



Maximising life in old chipseals

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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 contractPBC-01
 - Outcomes specified in Performance Measures and Levels of Service



David McDougall

Asset Manager - Inroads

Chipseal Surfacing Strategy



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
 - $f(\text{RAMM Rating}(\text{rutting, shoving, potholes, scabbing}))$
 - $f(\text{High Speed Data}(\text{rutting, shoving}))$
- 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?

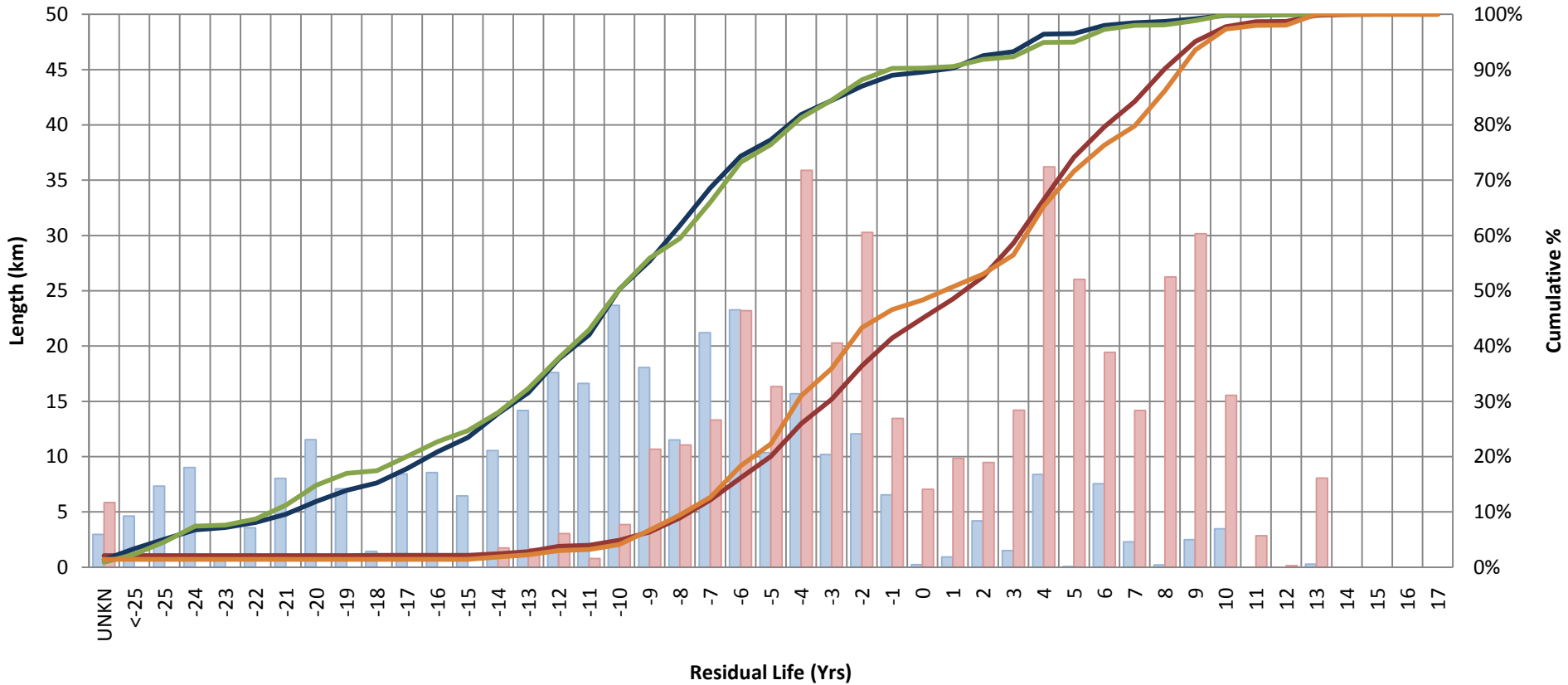
- Measurement of value left in a network
- Difficult to measure
- Now favour comparison to previous top surface
- Tracking texture change over time



Existing Top Surface vs Previous Top Surface

WBOPDC - Network Remaining Surface Life – (100-250 adt)

Top Surface and 2nd Layer, by Length, Excluding First Coats

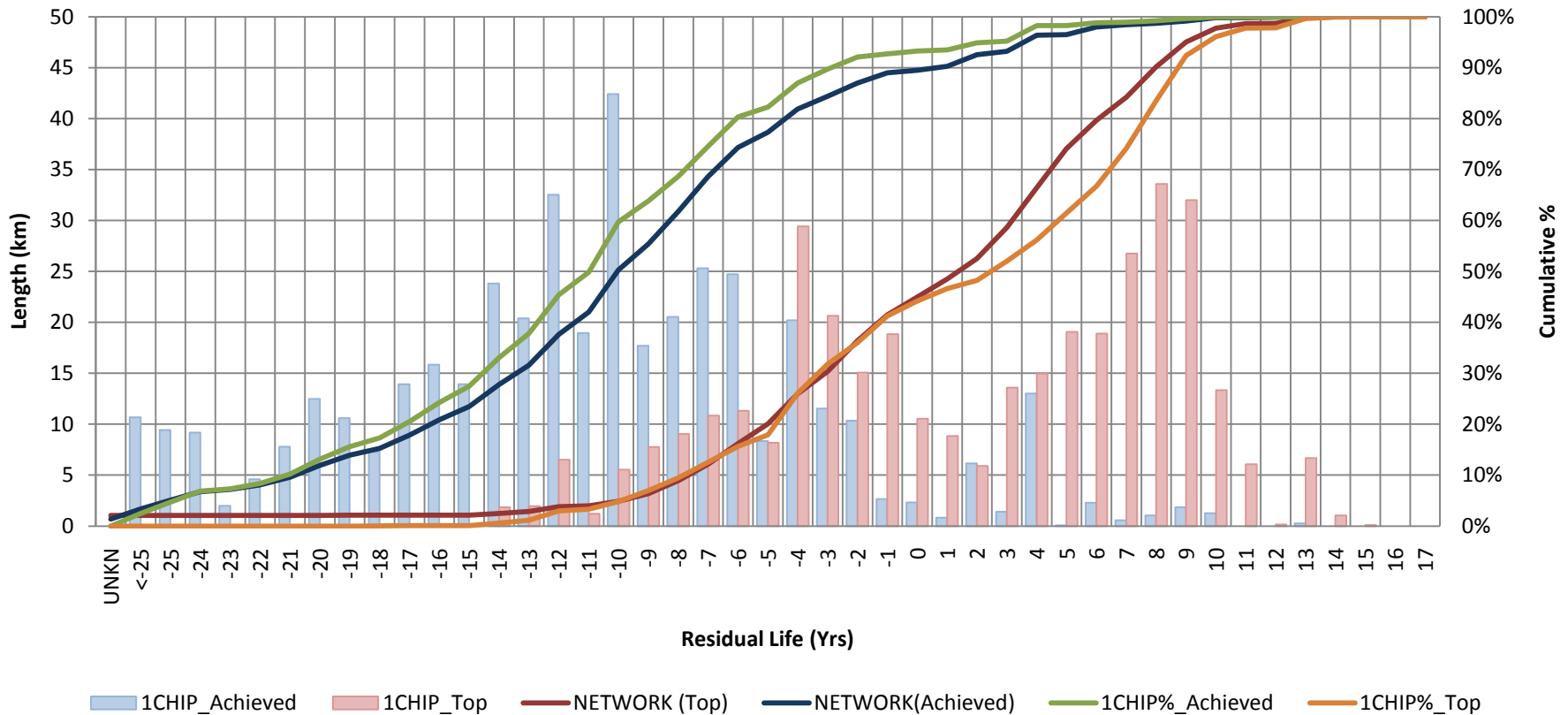




Existing Top Surface vs Previous Top Surface

WBOPDC - Network Remaining Surface Life - 1CHIP

Top Surface and 2nd Layer, by Length, Excluding First Coats

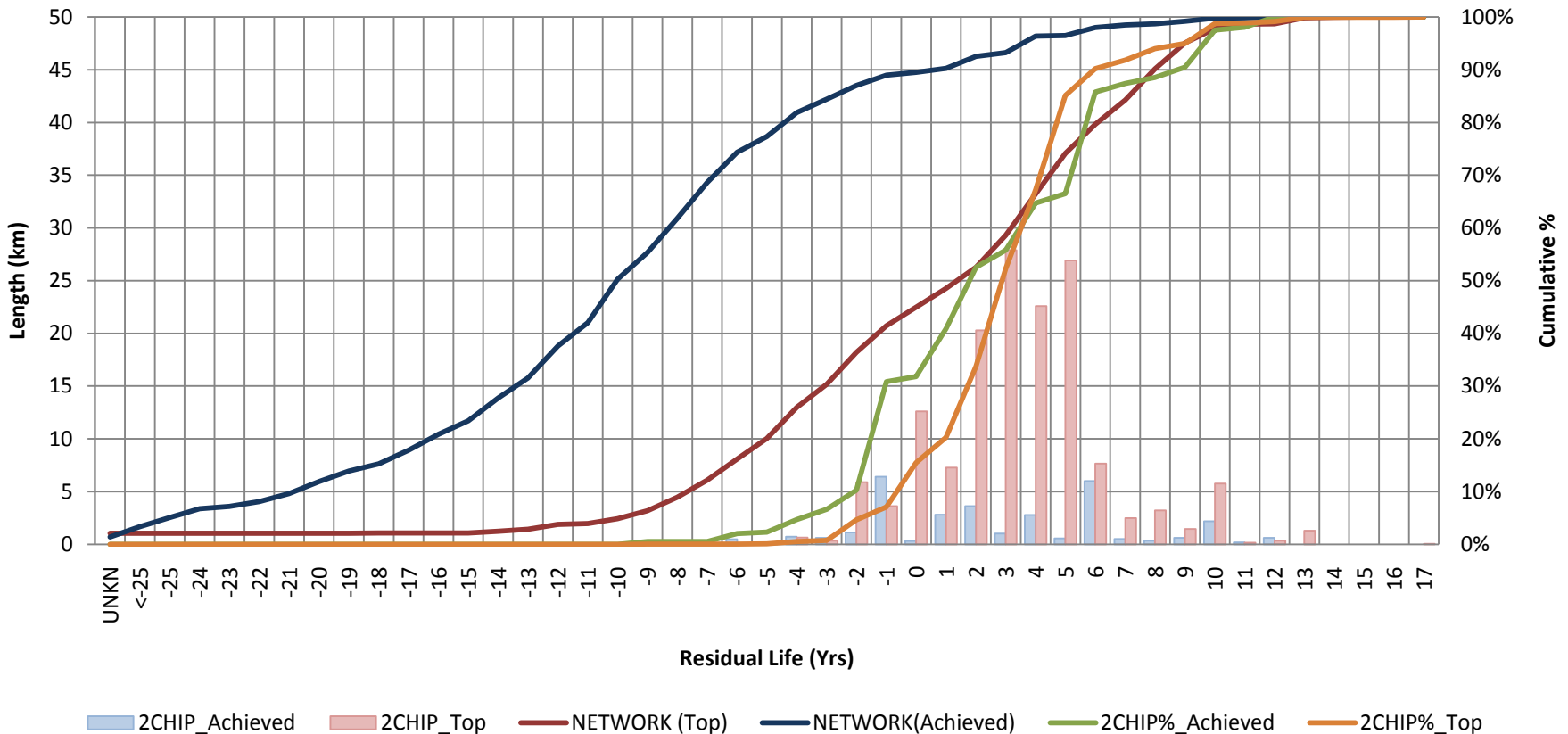




Existing Top Surface vs Previous Top Surface

WBOPDC - Network Remaining Surface Life - 2CHIP

Top Surface and 2nd Layer, by Length, Excluding First Coats





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 ?





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