

Introduction

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●TEMPERATURE has long been recognized as an important factor in asphalt pavement construction. For many years the mixing temperature has been controlled by specification, with the temperature of the mix during laying and rolling left to the discretion of the engineer on the project. Unfortunately, selection of these specific temperatures was for many years both empirical and arbitrary; by present standards the values assigned for a mixing limit in most cases probably were high.

The first change in this situation occurred some two decades ago using as the proper mixing control asphalt viscosity rather than temperature as such. This idea was adopted rather promptly by some agencies, has gradually been gaining wider acceptance, and is now getting general recognition. This is believed to be but a step in the badly needed evaluation of temperature effects throughout the construction process.

Temperature must be viewed from several standpoints. The first is its effect on the mix constituents. When the temperature changes, so does the viscosity, the wetting energy, and perhaps some of the properties of the aggregate which affect both the spreading and absorption of the asphalt. The second is its effect on the mixing, laying, and compaction operations as a result of these changes in the properties of the mix constituents. However, there is another factor in which temperature is involved—the rate of traffic densification. Here the temperatures are set not by the construction process but by the climatic conditions. However, some knowledge and estimation of traffic densification rates probably will be required in the ultimate rational design approach needed for maximum utilization of materials and economy in design. And last, but not least, is the effect of the temperature of the base or pavement on which the hot mix is to be laid.

The discussion topics will be followed in the order given in the program, as follows:

1. Temperature of Materials:

- A. Effects of aggregate temperature on bituminous mix properties.
- B. Temperature-viscosity relationship of asphalts used in the United States.

2. Effects of Temperature on Mixing:

- A. Effects of asphalt cement viscosity at mixing temperature on properties of bituminous mixtures.
- B. Effects of mixing temperature and time on consistency of asphalt cement during mixing.
- C. Effects of pugmill structure and asphalt spraying mechanism on mixing and properties of the mixtures.

3. Effects of Temperature on Compaction:

- A. Temperature of mix.
- B. Temperature of air and base.

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