5**		Pothole has exposed a stabilized base **..... → 10**	
5	Pothole is not associated with cracks **..... → 6**		Pothole is associated with cracks **..... → 8**	
6	Pothole affects seal and top of base only (< 50 mm) **Shallow surface repair**		Pothole extends > 50 mm into base **..... → 7**	

7	Pothole affects only the base **Medium depth repair**		Pothole extends below the base **…… → 8**	
8	Pothole does not affect entire pavement structure (only base and subbase **Medium depth or deep repair**		Pothole affects entire pavement structure - deformation **…… → 9**	
9	Pothole is the result of saturated subgrade or support ***Deep repair after sub-soil drainage installation***		Pothole is the result of poor material – no evidence of excessive sub-soil water ***Deep repair***	

10	Top of base has carbonated and is weak **…… → 11**		Top of base has not carbonated excessively and is still strong **Shallow surface repair**	
11	Pothole is associated with crocodile cracking **Deep repair**		Pothole is not associated with crocodile cracking **Medium depth repair**	

POTHOLE IDENTIFICATION AND CLASSIFICATION

Inspector ..... Weather..... Date .....

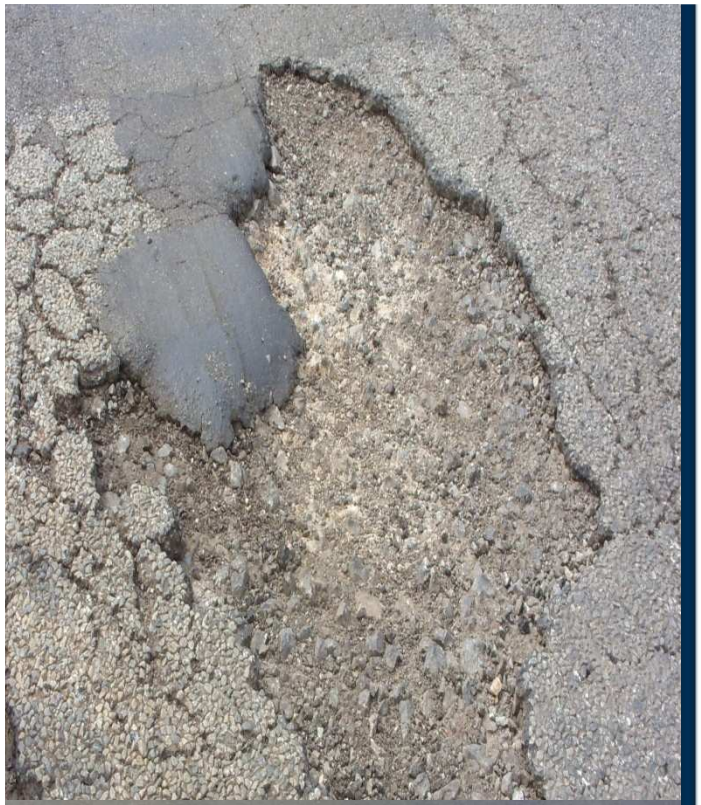
Road No.	Location	Surfacing type	Layers affected	Crocodile cracking	Surface deformation	Subgrade saturated	Stabilized base	Carbonation of base	Action	Comments

CODES:

Surfacing type: **A** – asphalt **TS** – Thin seal

Layers affected: **S** – Surfacing only **B** – Surfacing and base **SB** – Surfacing, base and subbase

Surface deformation (mounding, rutting, shearing, etc) stabilized base, Crocodile cracking: Subgrade saturated, carbonation of base: **Yes/No**

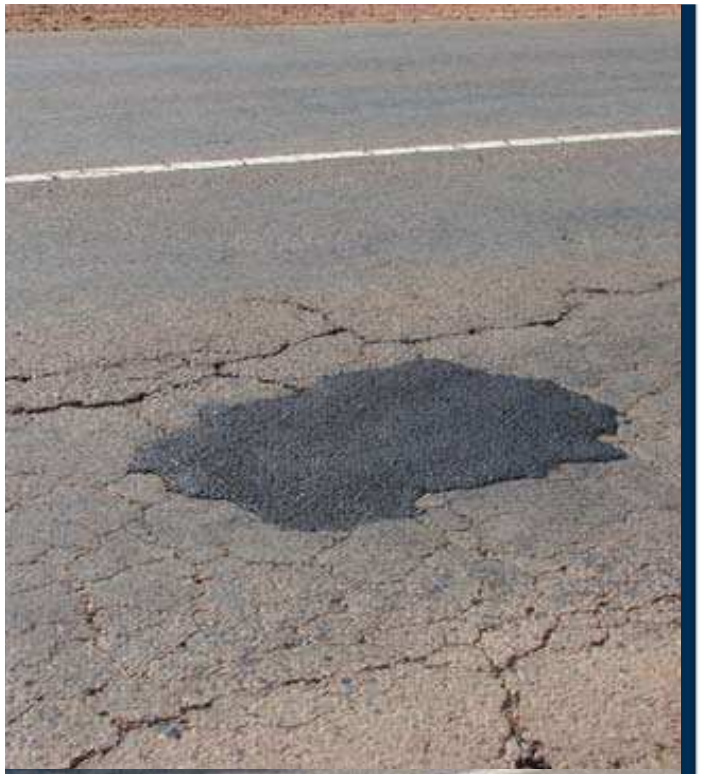


POTHOLES TECHNICAL

Repair/correction of potholes

Methods

- Shallow asphalt repair
- Medium-depth asphalt repair
- Deep repair (asphalt) with or without subsoil drainage
- Shallow surface repair (thin seals)
- Medium-depth repair (thin bituminous seals)
- Deep repair (thin bituminous seals) with or without subsoil drainage



POTHOLES TECHNICAL

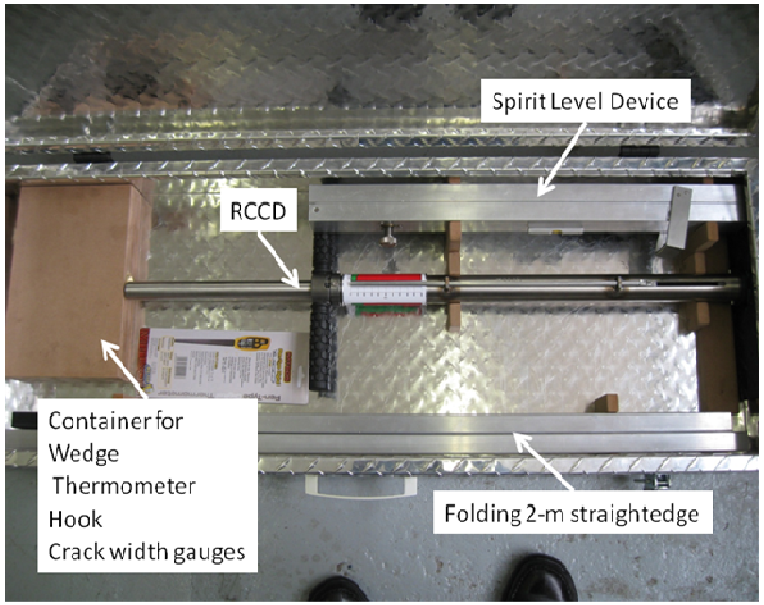
Quality control

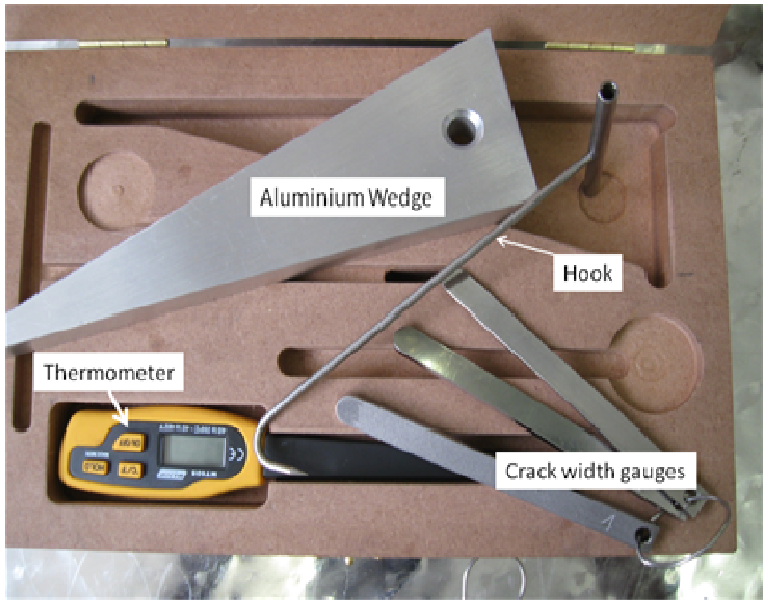
- Current problem is quality of repairs
- Frequently needs to be redone
- Use of system described should avoid this
- Still needs to be done properly
- Prepared a “kit” of required tools to assist

POTHOLES TECHNICAL

Quality control

- Kit





CURRENT STATUS

Training

- Workshops arranged by SARF
  - 6 held so far (ca. 250 delegates)
- Presentation to Parliamentary Portfolio Committee on Transport in March 2011 (PPG)
- Now directly at request of authorities
  - Dept Public Works, Tshwane Metro

    (4 workshops held with about 400 trainees)
- 8 more planned by SARF
- AsAc is arranging to train NQF levels< 5 with hands-on patching instruction

POTHOLES

Summary

- Sincerely hope that this assists with reduction of the problem
- Documents are freely available – no excuse for poor patching

Thank you

www.csir.co.za/pothole_guides

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