

A B S T R A C T

The initial grading of a road aggregate becomes changed as the result of external forces such as the effects of compaction and of traffic. In other words, it can be stated as degradation or comminution of size of the aggregates used in highway construction. Degradation studies in India do not appear to have been reported so far. The aim of this investigation was to study the problem of degradation with reference to three of the locally available and commonly used aggregates in road construction.

A study was made on these aggregates by conducting different degradation tests in order to arrive at the various factors affecting the degradation of aggregates in road construction. Major portion of the study was made on uncoated aggregates. However, to find out the effect of asphalt on degradation, only one asphalt content was used in the part of the study on coated aggregates. It has usually been said that the initial grading of the aggregate influences the degradation to a large extent. To verify this, six gap gradings were derived from the grading requirements of the American Association of State Highway Officials for soil aggregate materials. Besides, a single-sized aggregate passing 1/2" and retained on 3/8" square mesh sieves, Fuller's grading and a gap grading derived from Fuller's grading were also included in the series for the purpose of forming the initial gradings.

The investigation was carried out by conducting the following tests to evaluate the various factors influencing the degradation.

- (i) Crushing Degradation Tests.
- (ii) Impact Degradation Tests.
- (iii) Impact Degradation Tests on coated aggregates.
- (iv) Roller Degradation Tests making use of a flexible base course prepared for the purpose. Los Angeles abrasion tests were also run on the same aggregate size specifications as in roller tests for comparison.
- (v) Standard Degradation Tests. The Rattler, Idaho, and Olympia Degradation Tests were carried out on all the aggregates used in this study.

The results of the investigation indicated that both crushing and impact degradation tests revealed the mechanical degradation characteristics of the aggregates. The magnitude of the degradation measured by percentage increase in surface area depended on the type of aggregate, initial grading, compactive effort and method of compaction. The gradation of the aggregate was found to be the principal factor affecting degradation. Dense mixtures undergo less degradation and open graded and single-sized aggregates degrade more. In dense gradings the presence or otherwise of asphalt seemed to have no effect and in others it reduced the degradation slightly.

The rating of the aggregates from roller tests was the same as from Los Angeles tests. The need for the development of a laboratory degradation test covering both mechanical and weathering degradation characteristics is stressed and such a test should be included in the specifications for aggregates to be used in Highway Construction.