THE FUNDAMENTAL PROPERTIES OF BITUMINOUS MIXTURES AND THEIR MEASUREMENT

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SUMMARY

This paper deals with those properties of bituminous materials which must be known if a pavement is to be designed as an engineering structure. These are often termed "fundamental" or "mechanical" properties. The subject of bitumen modifiers and surface characteristics such as skid resistance will not be dealt with.

Bitumen-aggregate mixtures are complex materials and the determination of the relevant properties is a difficult and often contentious matter which is the subject of much debate. One of the major problems is that there are numerous variables which include:

- The source, grade, temperature susceptibility, etc of the bitumen
- The relative proportions of bitumen, aggregate and air voids in the mixture
- The shape, surface properties, absorption, strength, etc of the aggregates
- The grading of the aggregates
- The degree of compaction
- The level and variation of temperature and the presence of water
- The volume, speed and magnitude of wheel loads

Some of these factors are related, for example the deleterious effect of water is more marked if binder content is low, the aggregate more absorbent, the grading open or if the mixture is not well compacted.

Another problem is the development of test methods which can be used to determine relevant mechanical properties. If a test method is to closely simulate the variations in stress and environmental regimes experienced by the material in the road then it will involve complex techniques and sophisticated equipment operated by highly trained technical staff and the specimen turnover will be low. This paper discusses some of the test methods in general use.