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# 10 Years of Concrete Pavement Maintenance

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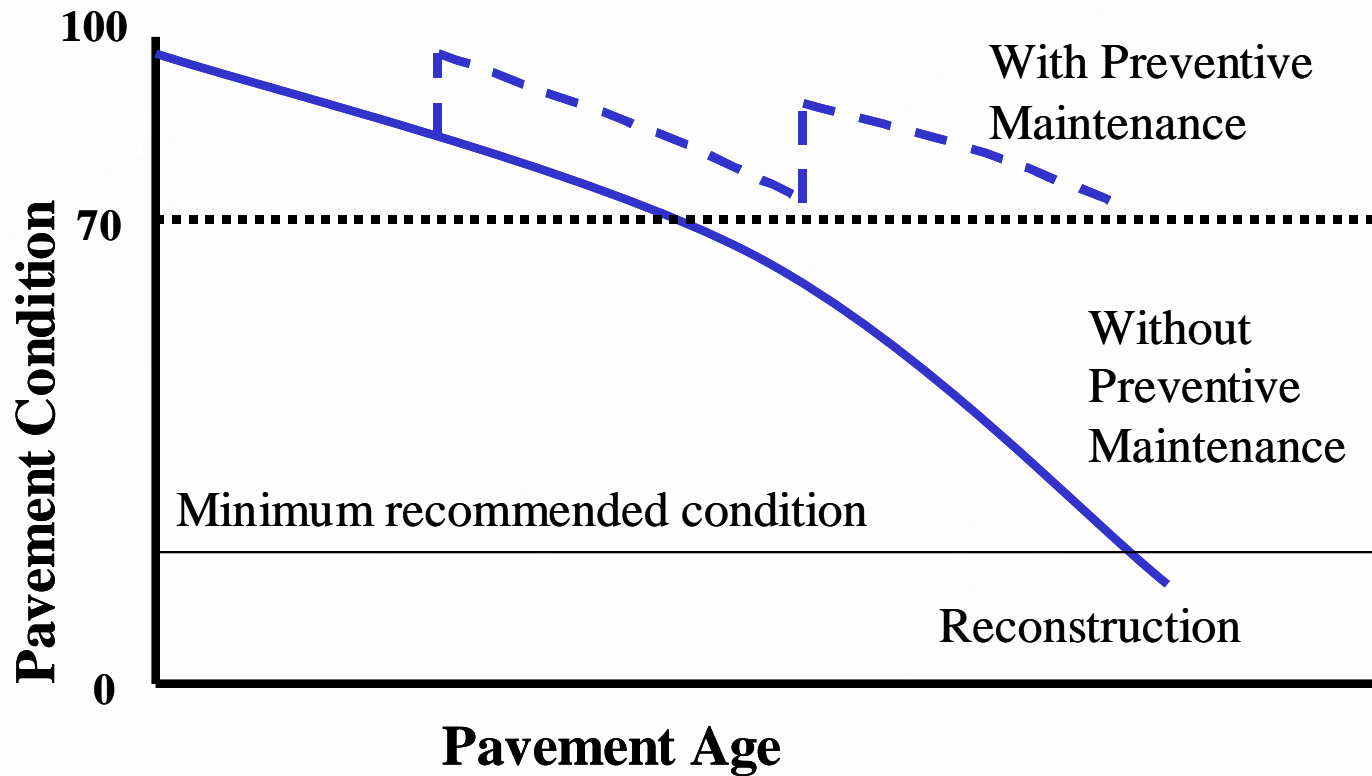
# Pavement Preservation

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- Identify maintenance and rehabilitation needs early
- Utilize a variety of targeted preventive maintenance techniques
- Work with industry to determine applicability of specific treatments



# Pavement Preservation Goal



Extend life while minimizing traffic disruption



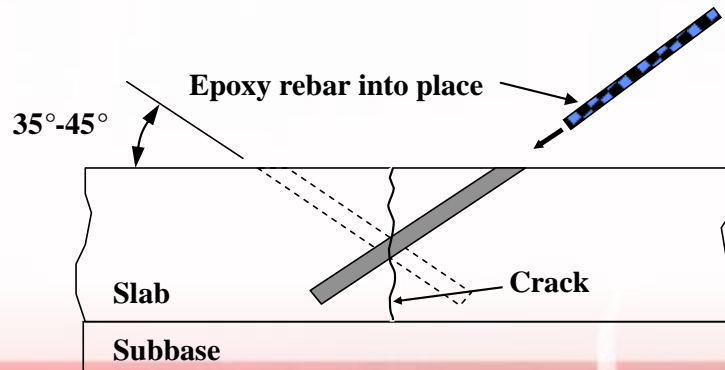
# Preservation Techniques

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- Many techniques in the “toolbox”
  - Crack Stitching
  - Joint/Transverse crack load transfer retrofit
  - Expansion joint retrofit
  - Texturization
  - Underslab sealing and jacking
  - Full-depth concrete slab replacement
  - Thin surface restoration techniques



# Crack Stitching



# Crack Stitching

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- Over 350 cracks stitched over the past 10 years
- Performance to date excellent
- Life expectancy > 10 years or more
- Cost of about US \$ 60 per bar
- Significantly less cost than slab replacement

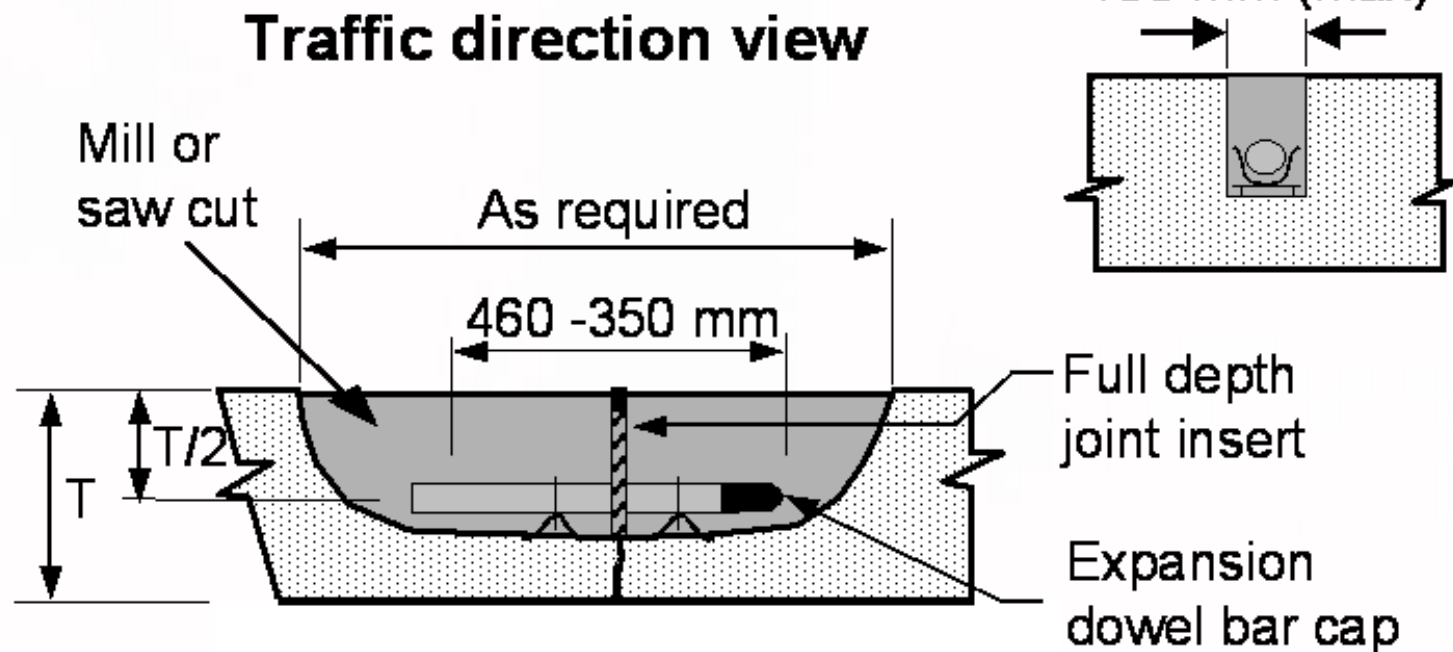


# Load Transfer Retrofit



# Load Transfer Retrofit

## Cross sectional view





# Load Transfer Retrofit

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- Over 100 crack and joint load transfer retrofits
- Primarily used for mid-slab transverse cracks
- Performance to date excellent
- Life-Expectancy of at least 8 to 10 years
- Cost for 8 bars/lane = US \$ 1,300



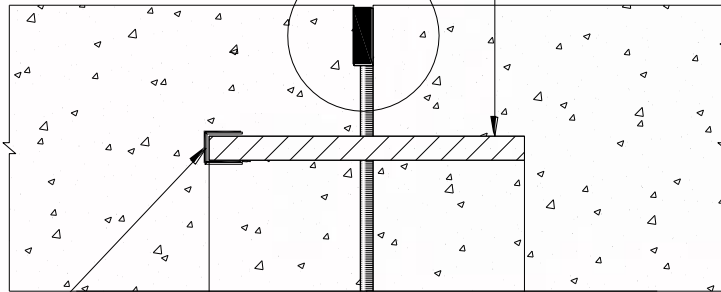
# Expansion Joint Retrofit



# Expansion Joint Retrofit

32 MM DIA. x 450 MM LONG EPOXY COATED SMOOTH  
DOWEL BARS GROUDED INTO SLOTS

SEE DETAIL J1

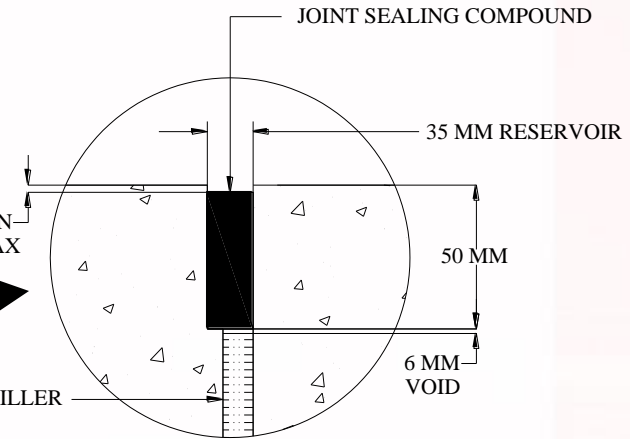


DOWEL CAP  
MIN. 25 MM MOVEMENT

225 225

3 MM MIN  
6 MM MAX

EXPANSION JOINT FILLER  
25 MM



# Expansion Joint Retrofit

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- 36 installations completed
- Monitoring indicates that they are working
- MIT magnetic imaging tomography confirms dowel bar alignment
- Life expectancy of 15 to 20 years
- Cost = US \$4,200 per lane



# Longitudinal Grooving



# Blastrac Texturization



# Skidabrader Texturization



# Texturization

- 175,000 m<sup>2</sup> of pavement treated
- Monitoring underway to assess longevity of the treatments
- Cost ranges between US \$2 and \$8/m<sup>2</sup>
- Effectiveness in improving frictional properties is being evaluated





# Slab Stabilization/Foam Jacking



# Slab Stabilization

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- 10,000 kgs of foam has been injected since 2004
- Cost in the order of US \$15/kg
- Service life depends on extent and severity of the initial problem
- Careful to not crack slabs during jacking operation
- Limit jacking to no more than 50 mm



# Summary

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- Many techniques available to assist in cost-effectively extending the life of exposed concrete pavement
- Performance may be different from agency to agency
- Depends on local practice and experience
- Ideally approach through life-cycle cost analysis



# Summary

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- Very aggressive pavement preservation approach has allowed 407 ETR to maintain pavement condition rating  $> 90$  out of 100 for the past 10 years
- Able to partner with industry to try new, promising techniques without requirement for open tenders while working with Contractors who know what is expected for quality

