

# Maintenance and repair techniques for concrete slabs

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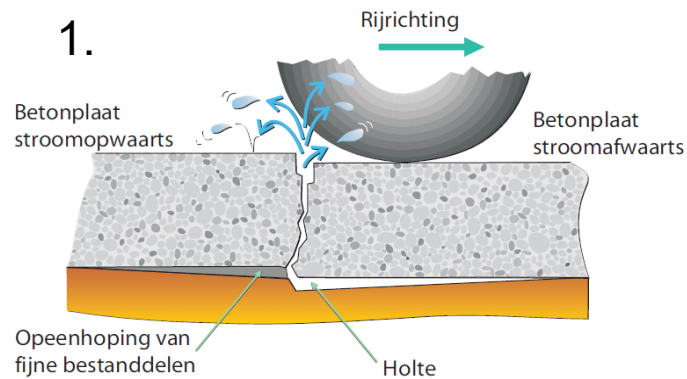
- 1 – Joint maintenance
- 2 – Crack repair
- 3 – Dowel bar retrofit



# Joint maintenance

Why is joint maintenance so important?

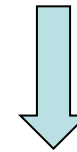
1. erosion of fine material
2. corrosion of steel rebar / dowels
3. dirt accumulation prevents cyclical movement



# Execution of joint maintenance



Joint chamber (at least 3 cm of depth)  
must be cleaned of any material



This means:  
Removing all sealant and other  
material with a steel hook  
(no compressed air, heating or  
brushing of the surface of the joint)



# Execution of joint maintenance



- Cleaning of joint sides with a rotating steel brush



Compressed air is not sufficient!



- If the joint is dried with hot air, always clean joint sides afterwards



- Apply adhesive varnish/primer (even if product data sheet does not prescribe)

# Execution of joint maintenance

- Hot poured bituminous sealant is applied just under road surface
    - In accordance with EN 14188-1 type N1/2
- ➡
- Sealant must be heated in oil bath
  - Minimum 5°C and dry weather



# Special joint maintenance

- Airport pavements, chemical industry, petrol storage and gas stations require special resistant sealants (MS-polymer, polyurethane, polysulfide,...)
- 3 considerations for maintenance
  - Resistance to exposed products
  - Operating conditions
  - Compatibility with exististing joint sealant (eg. Tar sealants)

=> Execution by specialised companies





# Crack treatment

Resin injection



Mastic asphalt coverage





# Crack treatment

## Elastic sealing:

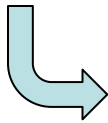
- Create a chamber by pneumatic or diamond crack-cutting
- Seal it as a regular joint
- Choice of bituminous or grey synthetic sealant



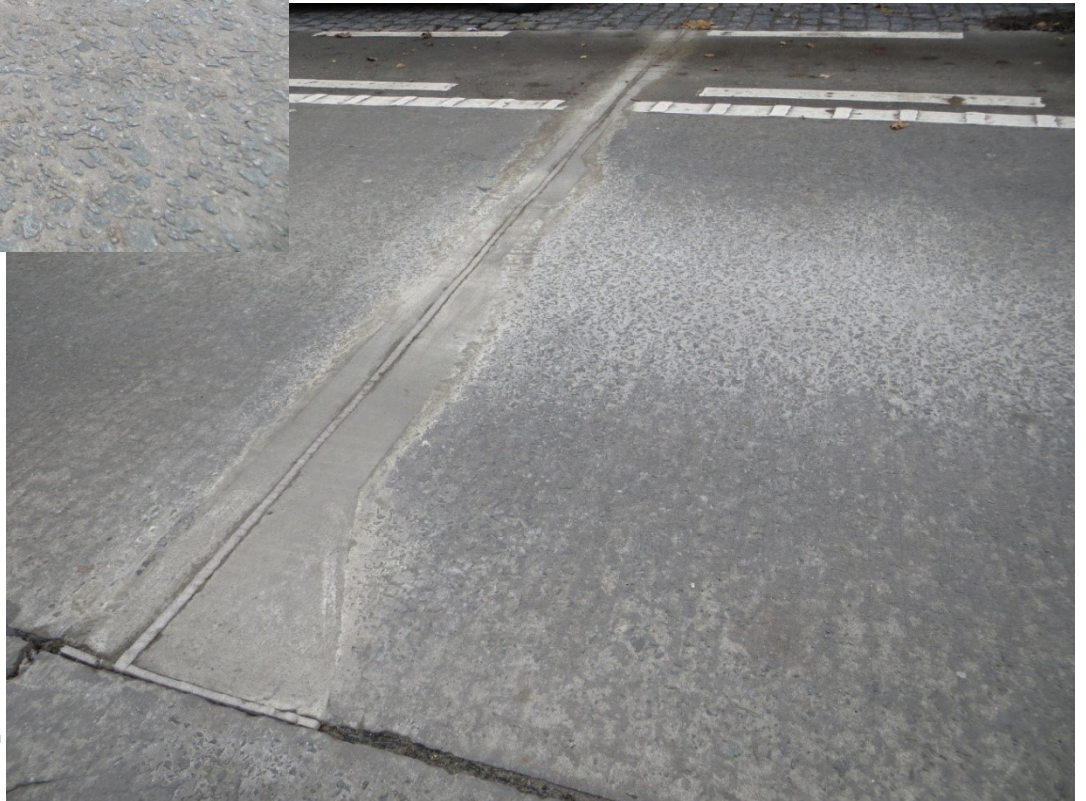
# Restoration of joint damage



Result of bad joint treatment



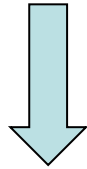
Restoration is still possible  
but...



# Some considerations...

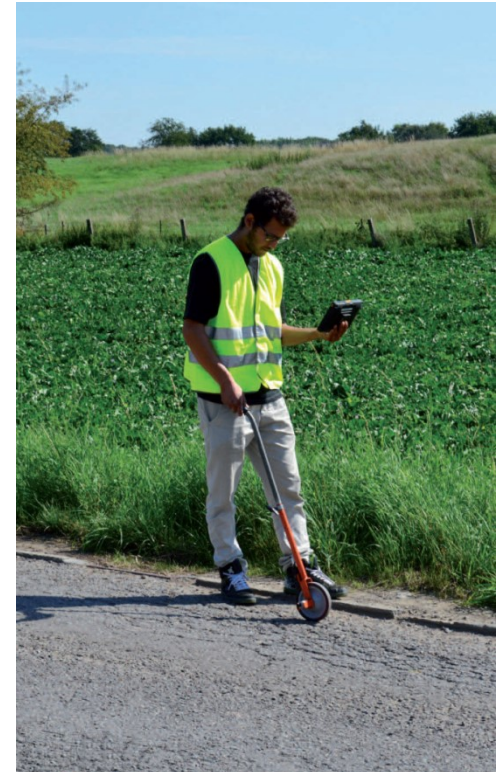
What is an appropriate joint maintenance lifecycle?

- Depends on joint- and slab dimensions, climate conditions and type of sealant
- On average:
  - Hot applied sealant : 6 to 8 years
  - 1 and 2 comp. sealants : 7 to 12 years



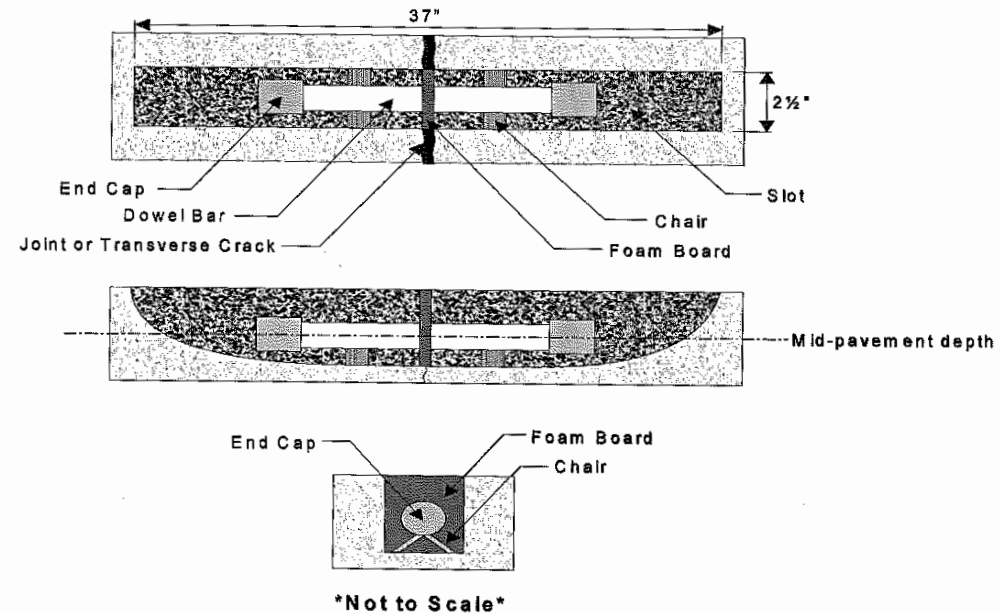
Yearly visual inspection from the 5th year:

- condition sealant
- level difference between slabs
- empty, clean joint -> vertical movement





# Dowel bar retrofit





# Dowel bar retrofit

New developed roads



Stabilisation of cracked parts of a slab



Life extension of older roads



# Dowel bar retrofitting at regional road N44 in Aalter



- Old JPCP built in 1958
- BRRC: Measurement of slab faulting and load transfer at joints
- Slab stabilisation by injection with large vertical movement and low load transfer

# Dowel bar retrofitting at regional road N44 in Aalter

## PRINCIPLE

- Insertion of 3 dowels per wheel track (2x3 dowels per lane)
- All dowels must be positioned horizontally and parallel for free joint movement
- The depth of the slot is half the slab thickness + 2 to 3 cm.



# Dowel bar retrofitting at regional road N44 Aalter



- Every dowel bar must be equipped with a air cap in order to allow horizontal movement



- Avoid mortar to enter the joint in order to allow horizontal movement

- Use a high quality hydraulic or synthetic mortar with low shrinkage



- Gluing mortar with the concrete is essential



# Dowel bar retrofit



## CONCLUSION

- Dowel bar retrofit gives you a possible life time extension of 10 to 20 years
- But the operation is delicate, so experience and best practices are expected from the contractor



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Thank you