

Unsealed Road KPMs

Reg Gibbs July 2009

Background

- 10 Yr Performance Based Contract
- WBoPDC and NZTA Network combined
 - 100% of Maintenance
 - Pavement, surfacing, signs, vegetation, structures, corridor, bridges, lights
 - 100% of Renewal
 - Unsealed metal, rehabilitation, signs, lights, emergency
 - Capital Construction
 - Seal Widening (80 km), Seal Extension (100km), Lighting Upgrades, Most Minor Safety
 - Excludes Major Safety
 - Passing Lanes, Major Construction



North Island - New Zealand

Background

- Awarded to Opus International 2002
 - Alliance Partners – *In³roads*
 - Transfield Services
 - Downer EDI
 - Subcontractors
 - Conspec, Horizon, Coastline Roadmarkers, etc
- \$200M
 - \$140 – WBoPDC
 - \$60 – NZTA
- 54 Key Performance Measures
- 175 Operational Performance Measures

KPMs – For WBoPDC Unsealed Roads

- 290km Unsealed Roads
- 4 KPMs
 - Dust
 - Hard to measure
 - Crashes
 - road factors that contribute to crash
 - Residual Life - Metal Depth
 - Still working on this
 - Grading effects Watertable shape and width
 - Which effects metal depth monitoring
 - Condition - Surfacing Defect Index

Surface Defects Index Make up

Fault No	Fault Type	Fault Weighting
1	Potholes Average no. potholes/100m carriageway	20%
2	Corrugations Average corrugation length/100m carriageway length	20%
3	Graded Width Ungraded width (m)	5%
4	Surface Water Channel Percentage defective	20%
5	Rutting Average rutting length/100m carriageway	5%
6	Cross Section Improper cross section	5%
7	Scour Average scour area/100m carriageway	10%
8	Shoving Average shoving length/100m carriageway length	10%
9	Loose Aggregate	5%

OPMs - Unsealed

- OPMs similar to C Series Specs
- Have become Intervention Measures for safety purposes

Potholes – Unsealed Pavement			
	> 5 potholes per 100m	3 & 4	5 days
	> 10 potholes per 100m	5	
	> 15 potholes per 100m	6	
	> 20 potholes per 100m	7	
Unsealed Pavement Surface Shape			
	Camber outside tolerances of 4% – 8% and/or superelevation outside tolerances of +4% – +10%	4 & 5	6 months
	Camber outside tolerances of 4% – 10% and/or superelevation outside tolerances of –4% – +15%	6	
	Camber outside tolerances of 4% – 15% and/or superelevation outside tolerances of –4% – +20%	7	
Unsealed Pavement Corrugations and Rutting			
	> 50mm depth and 10m length	4 & 5	1 Month
	> 65mm depth and 15m length	6	
	> 75mm depth and 30m length	7	

Unsealed KPMs / OPMs - USE

- Council wanted to change LOS
 - Less corrugations and potholes
 - Improved condition
 - Less complaints
 - No additional cost
 - System to demonstrate above
- Inroads implemented the following
 - Annual KPM changed to Monthly Measure
 - OPM used only for intervention
 - Introduced Emergency Repair Type

Unsealed Monthly KPM - Now

FAULT No.	FAULT TYPE	FAULT WEIGHTING	Emergency Repair
1	<u>Potholes</u> Average no. potholes /100m c'way length >100 mm dia > 25 mm deep	20%	Pothole >75mm deep
2	<u>Corrugations</u> Average corrugation length/ 100m c'way length > 25 mm	20%	Corrugation > 75mm deep
3	<u>Graded Width</u> Ungraded width (m)	10%	
4	<u>Surface Water Channel</u> Percentage Defective	5%	
5	<u>Rutting</u> Average Rutting length / 100m c'way length >40mm	5%	Rut >75mm deep
6	<u>Cross section</u> Improper cross section < 5 %	5%	
7	<u>Scour</u> Average scour area / 100m c'way length	10%	Scour >75mm deep
8	<u>Shoving</u> Average shoving length / 100m c'way length > 40 mm	20%	Shove >75mm deep
9	<u>Loose Aggregate</u>	5%	

Inroads Inspection Regime

- Either
 - 1 - 4 weekly (2 week average) inspection
 - Or Customer triggered
- Inroads Rating System (laptops)
 - Tracked over time
 - 0= zero faults- Inspection only recorded
 - 1= minor faults - no action required
 - 2= number of faults but within OPM tolerance
 - 3= breaches OPM, response time required
 - 4= emergency repair required
- All staff have instant access to current condition
- Sets FWP
 - Some 2s completed with 3s and 4s

Unsealed Monthly Inspection

FAULT TYPE/ EXOR Rating	ROAD CONDITION OVER ANY 100 Metre Section				
	0	1	2	3	4 Emergency repair
<u>Potholes</u> No. potholes more than 100mm in dia and more than 25mm deep	0	0 to 2	2 to 25	25 plus	Any Pothole more than 75mm deep
<u>Corrugations</u> Average corrugation length more than 25 mm deep	0	0 to 4m	4 to 50m	50m plus	Any Corrugation More than 65mm deep
<u>Rutting/Scour</u> Average Rutting length more than 40mm deep	0	0 to 5m	5 to 50m	50m plus	Any Rut more than 75mm deep
<u>Shoving</u> Average shoving length more than 40mm deep	0	0 to 3m	3 to 9m	9m plus	Any Shove more than 75mm deep

Unsealed Monthly Monitoring

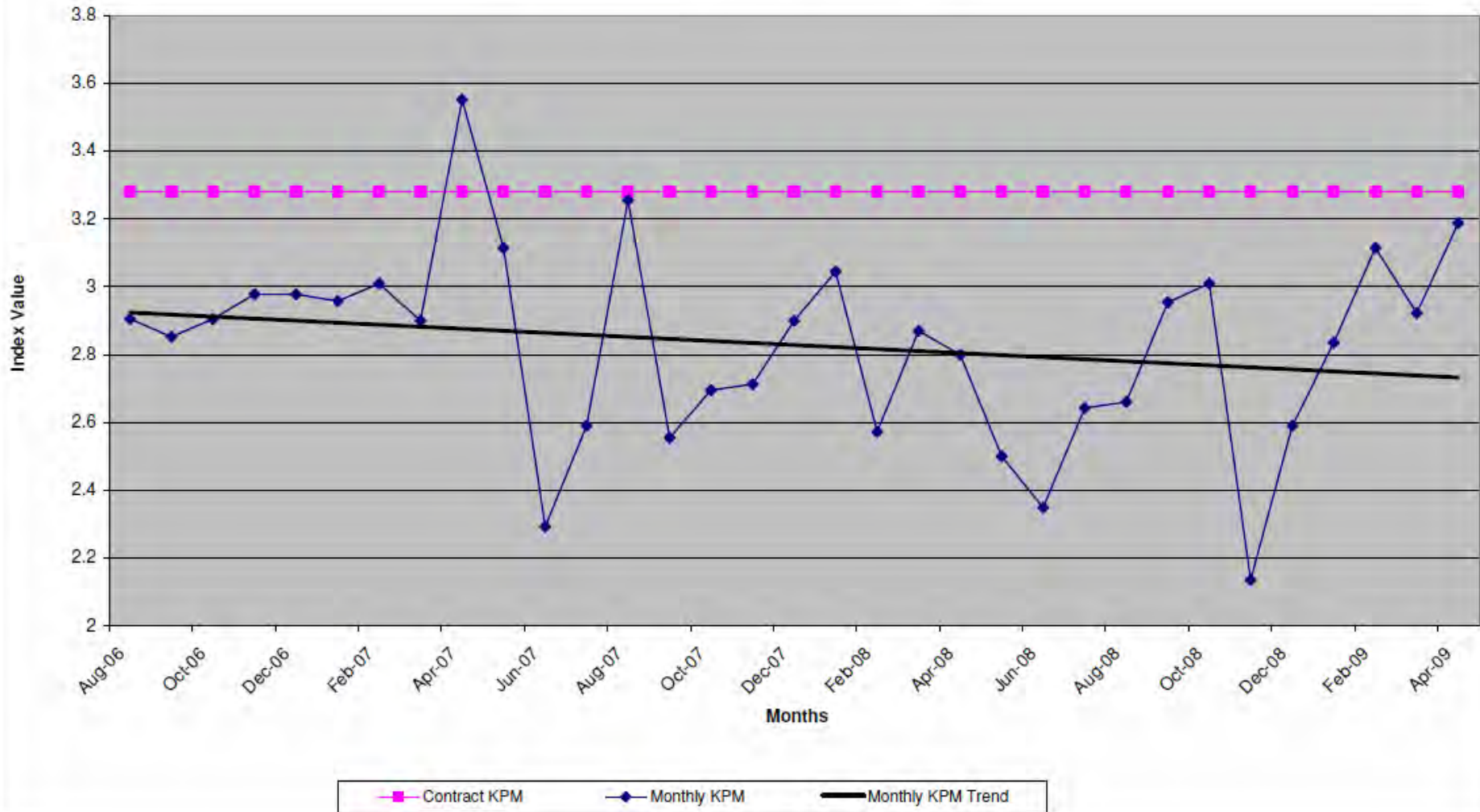
- Compliance Data Collection Process
 - \$4.5k per annum (\$375/month)
 - Independent audit
 - 10Km per month (5%)
 - Randomly selected by Superintendent

Unsealed Monthly Monitoring

- Conclusions
 - OPMs only track intervention
 - pass or fail
 - Or % compliant
 - KPMs will track condition over time
- Examples

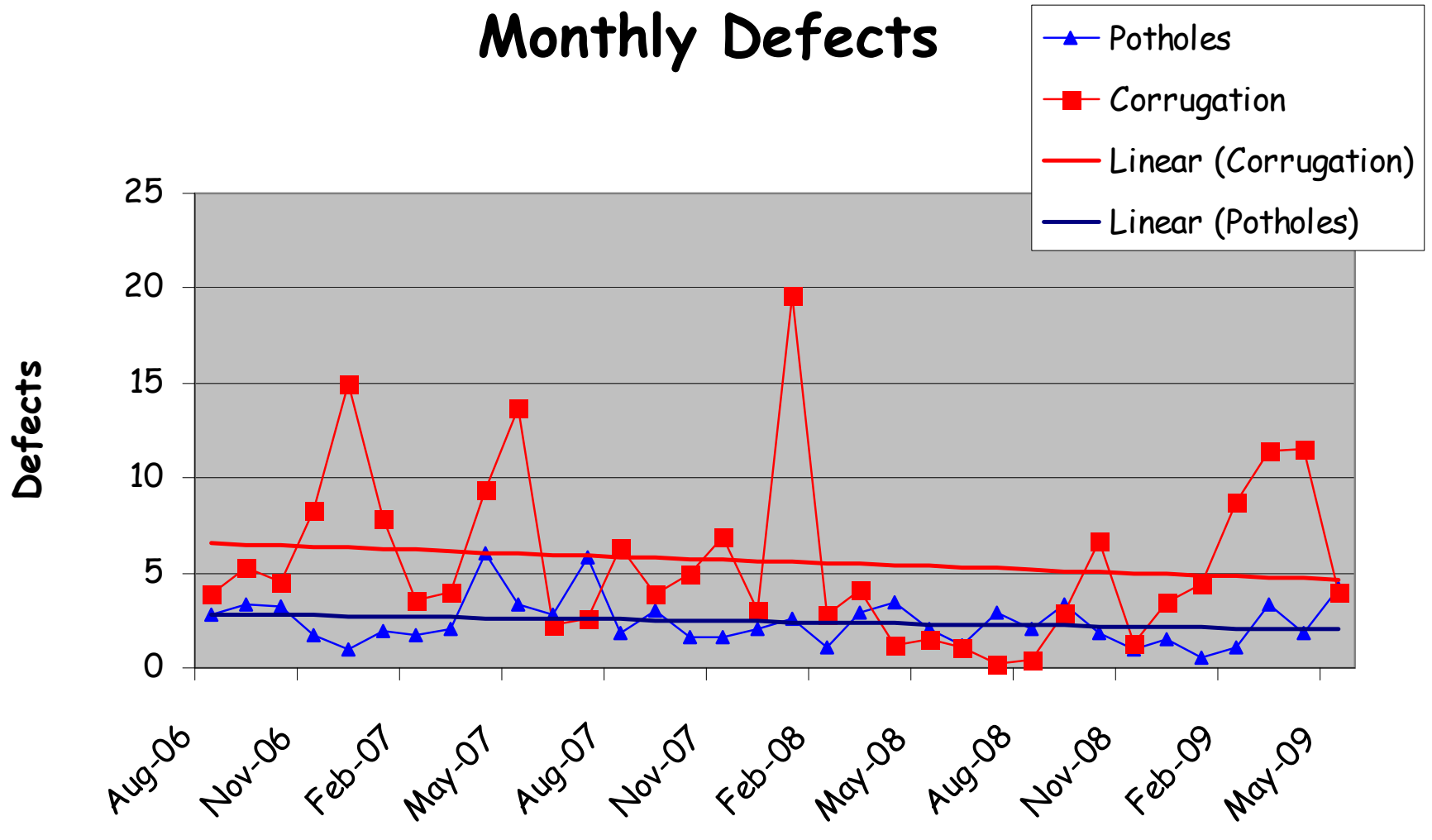
Unsealed Monthly Monitoring

Unsealed Road KPM Monthly Surface Index



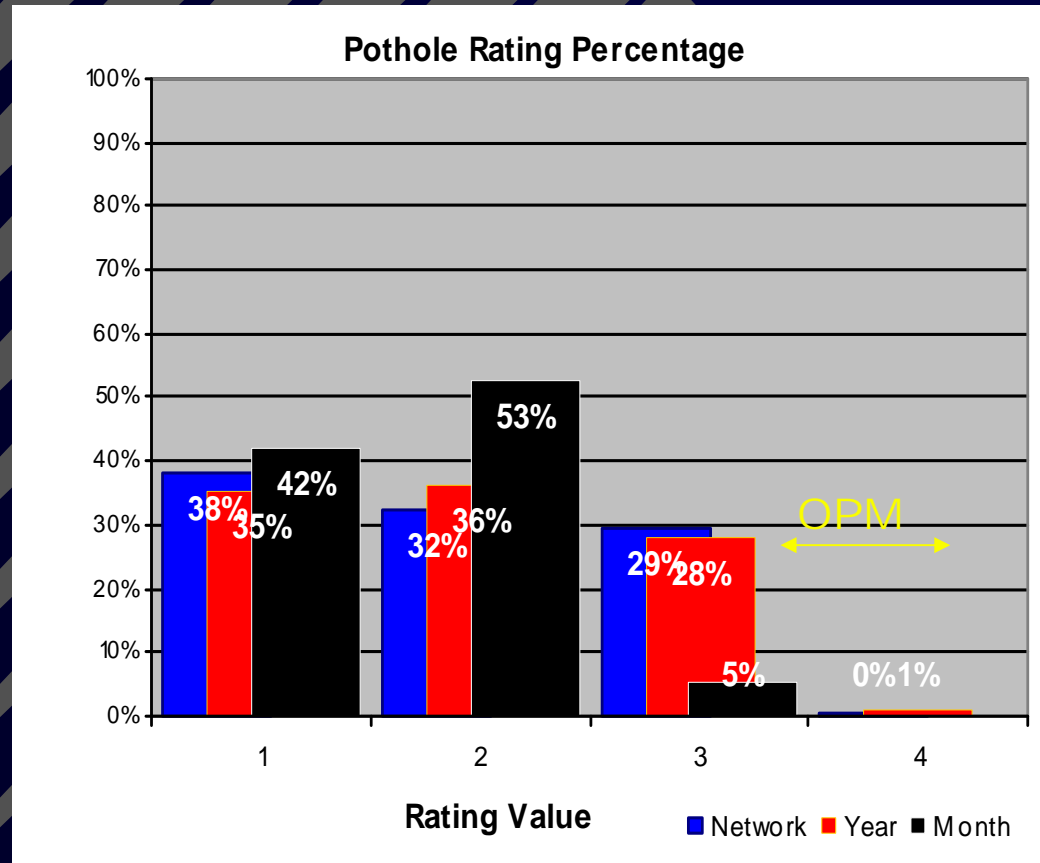
Unsealed Monthly Monitoring

Monthly Defects



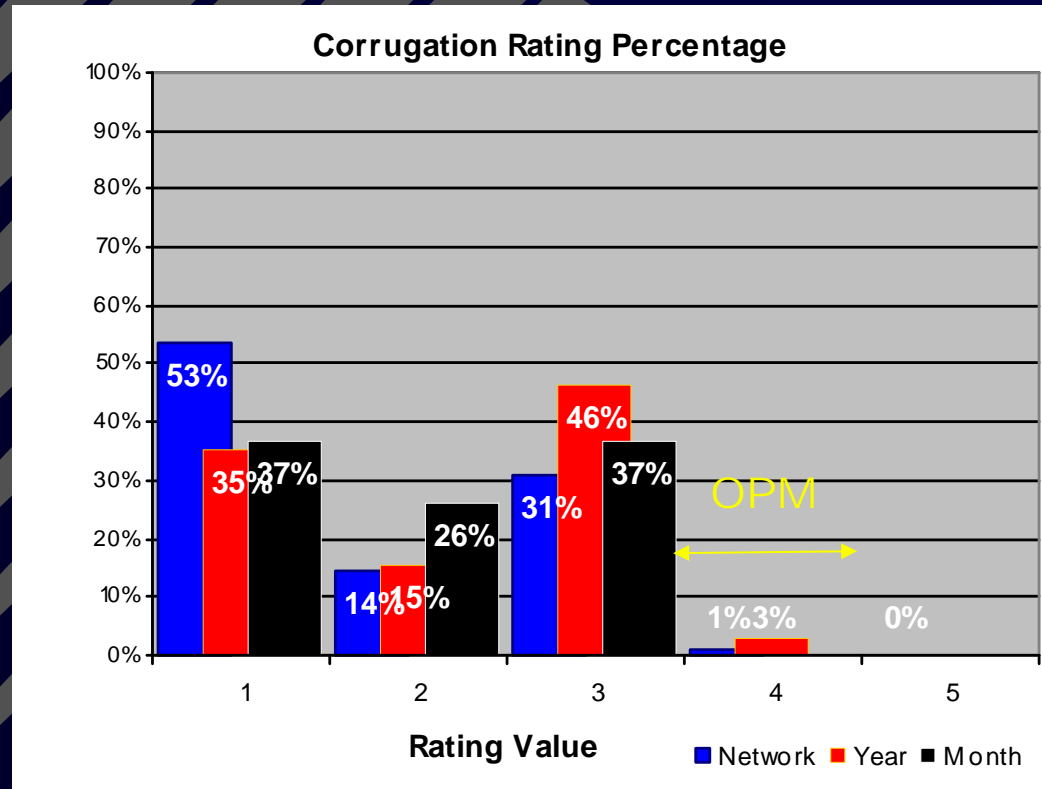
Unsealed Monthly Monitoring

- 42% no potholes/100m
- 53% <2 potholes/100m
- 5% <25 potholes/100m
- 0% >25 potholes/100m
- OPM Result
 - Pass 100%
 - No section >25



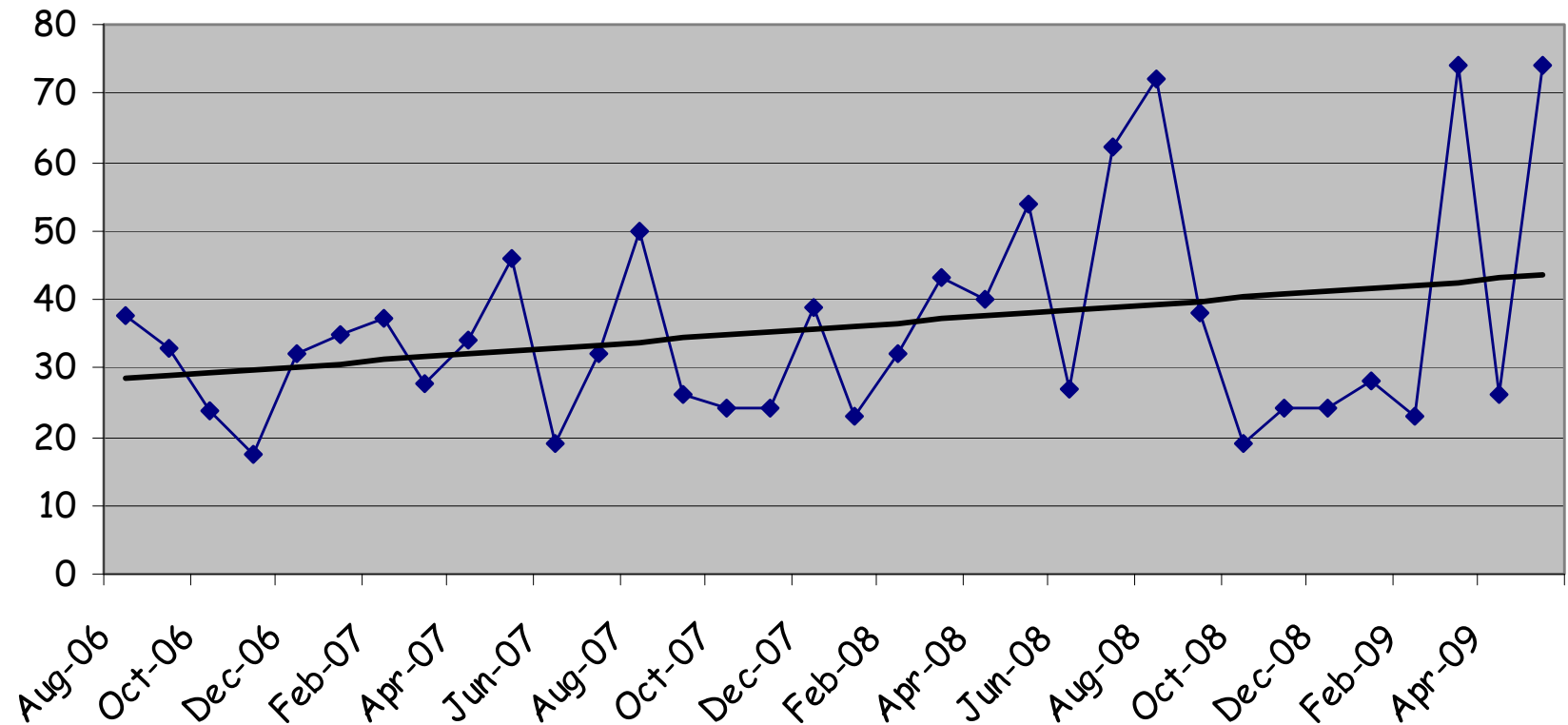
Unsealed Monthly Monitoring

- 37% no corrug/100m
- 26% <4m corrug/100m
- 37% <50m corrug/100m
- 0% >50m corrug/100m
- OPM Result
 - Pass 100%
 - No Section >50m



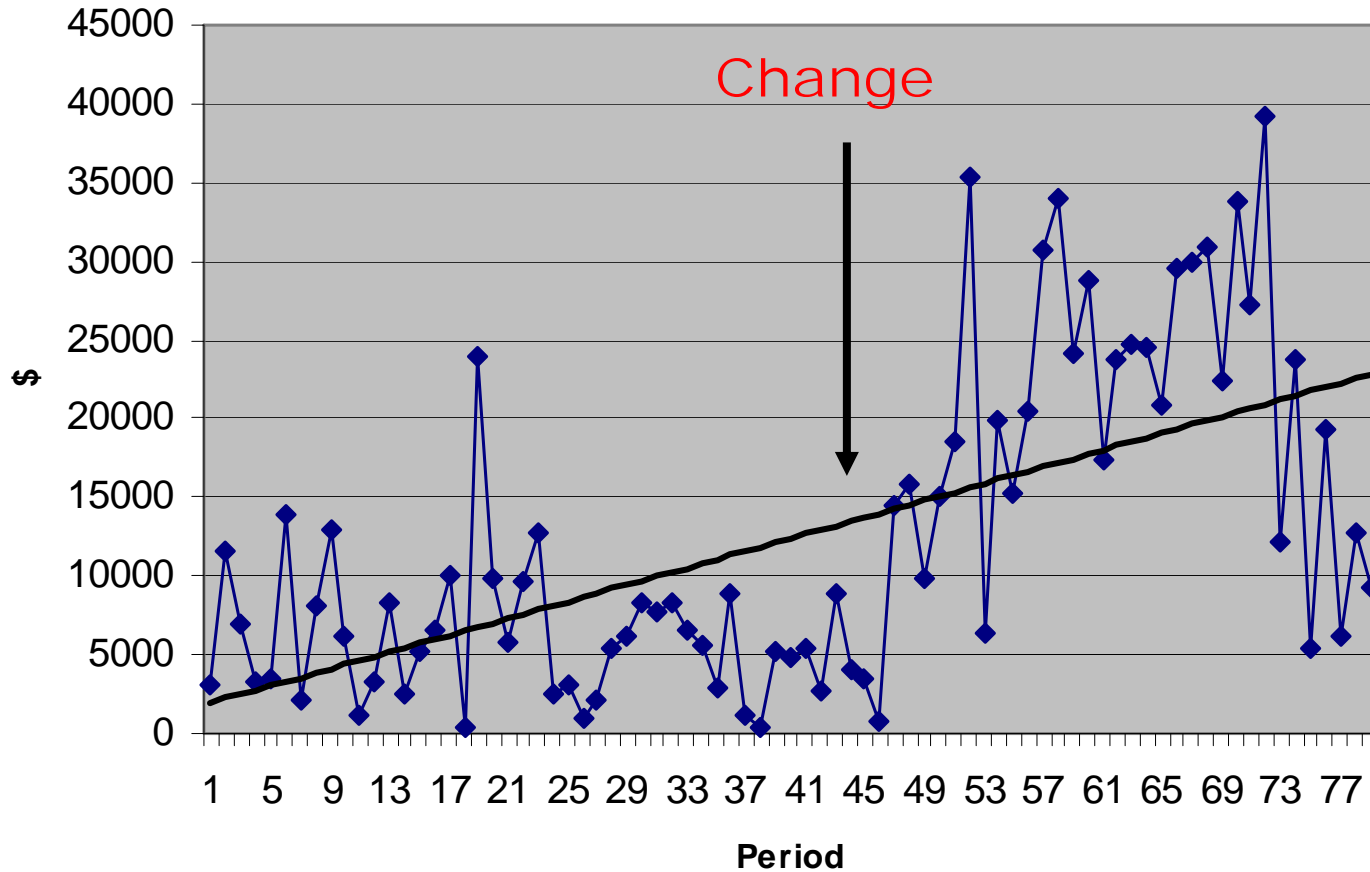
Unsealed Monthly Monitoring

Unsealed road complaints



Unsealed Monthly Monitoring

Unsealed Maintenance costs



Unsealed Road monitoring

- Introducing a Smooth Travel Exposure KPM to measure the condition of the unsealed Roads was considered
- WBoPDC Sealed roads has a Smooth Travel Exposure KPM
- Independent Compliance vehicle doing Unsealed SDI testing has lasers attached to measure NAASRA
- Therefore cost would be minimal
- Latest technology

Reason why not introduced

- WBoPDC Unsealed network varies in width from 2.2m to 7.5m
- Traffic Volumes vary from 4 to 246 vehicles per day
- Mean free speed of unsealed roads varies from 20 to 95 km/hr
- What speed do you travel at
- Technology limitations (40 - 60Km/hr)

Unsealed Road monitoring

What line do you take

- Design lane as per sealed roads
- Wheel path that people drive on unsealed roads
- Roughest line to nail the contractor
- Smoothest line that the contractor could take to give the best roughness value
- Sealed road NAASRA readings are tending to be unreliable at low speeds and on short roads
- What faults are causing your roughness?

Unsealed Road monitoring

- Conclusion
- Technology limitations would mean 49% of the unsealed roads would not be surveyed
- Inroads also considered that there were too many variables open to abuse at this stage to use a NAASRA target as a contractual condition KPM for the WBoPDC unsealed roads

Summary

- Using weightings on RAMM collected data to measure Unsealed Road Condition will give
 - An unsealed road condition Index that will track condition over time
 - Consistent repeatable results
 - Any certified RAMM rating person can collect data
 - Can be used for **all WBoPDC** unsealed roads
 - Can track/monitor 9 faults
 - Cheap to implement
 - Can be as a contractual KPM
 - Easy to adjust increase/decrease KPM targets

SUMMARY

- Council wanted change
 - Less corrugations and potholes ✓
 - Improved condition ✓
 - Less complaints ×
 - No additional cost ×
 - Process to demonstrate above ✓
- WBoPDC has now a robust Unsealed Road Monitoring system in place for Council to review Value for Money at any time

QUESTIONS?