CUSTOMER CONNECT

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Better Roads, Better Life

Hindustan Colas Private Limited

Quarterly News Letter Issue No. 26 / Apr. - Jun. 2016

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The Quarterly Newsletter of Hindustan Colas Private Limited aims at strengthening exchange of information and experience sharing amongst its customers. The success of this communiqué is largely dependent on feedback and information inflow from our customers and we thank them for their continued support.

For Asphalt pavements, a number of possible repair treatments are available, depending on the nature, size and depth of the defect, as well as the available budget of the road owner / operator. These can be applied as either reactive or preventative treatments, but the principles of their application are the same.

Use of recycled highway materials in pavement construction is an effort to preserve the natural environment, reduce waste, and provide a cost effective material for constructing highways. Encouraging the use of recycled materials in the construction of highways to the maximum economical and practical extent possible with equal or improved performance is established to be beneficial. There are three key requirements that must be satisfied for asphalt pavement recycling to be successful. Recycled asphalt pavements must:

1. be cost effective,
2. be environmentally responsible, and
3. perform well.

Recycling of asphalt is proven successful technology, environmentally sound, economical and contributes to conservation of natural resources. Optimizing and maximizing the use of recycled asphalt clearly makes sustainable sense in delivering the roads of the 21st century and beyond.

1. Cold In-Place Recycling (CIR)

Cold in-place recycling (CIR) is a pavement preservation technique that can be a cost effective alternative to asphalt overlays and mill and fill treatments. Traditional treatments require placing virgin plant-mixed material, whereas CIR processes remove and recycle the road surface in-place. An overlay and/or chip seal is placed on the roadway soon after CIR construction.

The CIR process involves milling the existing pavement to a specified depth, generally 60 to 125 mm. The milled material is then crushed and screened to meet design specifications. Emulsion, water and lime/cement are added to rejuvenate the existing plant mix, after which the mixture is placed and compacted. This is all done in one pass of the recycling train. The CIR production rate is about 3 lane km per day.

Selecting the right projects for CIR is very important. CIR is well suited for low traffic roadways in dry climates. With proper selection, life expectancy of CIR pavement should be similar to other pavement preservation techniques.

1.1. Advantages of Cold In-Place Recycling

- Cost effective in areas lacking aggregate or when the cost of bitumen is high
- Eliminates hauling of asphalt to project location resulting in lower fuel costs
- Reduces wear and tear on haul routes
- Ease of construction
- High production rate
- Environmentally friendly

1.2. Steps Involved:

The steps in Cold in-place recycling consists of

- Preparation of construction area,
- Milling the existing pavement
- Addition of bitumen emulsion and virgin material
- Lay down & Compaction
- Placement of surface course

The addition of new aggregates may not be necessary in some projects.

1.3. Field Adjustments to the mix design

The optimum moisture and emulsion contents from the laboratory mix design are recommended as a starting point in the field. First, the coating of the recycled mix is examined after the surface dries. If the coating is not satisfactory (less than 75%), the moisture content is adjusted before the emulsion content. If the mix lacks cohesion in spite of adequate coating, the emulsion content is increased. A crude test for evaluating cohesion has been used. A ball of the recycled mix is made by squeezing it in the palm of one's hand. If the ball falls apart (friable) after the pressure is released, the mix lacks cohesion. The palm of one's hand should also be examined for stains. If specks of asphalt are present, the emulsion content is generally adequate. A palm that is almost completely stained by asphalt indicates exces-

sive emulsion content.

2. Cold Central Plant Recycling (CCPR)

Cold Central Plant Recycling (CCPR) is another cold recycled method used in place of traditional bituminous surfacing techniques. CCPR involves milling the existing pavement surface to a desired depth and transporting these millings to the stockpile for immediate or future use. After millings are treated at the central plant with bitumen emulsion, water, and lime/cement, they are immediately hauled from the central plant back to any construction site and placed on the roadway for paving and compaction.

CCPR is used in different types of situations. First, the road surface can be milled at a partial depth and cold millings can be stockpiled, treated at any time, and used on any project. Cold millings from one road surface can be recycled and placed on either the same or different roadway. Second, CCPR can be used in reconstruction or new construction projects. The road surface is milled at full depth and underlying base material can be reconstructed while still being able to cold recycle the existing bituminous surfacing. It is recommended that a CCPR surface be overlaid with a layer of hot mix asphalt (HMA), although some low traffic roadways can perform well with a single or double chip seal.

- CCPR allows better control of mix properties and quality control testing as opposed to CIR.
- CCPR also allows for a more fluid paving process considering paving does not rely on material milling and other operations associated with CIR.
- CCPR pavements can match life expectations of tradi tional pavement projects with correct project selection.

2.1. Advantages of Cold Central Plant Recycling

- Millings and CCPR mix can be stockpiled in any central location to use on any project.
- Gradation can be controlled and improved. Virgin aggregate can be combined with millings if desired
- Cost effective in areas lacking aggregate
- Cost effective in roadways that require reconstruction of base material. Plant mix can be milled off and transported to a central plant. Millings can then be reap plied after reconstruction of the base material
- CCPR can completely eliminate cracking when the base is pulverized and reconstructed.

2.2. Steps Involved:

The different steps in cold-mix recycling in a central plant are

- Removal of the existing pavement,
- Crushing & stockpiling
- Mixing
- Lay down, aeration & compaction.

2.2.1. Removal of the existing pavement

The first step is to rip, scarify, pulverize or mill the existing pavement to a specified depth. The material is then hauled to a central plant, where it is crushed further, if required, stockpiled, and mixed with virgin asphalt binder and aggregate, if required, in a batch or drum-mix plant or a continuous (stabilization) plant. Removal of the existing pavement can be done in different ways. However, it should be noted that recycled cold mix produced at a central plant from an existing RAP stockpile can be used for overlaying an existing pavement which does not have to be removed.

2.2.2. Crushing and stockpiling

Crushing and screening plants are used to reduce the pieces of broken pavements to acceptable limits. The material is then stockpiled for immediate or future use. The height of the RAP stockpiles should be limited to prevent the crushed material from sticking together because of dead load and high temperature. Construction equipments should not be permitted on the RAP stockpiles. To minimize sticking and excessive moisture in the stockpiles, the height of the stockpiles can be kept at a minimum by coordinating crushing and mixing operations

2.2.3. Mixing

Mixing may be done at a batch drum, or continuous (stabilization) type of plant. A continuous type of plant is most often used for mixing. 100% coating of the coarse aggregate is not always achieved in the mixing plant, and it is not necessary to have 100% coating at the time of mixing. Further coating takes place during spreading and

rolling of the mix. Difficulty in coating particular types of aggregates should be evident in the mix design stage, and the mixing procedure should be adjusted to produce uniform dispersion of the bitumen emulsion with a complete coating of the finer aggregate fractions.

2.2.4. Laydown, Aeration and Compaction

The laydown and spreading equipment used for cold recycled materials is generally the same as for conventional hot mix asphalt. Aeration of recycled mix is required to reduce the water and volatile content of the mix. The motor grade can be used to aerate the mix by blading the mix back and forth across the roadway. The aeration process helps in reducing the fluid content of the mix so that it becomes stable enough to support the weight of the compactor roller. The rate of volatile loss is controlled primarily by the type of bitumen modifier, mix water content, gradation of aggregate, wind velocity, ambient temperature, and humidity.

Dense-graded cold mixes should be placed in compacted thickness of 75 mm or less, if practical, and with multiple lifts, some curing time should be allowed between successive lifts (two to five days under good curing conditions). Open-graded cold recycled mixes can be placed up to thickness of about 100 mm. Construction should not continue during rainfall, or begin when rain is expected. The emulsified asphalt base should not be placed if the ambient temperature is below 10 C.

Usually a wearing course, in the form of HMA overlay or a double surface treatment is applied over the cold recycled asphalt base. The application of the overlay should be delayed for sufficient time if the mix needs additional curing to avoid moisture retention and loss of stability. During this delay, ideally, traffic should not be allowed on the surface. However, it is not always practical to delay the opening of traffic. Fog seal should be used if raveling becomes a problem.

Cold recycling is used to rectify all types of cracks except the cracks caused by base failures.It improves the riding quality without altering the geometry of the pavement. It can be used to lower pavement profile by milling or removing a greater depth of pavement than that required for recycling.

Hincol Cold Recycling Emulsion is ideal suited for this application.

We look forward to enhanced contribution from our customers to further enrich this newsletter. We also welcome suggestions, recommendations and critics that will help us serve you better. You may send your feedback and contributions to us at: **customerconnect@hincol.com** or visit **www.hincol.com**

Alternatively, you may also post us information at:

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