

Longitudinal and Transverse Variable Application Seal Design for long life seals.

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The industry standard seal design algorithms used for designing chipseals in New Zealand for the past 30 years have been compromising seal texture life due to the assumption that a single application rate is suitable for the entire surface in spite of texture and traffic variations. There are three inputs into the design algorithm: chip size, surface texture and traffic. The chip size or average least dimension of the chip that is measured in the laboratory is a reasonable approximation to what will be applied in the field.

The surface texture whether measured by sand circle or laser or other techniques can be quite accurate for the specific area or location. However many sites have considerable transverse and longitudinal texture variation and use an average texture for the site which means that an average binder application rate will be calculated and used for the site.

The traffic data which is reasonably accurate for the state highways and but less so for local highways is a measure of the past traffic. This data is then turned into Equivalent Light Vehicles (elvs) by changing Heavy Commercial Vehicles (HCVs) into elvs by multiplying each by 10. The elvs are then used as if they impact equally transversely across the road when the majority of traffic travel in the wheelpaths with the rest of the road less trafficked.

The average binder application rate calculated using these inputs is a compromise where the single averaged binder application rate will be too heavy for the high trafficked / low textured areas leading to premature flushing and too light for the low trafficked / coarse textured areas leading to premature chiploss.

Advances in seal design and bitumen distribution plant now allow the binder application rate to be calculated and applied using binder application rates that vary both longitudinally and transversely to compensate for site specific texture and traffic loading variations. Applying the appropriate binder application rate will help extend the lives of chipseals by reducing these premature failure modes.

This paper describes the future requirements for quantifying the appropriate binder application rates and the techniques used for constructing long life seals.