An aerial photograph of a winding asphalt road that curves through a dense, green forest on a hillside. The road is light-colored and contrasts with the dark green trees. The terrain is rugged, with rocky outcrops visible on the right side of the road. The overall scene is a mix of natural beauty and infrastructure.

IMPROVING URBAN INFRASTRUCTURE: CRUMB RUBBER MODIFIED ASPHALT

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MAP OF THE PRESENTATION

01

RAW MATERIALS AND METHODS OF PREPARATION

Bitumen, aggregates and crumb rubber are used to prepare CRMA through the dry or wet method

02

PHYSICAL AND RHEOLOGICAL PROPERTIES OF CRMA

Elastic recovery, ductility, penetration, viscosity and softening point

03

PAVEMENT DISTRESS

Rutting and fatigue cracking

04

ADVANTAGES AND BENEFITS

Resistance to plastic deformation, safety, sustainability, lower costs, durability

RAW MATERIALS



BITUMEN

Binder for the stony aggregates and the crumb rubber



COARSE AGGREGATE

Crushed rocks



FINE AGGREGATE

Different sand composition



FILLER

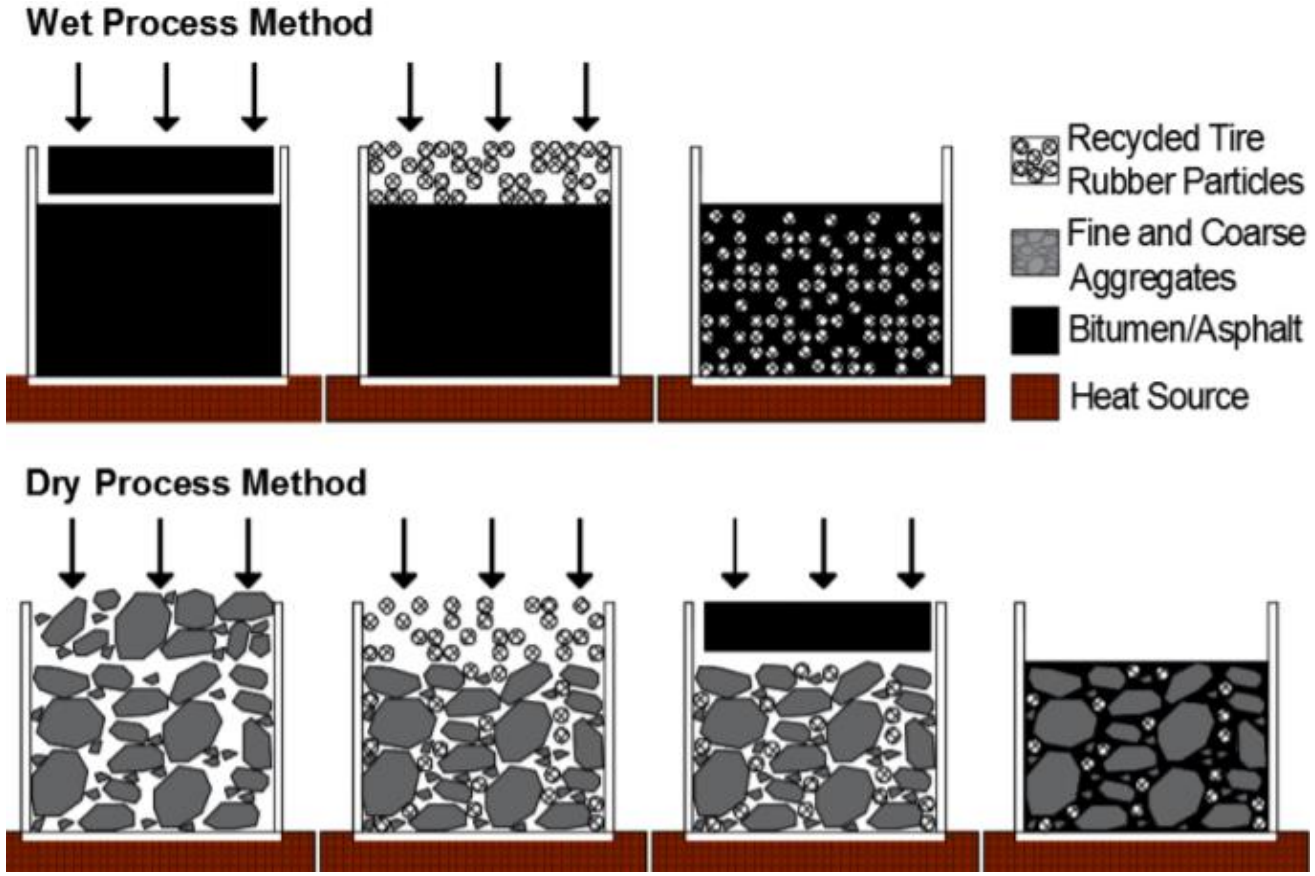
Limestone powder or cement dust are generally used



CRUMB RUBBER

Recycled car tires

METHODS OF PREPARATION



S. Alfayez, A. Suleiman, M. Nehdi, "Methods of crumb rubber addition to asphalt mixtures" in Recycling Tire Rubber in Asphalt Pavements: State of the Art. Multidisciplinary Digital Publishing Institute, October 2020. Accessed on: Mar. 31, 2021 [Online]. Available: <https://www.mdpi.com/2071-1050/12/21/9076>.

PHYSICAL AND RHEOLOGICAL PROPERTIES

ELASTIC RECOVERY

Elastic recovery is a measure of the ability of a bitumen binder to return to its original shape when a compression load is removed

DUCTILITY

Ductility refers to the degree to which a material can sustain plastic deformation under tensile stress before failure

PENETRATION

Penetration is a measure of softness of bitumen binder which is expressed as the distance in tenths of a millimeter that a standard needle penetrates vertically into a specimen of the material under specified conditions of temperature, load, and duration of loading

VISCOSITY AND SOFTENING POINT

Viscosity is a fluid property, a measure of flow resistance

The softening point is the temperature at which the bituminous binder softens beyond some arbitrary softness

PAVEMENT DISTRESS



RUTTING

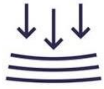
Surface depression in the wheelpath which emerges as a result of insufficient compaction of asphalt layers during construction, improper mix design or manufacture, and high traffic loads



FATIGUE CRACKING

Pavement distress which appears due to repeated loads of heavy traffic services which occur at intermediate and low temperatures

ADVANTAGES AND BENEFITS



RESISTANCE TO PLASTIC DEFORMATION

An elastically deformable conglomerate is created by adding crumb rubber, but at the same time, a highly resistant to permanent deformation one



SAFETY

Homogeneous and elastic surface



Decrease in the number of accidents



SUSTAINABILITY

Using crumb rubber as an asphalt modifier is one of the best options to give old car tires a new life



LOWER COSTS

Reduction in the amounts of fine aggregate used
Reduction in maintenance exigencies



DURABILITY

Improvements in rutting and fatigue cracking resistance



Better durability

CONCLUSION



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**THANKS FOR
LISTENING!**

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