



# OPTIMISING LINE REMOVAL

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# NZRF LINE REMOVAL GUIDE

- The Guide was prepared and published in 2006
- It sets out key removal principals
- Revision in 2017 with assistance from contractors and NZTA
- Updated to include changes to marking materials, surfaces and removal technology
- Highlights removal methods in common use

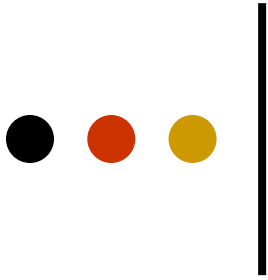




# PRINCIPLES

Redundant pavement markings must be obliterated  
*so as to not function as a recognisable marking*



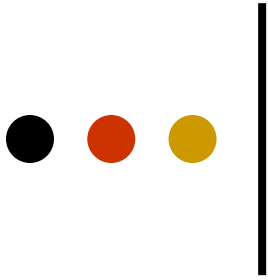


Where markings are reflectorised, obliteration must include the *removal of reflective elements*









The guide is aimed at providing a general description of the more common line removal methods, with a *simplified method for the selection* of an appropriate removal system for different marking types on particular pavement substrates.





# LINE REMOVAL STANDARDS

- Effective line removal is a compromise between leaving “residual markings”, creating “ghost markings”, and causing pavement damage
- The risk of and the degree of damage to the pavement increases exponentially as the degree of removal increases, as does the risk of creating “ghost markings”





# LINE REMOVAL STANDARDS

- Removal to recommended standards such that damage to the pavement is minimised requires trained operators working with care and attention to detail.



# VIEWING STANDARDS

- These are based on how road-user views the road, i.e. not an aesthetic approach.
- Providing these standards:
  - Limits risk of pavement damage
  - Limits risk of “ghost” markings
  - Establishes the acceptable degree of “residual” markings

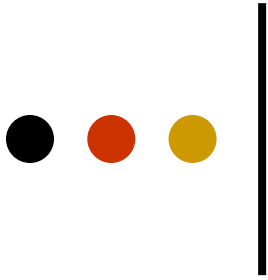




## VIEWING DISTANCES - “RESIDUAL MARKINGS”

- Edgeline 70 kph or above, view in direction of travel at 50 m
- Edgeline at below 70 kph, view in direction of travel at 20 m
- Centreline 70 kph or above view in both directions at 30 m
- Centreline and lane lines at below 70 km/h view in both directions at 20 m
- Intersection markings view in direction of travel at 10 m





## SURFACES

- Chipseal
- Open graded asphalt
- Dense grade asphalt
- Concrete
- Pavers



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## REMOVAL METHODS

- High Pressure Water Cutting / Milling
- Grinding or Scabbling
- Abrasive Blasting
- Water Blasting – Sodium Bicarbonate System
- Chemical Paint Removers





## REMOVAL METHODS

- Heat Lance
- Permanent overlay
- Mechanical Destruction
- Void Concealment ***following*** 1 of the above





## REMOVAL METHODS

- Description of the removal process, equipment alternatives and materials used
- Advantages and disadvantages of each removal method
- Risks with each method
- Relative cost
- Highlights high pressure water cutting as the most common removal practice

# WHAT HAS CHANGED SINCE 2006













## RESEARCH

- With the University of Auckland, School of Engineering
- Looked at various removal methods for different markings
- Assessed pavement damage
- Assessed residual markings
- Assessed retroreflectivity after removal
- Looked at control over removal standards by altering pressures and speed

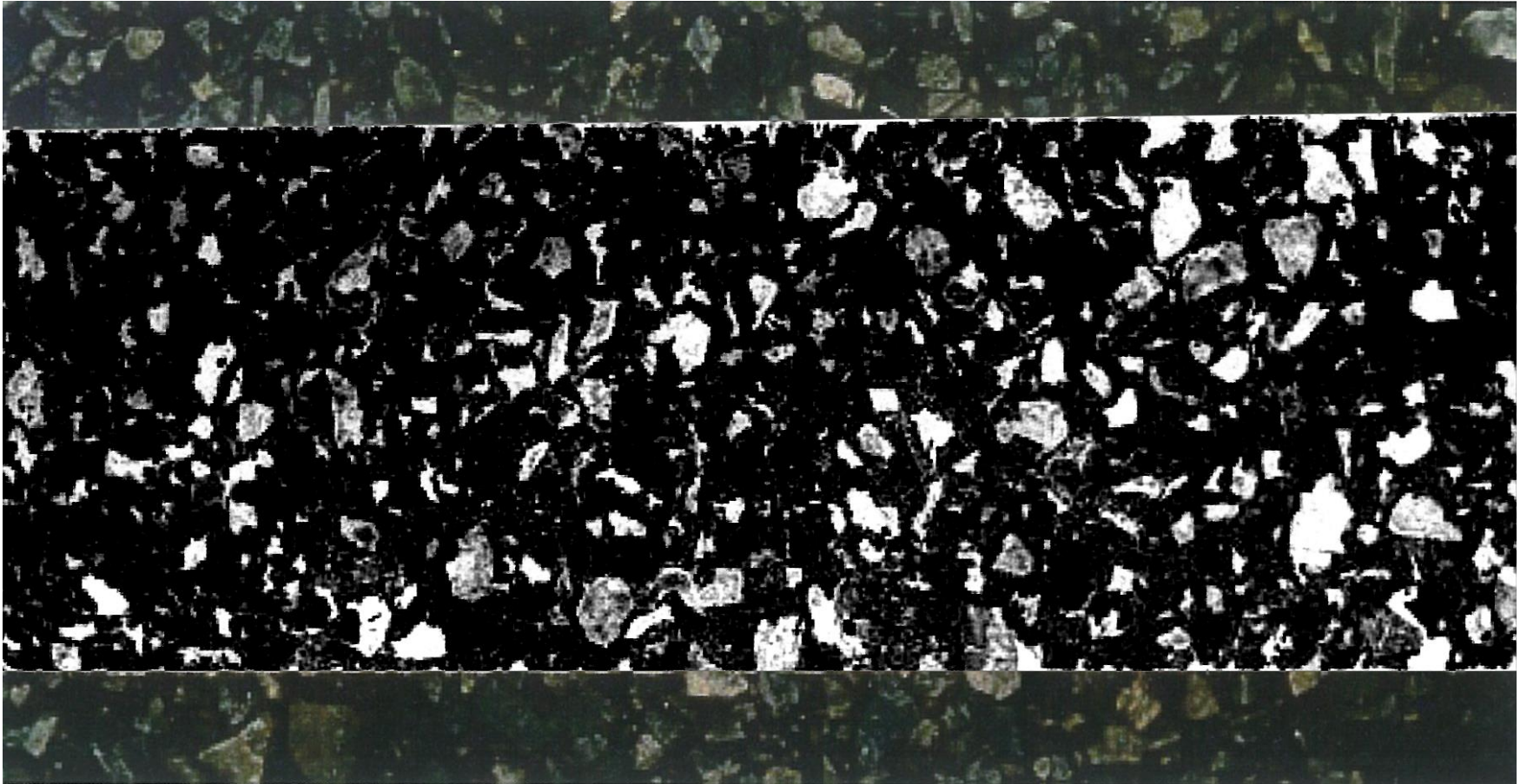




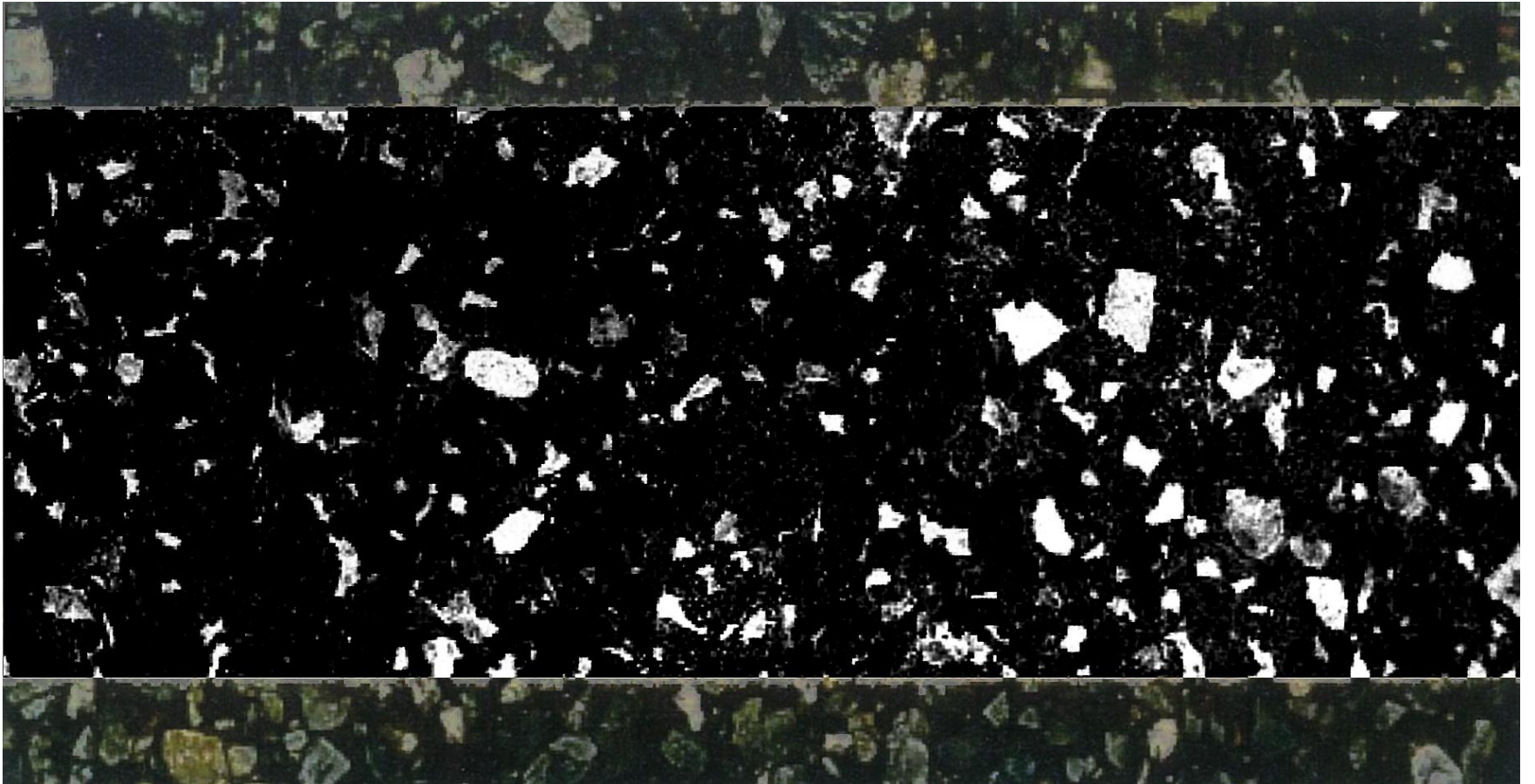
## RESEARCH

- Established pictorial standards to match preview distances
- 75% removal standard is adequate for a preview distance of 50 metres
- 85% removal standard is adequate for a preview distance of 20 or 30 metres
- Pictorials in the Guide are inverted pictorial standards from AS4049 specification.











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