



## TC 4.1 activities in the PIARC 2020-2023 cycle

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# PIARC / World Road Association

founded in 1909 as a non-profit, non-political association

**goal:** organise exchange of knowledge on all matters related to roads and road transport

**members:** 125 Member Governments all over the globe (but also private sector companies, universities, regions, ...)

<https://www.piarc.org/>



*member since 1919*



# Knowledge exchange - The core of PIARC

more than 20 Technical Committees and Task Forces (1200 experts from 80 countries) work towards commonly-agreed deliverables, which are widely accessible:

- ❑ reports
- ❑ seminars or workshops
- ❑ online manuals
- ❑ online dictionary
- ❑ software and tools



# Strategic Theme 4 - Resilient Infrastructure

## TC 4.1 Pavements

TC 4.2 Bridges

TC 4.3 Earthworks

TC 4.4 Tunnels

## *Terms of Reference for TC 4.1*

Task 4.1.1 Use of recycled materials in pavements

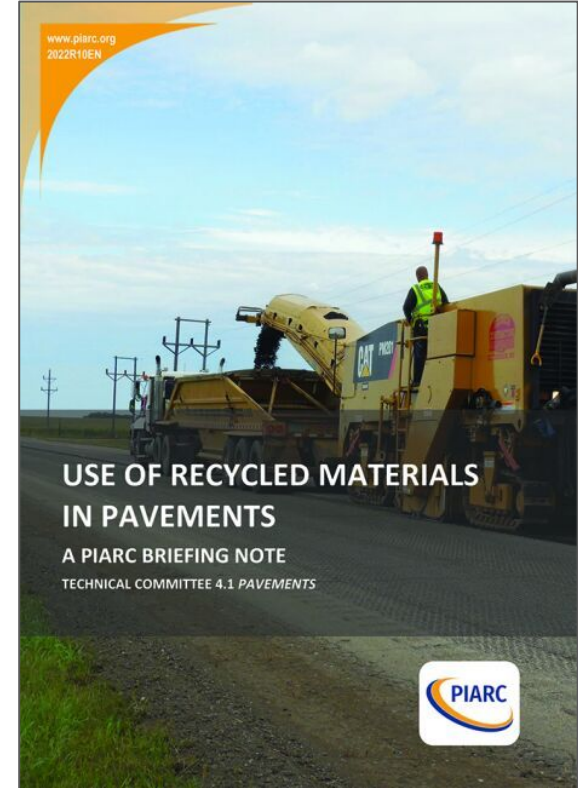
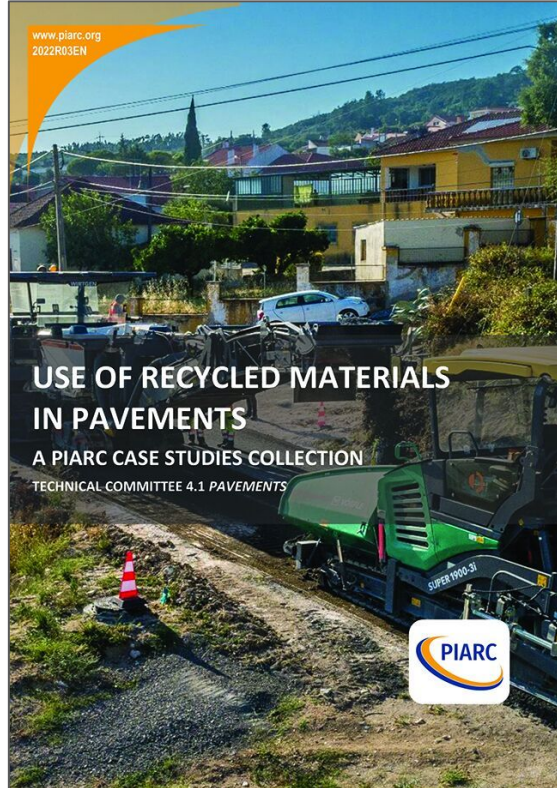
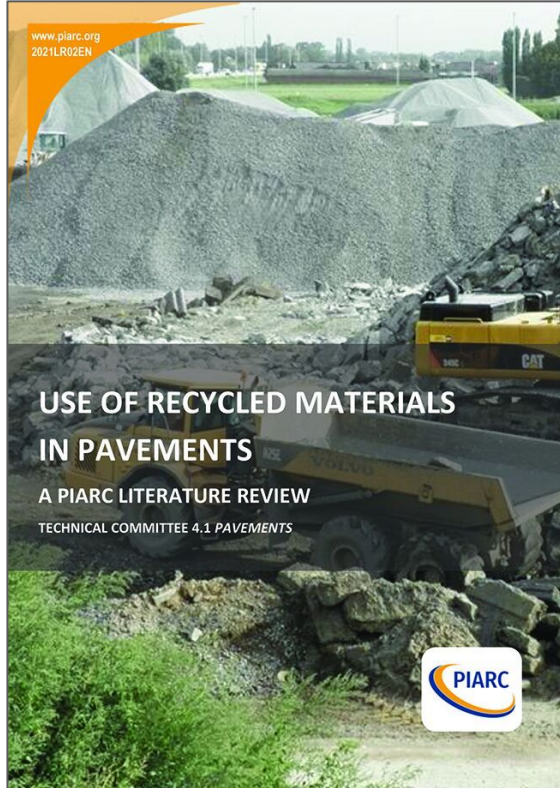
Task 4.1.2 Innovative pavement maintenance and repair strategies

Task 4.1.3 Road monitoring based on Big Data

Task 4.1.4 Measures for improving resilience of pavements

Task 4.1.5 Carbon footprint for road pavements

# Use of recycled materials in pavements - deliverables



# Objectives of recycling

from economics to sustainability

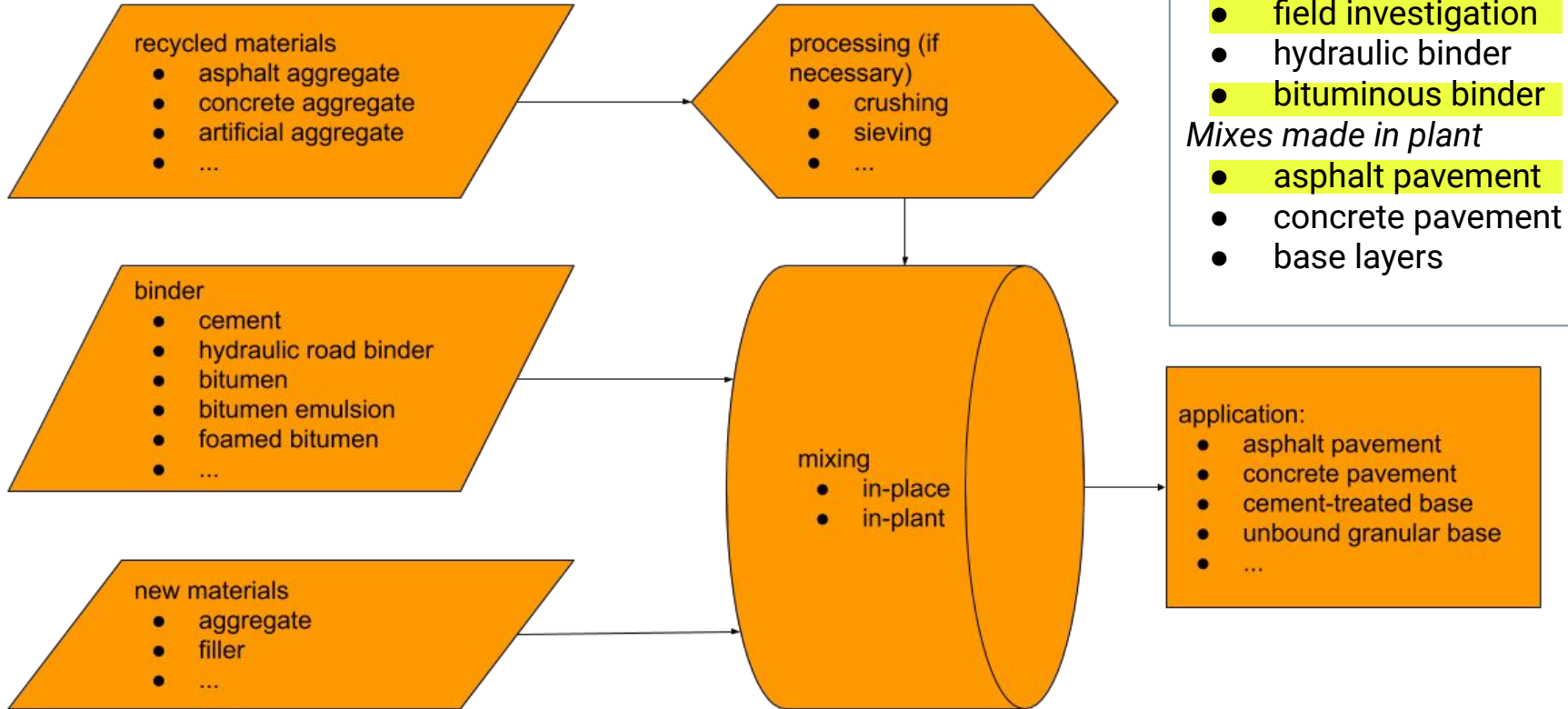
- ❑ less transport ⇒ less emission of green house gasses
- ❑ less use of virgin materials ⇒ less impact on natural resources

e.g. European “Waste Framework Directive”

re-use vs. recycling (downcycling)



# Materials, mixes and application



## Table of Contents

### *In place recycling*

- field investigation
- hydraulic binder
- bituminous binder

### *Mixes made in plant*

- asphalt pavement
- concrete pavement
- base layers

# In place recycling - Preliminary field investigation

understand cause of distresses

only “superficial” distresses

- cracking
- ravelling
- rutting

characterisation of material

- coring
- test pits

extra tests: FWD, TSD, GPR, ...





# In place recycling with bituminous binders

binding agents

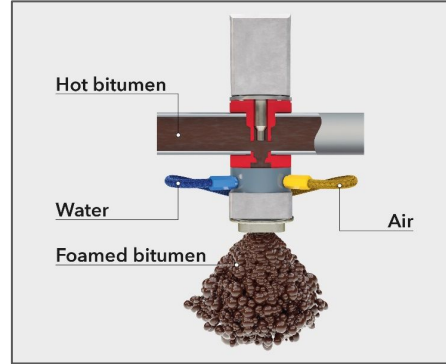
- emulsions
- foamed bitumen

mix design

equipment

- reclaimer
- recycling train

Hot In Place Asphalt Reuse (HIPAR)



# Asphalt mixes made in plant

## definition

- ❑ < 30 % RAP use  $\Rightarrow$  low-rate reuse
- ❑ 30-60 % RAP use  $\Rightarrow$  high-rate reuse
- ❑ > 60 % RAP use also possible in some cases

better quality control of RAP  $\Rightarrow$  higher rates possible

- ❑ layer-by-layer deconstruction (milling)
- ❑ improve homogeneity by crushing and sieving
- ❑ stockpile management
- ❑ storage of RAP to control humidity

(\*) RAP = Reclaimed Asphalt Pavement



# Asphalt mixes made in plant

## mix design

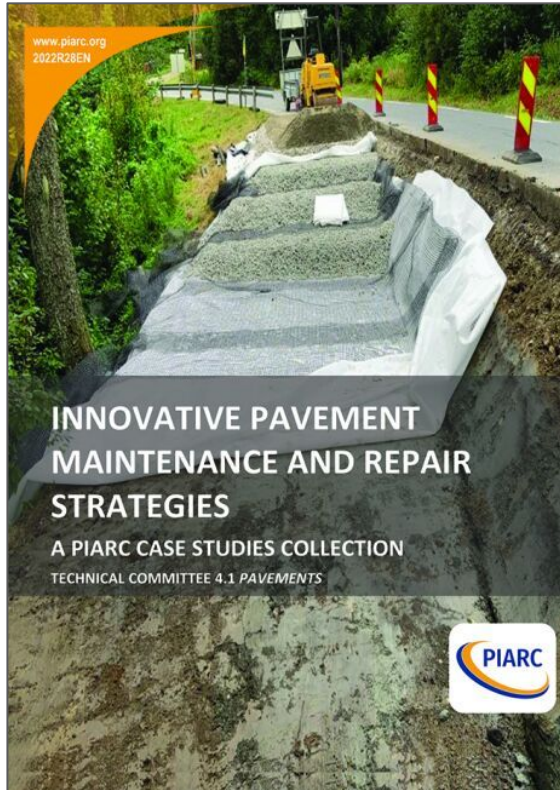
- ❑ influence on grading curve
- ❑ quality of the old binder (hardening)
- ❑ use of rejuvenator

## production

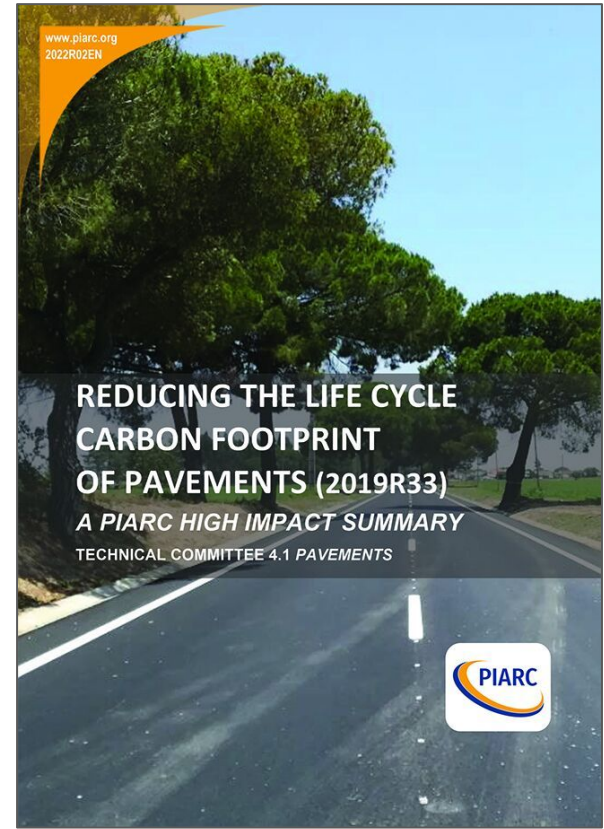
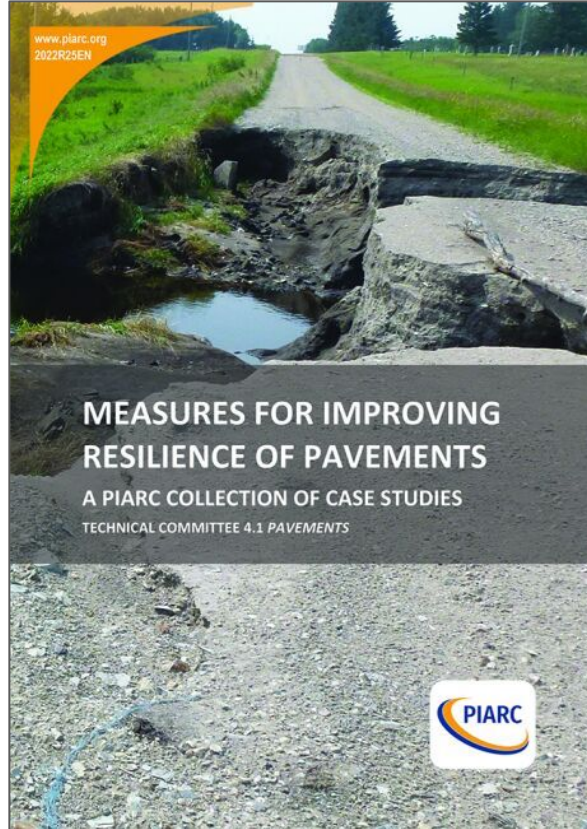
- ❑ high rates: special equipment
- ❑ parallel drum



# Innovative pavement maintenance and repair strategies



- ❑ Innovative surface technical maintenance and repair strategies on asphalt pavements
- ❑ Innovative structural technical maintenance and repair strategies on asphalt pavements
- ❑ Innovative structural technical maintenance and repair strategies for widening rural roads and edge strengthening
- ❑ Innovative surface technical maintenance and repair strategies on concrete pavements
- ❑ Innovative organizational and strategic aspects on pavement maintenance



## Strategic Theme 4 - Resilient Infrastructure

### TC 4.1 Pavements

#### » Innovative Pavement Maintenance and Repair Strategies



This report contains the collection of case studies related to innovative pavement maintenance and repair strategies of road pavements. This report addresses different pavement types i.e. flexible and (semi-)rigid pavements - as well as different road types. It considers both functional and structural aspects. The report covers innovation aspects on a technical level, such as the use of special or innovative materials, or the use of specific maintenance techniques, as well as innovative and strategic [...]

#### » Measures for Improving Resilience of Pavements - A PIARC Collection of Case Studies



This report contains a collection of case studies related to measures to improve the resilience of pavements. Most of the measures address the impacts of climate change, such as increased precipitation and extreme temperatures. However, the case studies also explore how to make pavement more resilient to traffic-related impacts, including through the use of innovative materials. The full report on “Measures for improving resilience of pavements” by TC 4.1 Pavements will refer to these case [...]

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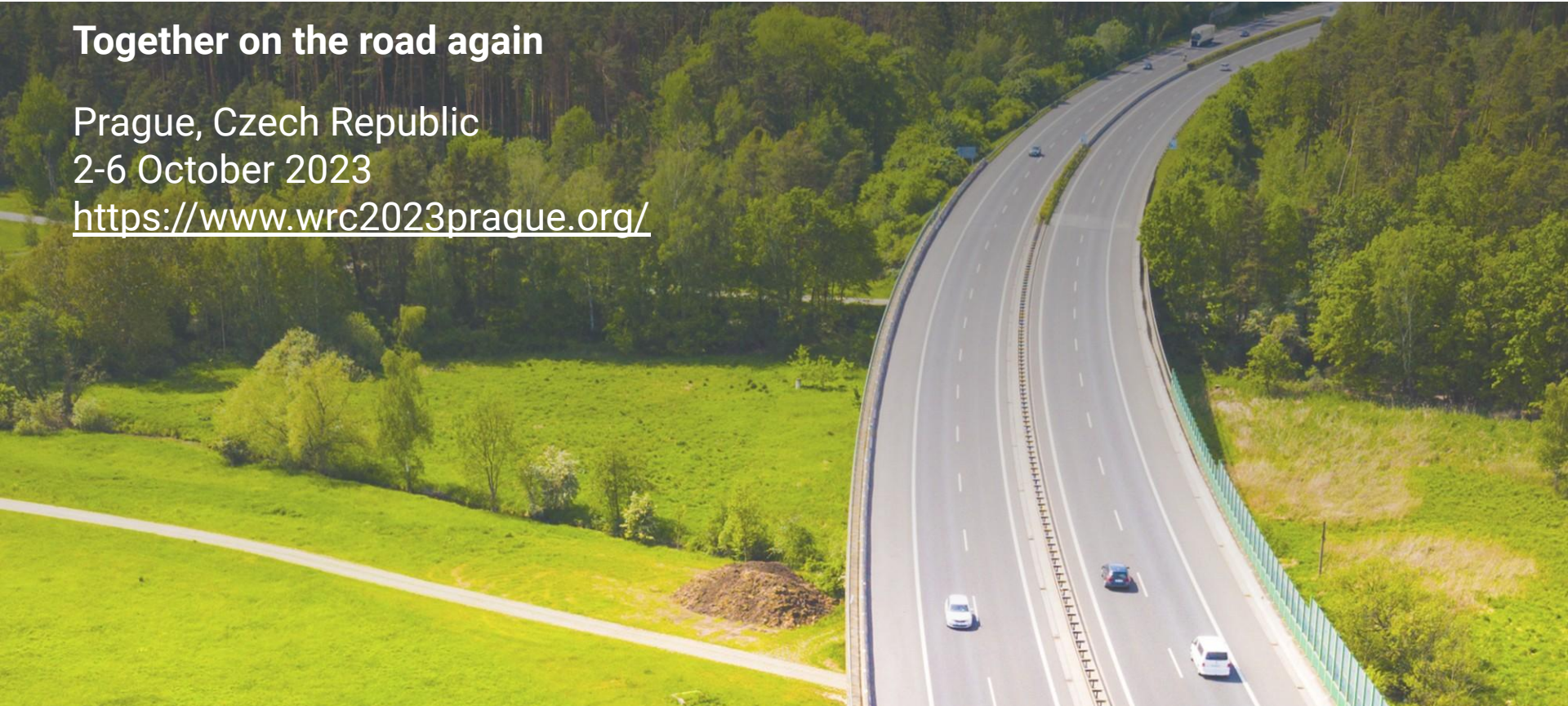
# World Road Congress

Together on the road again

Prague, Czech Republic

2-6 October 2023

<https://www.wrc2023prague.org/>



**Thank you for attention...**

