

## **Module 4-2**

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# **Joint Sealing**

## **Objectives**

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Identify factors affecting sealant performance

Describe the steps for resealing joints

Identify sealant types, properties, and specifications

Describe factors to consider for design

## **Introduction**

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### **Purpose of joint sealing**

- Reduce moisture infiltration
- Prevent intrusion of incompressible materials

Transverse contraction joints are generally most critical

Longitudinal joints are sometimes sealed

## **Effects of Moisture**

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## **Effects of Incompressibles In Joint**

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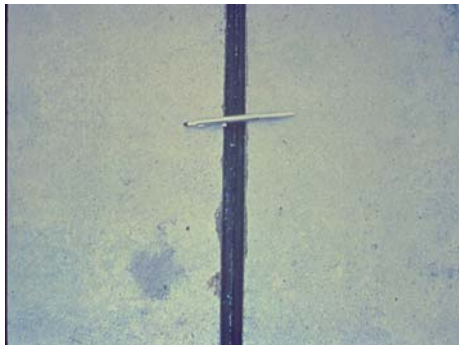


## **Sealant Materials**

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- **Thermoplastic materials**
  - Hot-applied
  - Cold-applied
- **Thermosetting materials**
  - Chemically cured
  - Solvent release
- **Preformed compression sealants**

## Preformed Compression Seals



## Guidelines for Resealing

### Reseal when no longer functional

- Missing or damaged sealant
- Poor bonding to joint face
- Incompressibles in joint

### Resealing most effective when:

- Pavement is not severely deteriorated
- Performed with other restoration activities

Moderate installation temperatures

Proper joint preparation is essential

## Sealant Material Performance

Performance life varies by material type

Recent studies suggest silicone sealants are the most cost effective

Several on-going studies

- SHRP H-106
- SPS-4 studies
- United Kingdom

## Effect on Pavement Performance

Some debate as to the effectiveness of joint resealing

Most states continue to reseal joints

Some believe the benefits do not offset the costs, especially under certain conditions

## Design Considerations

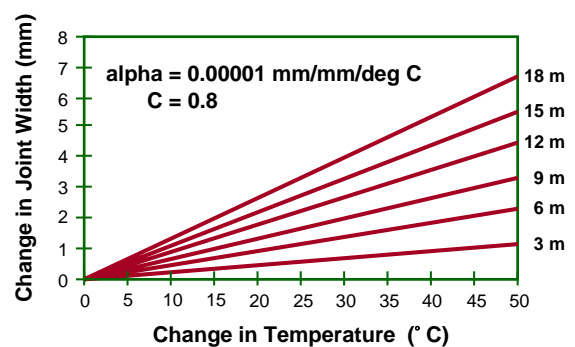
Transverse joint movement

Shape factor

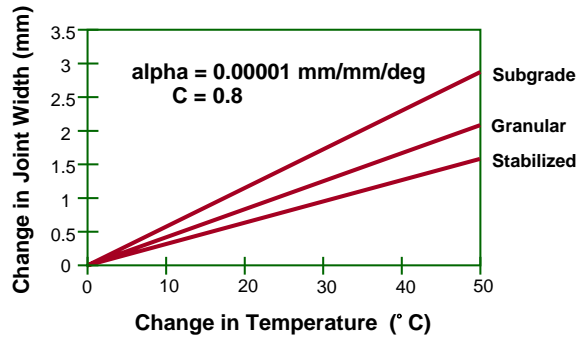
Sealant configuration

Sealant properties

## Effect of Temperature Change and Joint Spacing



## Effect of Temperature Change and Base Type



## Shape Factor

Ratio of sealant width to depth (W/D)

Stresses based on shape of sealant

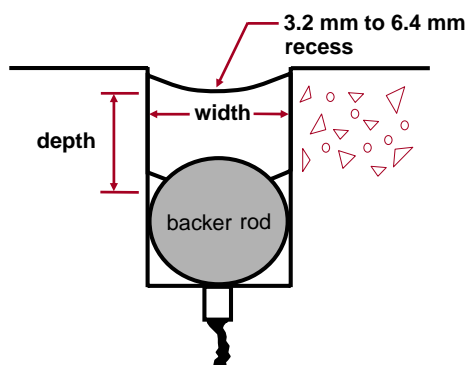
Design should consider strain and deformation

Recommended shape factors

- 1:1 to 1:2 for hot-poured sealants
- 2:1 for silicone sealants

Backer rod is highly recommended

## Recommended Design



## Sealant Properties

Durability

Extensibility

Resilience

Adhesiveness

Cohesiveness

## Typical Material Costs (\$/kg)

Asphalt cement	0.11 - 0.33
Fiberized asphalt	0.33 - 0.55
Rubberized asphalt	0.44 - 1.10
Polysulfide	2.21 - 2.76
Polyurethane	6.08 - 7.18
Silicone	5.52 - 7.73

\* Cost comparisons should consider total installation cost and anticipated life

## Transverse Joint Resealing Steps

- Remove old sealant
- Reface joint sidewalls
- Clean joint reservoir
- Install backer rod
- Install new sealant

**Sealant Removal Using V-Plow**

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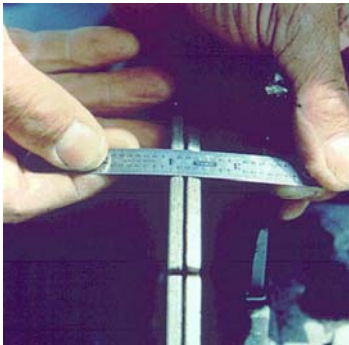
**Sealant Reservoir Refacing**

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**Refacing Blades**

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**Joint Cleaning - Remove Old Sealant**

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**Joint Cleaning - Water Blast**

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**Joint Cleaning - Compressed Air**

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**Joint Cleaning - Sand Blast**

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**Backer Rod**

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**Backer Rod Installation**

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**Backer Rod Installation**

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**Finished Backer Rod Installation**

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**Sealant Installation  
(Thermoplastic Materials)**

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### Sealant Installation (Thermosetting Materials)

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### Sealant Installation (Compression Seals)

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### Longitudinal Joint Sealing

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#### PCC/PCC joints

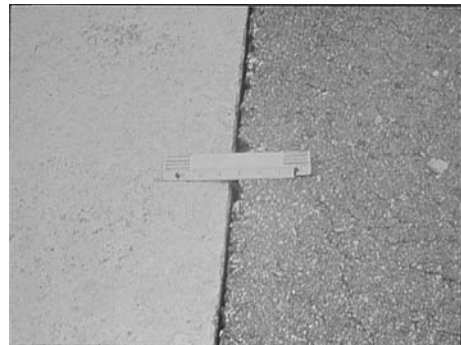
- Limited movements (typically tied)
- Hot-poured thermoplastic materials used
- No reservoir is formed or needed

#### PCC/HMA joints

- Large vertical and horizontal movements
- 25-mm width (minimum) and depth
- No backer rod required
- Hot-pour and silicone sealants used

### Longitudinal Joint

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### Longitudinal Joint Cutting

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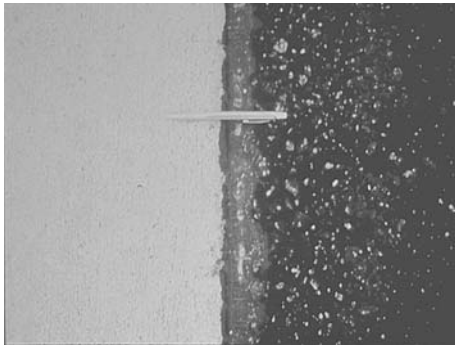
### Longitudinal Joint Cut

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## Longitudinal Joint Sealing

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## Equipment

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### Removing / refacing

- Joint plow
- Diamond-bladed saw
- Routers

### Cleaning

- Air-blast
- Sand-blast

### Placing

- Melters
- Silicone pumps
- Applicators

## Summary

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Reduce moisture infiltration and prevent intrusion of incompressibles

Most effective when little deterioration

Some debate as to the effect on pavement performance

Good installation practices are essential