

Module 4-3

Pressure Relief Joints

Objectives

Identify causes of expansive pressures

Identify pressure-related distresses

Describe the applications of pressure relief joints

Describe proper construction techniques

Recognize potential problems of pressure relief joints

Introduction

Expansive pressures can build up in rigid pavements

- Incompressibles in joint
- Expansion of reactive aggregates
- Thermal and moisture conditions

Severe distresses often result

Pressure relief joints relieve internal expansive pressures

Blow-up



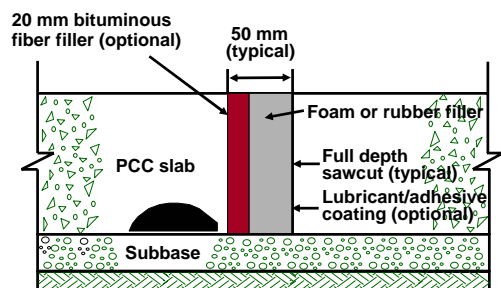
Types of Pressure Relief Joints

Narrow pressure relief joints

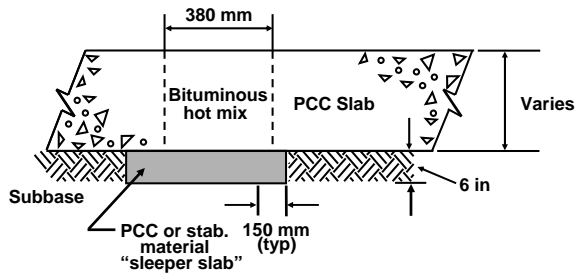
Wide pressure relief joints

Within full - depth repairs

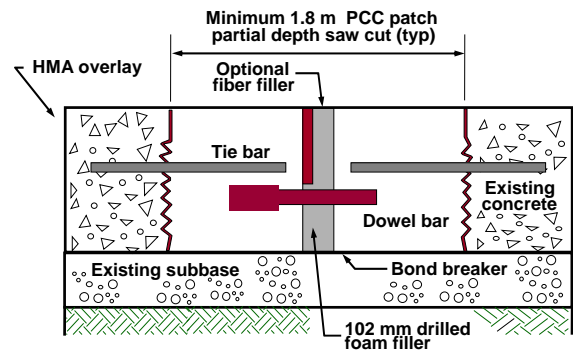
Narrow Pressure Relief Joints



Wide Pressure Relief Joints



Within Full-Depth Repairs



Causes of Pavement Expansion

Incompressibles in joints and cracks

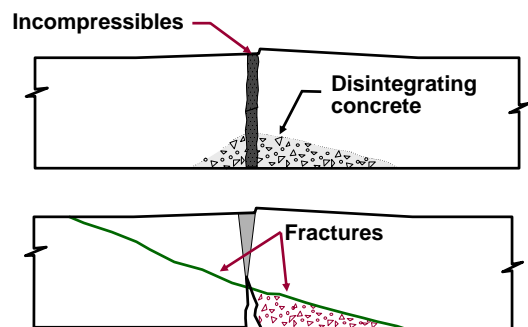
Expansion of reactive aggregates

- Alkali - silica reaction (ASR)
- Alkali - carbonate reaction (ACR)

High pavement temperatures (α)

High moisture contents

Mechanism of Blow-ups



Mechanism of Blow-ups



Mechanism of Blow-ups



Limitations

Poor load transfer

Joints may close completely over time (temporary fix)

Widening of nearby joints and cracks, causing intrusion of incompressibles, faulting, and damage to joint sealants

“Humping” of asphalt patches

Accelerated pavement deterioration

Applications

Recommended only on pavements with severe blow-ups or bridge pushing problems

Most effective on long-jointed rigid pavements and near bridges

Not recommended on CRCP or non-doweled JPCP

Not required near other pressure-relieving features

Design Recommendations

Install 300 m from other pressure relief joints or pressure-relieving features

Install at mid-slab locations

Limit widths to 25 to 50 mm

Continued use is recommended to protect bridges and other structures

Existing drainage conditions and improvements should be considered

Construction Considerations

Joint created with a carbide-tipped wheel saw or a diamond-bladed saw

Filler is generally compressed

Filler is capped with sealant

On multi-lane pavements, joint should be installed full width within 48 hours

Moderate installation temperatures (4 to 21 °C) are recommended

Summary

Reduce expansive pressures and distresses

Only recommended on pavements exhibiting blow-ups or bridge pushing

Unwarranted use can lead to problems

Bituminous patches are not recommended

Not recommended on CRCP or non-doweled JPCP