

Environment Friendly Cold Mix Technology for Construction of Structural Layers of Bituminous Road

Akshay S. Hundekar¹, Shashank U. Vanakudari²

¹M.Tech. Student, Department of Civil Engineering, Jain College of Engineering, Belagavi, India

²Assistant Professor, Department of Civil Engineering, Jain College of Engineering, Belagavi, India

Abstract: There is some intermixing of terms such as bitumen and asphalt. Different countries attach different meanings to these terms. American terminology uses the name asphalt for substances known by the name bitumen in British terminology. Bitumen is defined as a viscous liquid, or a solid, consisting essentially of hydrocarbons and their derivatives, which is soluble in carbon disulphide. The use of bitumen on roads in recent times picked up in the 19th century. Natural rock asphalt was initially used, but as petroleum distillation began to grow as an industry to fuel the road vehicles, the residues found equally increasing use in constructing better roads.

Keywords: cold mix technology, structural layers of bituminous road

1. Introduction

The use of bitumen on roads in recent times picked up in the 19th century. Natural rock asphalt was initially used, but as petroleum distillation began to grow as an industry to fuel the road vehicles, the residues found equally increasing use in constructing better roads.

A. General properties and requirements of bitumen

- They are chemically inert.
- They oxidise slowly.
- They are insoluble in water.
- Most bitumen are colloidal in nature.
- They predominantly soluble in carbon disulphide.
- They are highly impermeable in water.
- Specific gravity is 1.02-1.04.

B. Requirements

- They should have good affinity to the aggregates and not stripped off in the presence of water.
- Bitumen should be ductile and not brittle.
- It should be fluid enough at time of mixing.
- It should have low temperature susceptibility

2. Mix design methods

There are four popular method of mix design:

- Marshall method

- Hubbard-field method
- Hveem method
- Smith triaxial method

3. Advantages of cold mix technology

- Construction of roads with cold mix technology is feasible in all climates including cold and wet climates.
- Because emulsion is of relatively low viscosity at normal temperature, they eliminate the need to heat aggregate and binder, and thus they conserve energy.
- Their use reduces environmental pollution especially because, unlike cutback bitumen, they do not release harmful diluents into the environment.
- They are ideal for patching and repair works, particularly because they do not require heating before use.

A. Disadvantages

- Emulsions are, however, costly and since they contain a substantial a quantity of water, the transportation costs are higher.

4. Cold mixes used in situations

- Where hot mix plants are not available
- In remote areas
- For maintenance operations
- Cold weather work
- Cold mix macadam and bituminous carpets at summer and winter temperatures, both in plains and in high altitude.

5. Conclusion

Construction of roads with specifications of bituminous macadam as base course and semi dense bituminous concrete using bitumen emulsion cold mixes is feasible by using presently available road construction infrastructure such as paver, roller and hot mix plant (used cold mixer without heating

arrangement).

Tentative specifications of Bituminous Macadam, Semi Dense Bituminous Concrete and Close-graded premix carpet with cold mix technology are drafted. The specifications are in

consideration of Indian Road Congress for implementation.

References

- [1] Civil Engineering and Construction Review. (Roads)
- [2] L.R. Kadyali. N. M. Lal, "Highway Engineering."