Maximising life in old chipseals

Jim Paterson – WBoPDC Transportation Network Manager
David McDougall – Inroads Asset Manager
Where and What

- Western Bay of Plenty District
  - Population 42,000
  - 3x national growth rate
  - 10th fastest growing (96-01)
  - 14th fastest growing (01-06)

- 1030 km local roads
  - 790/240 (sealed/unsealed)
  - 177 Bridges and Structures

- 150 km state highway

- Surrounds Tauranga City
  - 110,000 population
  - Largest port in NZ (by volume)
Background

• The problem faced in 1999
  – Traffic Growth at 4%
  – Declining Levels of Service
  – Escalating costs
  – Council constraining future rate rises

• The Solution
  – Lump sum, performance based, long term maintenance contract ….PBC-01
  – Outcomes specified in Performance Measures and Levels of Service
Resealing

• Traditional Resealing Strategy?
  – RAMM Treatment Selection (based on seal age)
  – Available Funds
  – Seal Life Expectation
  – Minimise maintenance costs (internal)
  – Do Minimum

• Performance Based Contract?
Background – what makes the Contractor seal?

Contractual Obligations to meet LOS through KPM’s

- Texture KPM (%<0.5mm thresholds)
- Surface Defects Index KPM
  - $f$(RAMM Rating(rutting, shoving, potholes, scabbing))
  - $f$(High Speed Data(rutting, shoving))
- Residual Seal Life KPM

Contractor Drivers

- Minimise maintenance costs
  - Avoid potholes, patches, digouts, stabilised patches through timely reseals
- Maximise contractor profitability
  - Defer reseals until most cost efficient
Ensuring we achieve the maximum seal life

• Reseal just in time – just before required
• Benefits
  – Longer pavement life cycle
  – Incremental (small benefit each year)
  – Least whole of life cost
• Risks
  – Significant cost if delayed too long (premature pavement failure and more expensive)
  – Loss of LOS (potholes, roughness, texture)
  – Cash flow implications
• Consequences
  – A conservative MIS for Resealing may be seen as cheap insurance for both service provider and Council
Systems Based Approach

• Annual Programme
  – Desk top study
    • high speed data exception reporting plus RAMM rating
  – 100% field validation by experienced Asset Managers

• Ongoing Monitoring Programme
  – 1-6 week MIS inspections for Vulnerable Seals as part of inspectors
  – Logging all faults (laptops and Exor)
  – Run weekly exception reporting on VS.
  – warning signs such as cracking, scabbing, potholes, shoving, pumping, lack of waterproofing, etc

• Cost of Data Collection
  – is high, but low in comparison to $ gains in deferring Reseals
Laptops in field inspection vehicles
Faults in a 18 year old grade 4
No faults – 27 year old grade 3
What has worked and what hasn’t review

Residual life KPM has not been the right driver

• not all seals behave the same or can be predicted due to pavement depth and construction quality

• Performance is variable (ie 25 year old Gr 5 vs 4 year old Gr 2)

• is dependant on actual life and defects

• To insist @Yr 10 to match Yr 0?
  – Counter productive
  – Could extract more value with careful MIS
Residual Seal Life – Why is it Important?

• Measurement of value left in a network
• Difficult to measure
• Now favour comparison to previous top surface
• Tracking texture change over time
WBOPDC - Network Remaining Surface Life - 2CHIP
Top Surface and 2nd Layer, by Length, Excluding First Coats

Length (km)
0
5
10
15
20
25
30
35
40
45
50

Residual Life (Yrs)
0
10
20
30
40
50
60
70
80
90
100

Cumulative %

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2CHIP_Achieved
2CHIP_Top
NETWORK (Top)
NETWORK(Achieved)
2CHIP%_Achieved
2CHIP%_Top

Western Bay of Plenty District Council
OPUS
Seal Residual Life - Summary

- Extending the life of an asset through a careful and proactive MIS thereby adding value
- Residual Life KPM should encourage the extraction of its maximum potential life through
  - an effective MIS
  - tracking age profiles
  - not through Y0 profiles
  - flexible
  - risk transfer
  - needs to have understanding/management
  - whole of network approach
Jim Paterson
Transportation Network Manager - WBoPDC
Financial long term gains for the future?

• Development of more accurate cost models
• Future costs can be better predicted
• Cost minimisation can be demonstrated through extended seal lives
• However
  – Residual Life Models are not sufficiently robust to use as predictive models
  – Is worth monitoring/reporting in order to better understand asset performance and to potentially use as a predictive tool in the future
Lessons for the next maintenance contract?

• Balancing Risk
  – Of irreversible pavement deterioration through sealing too late (higher maintenance cost)
  – Bow wave of deferred work (for client and next contract)
  – Waste of money from prematurely resealing

• With Cost
  – Too much if underpinned quantities are excessive
  – Too little if underpinned quantities are insufficient

• Thus Clients need to be Knowledge Rich (Smart Client)
  – Underpinned quantity is an effective mechanism to limit Client’s risk to affordable levels
  – Provides a trade-able contingency for Clients if not required
Questions ?
Questions ?