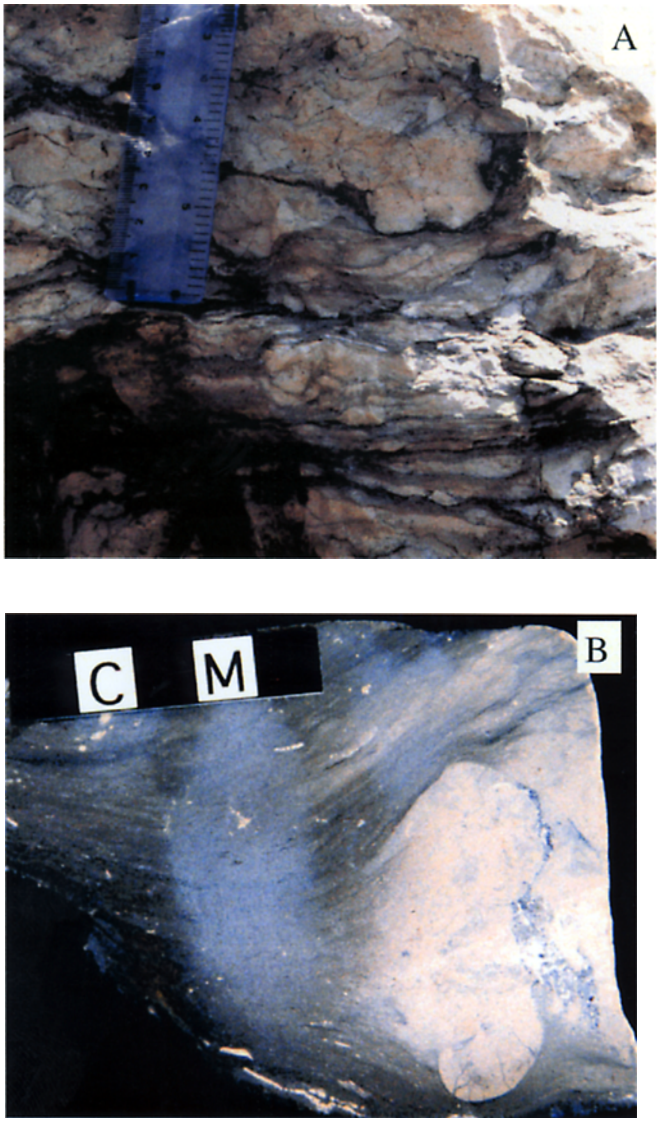

Figure 3.4. (A) Photo of thin, diffuse stylocumulates on outcrop. The irregular pattern, thinness and distribution throughout the limestone would likely cause these clay-rich zones to become part of the aggregate following crushing of the rock.
(B) Hand sample of argillaceous skeletal wackestone (locality SRS) showing the stringy, and wispy nature of the diffuse stylocumulates. These wisps of clay-rich material will not be separated from the limestone when the rock is crushed.

Figure 3.5. Photo of a bed of phylloid algal wackestone with completely disseminated argillaceous material throughout its thickness. This from of clay is recognized by the bluish-gray color it imparts to the rock. Due to the disseminated nature of the clay, it will become part of the aggregate following crushing of the rock.

of its diffuse nature and distribution throughout limestone beds, this occurrence of clay generally will be retained in the crushed aggregates

Clay also occurs as completely disseminated argillaceous material in limestone. In these occurrences there are no visible discrete seams or stylolites. Instead, this clay distribution is typically recognized in outcrops by the bluish-gray color the disseminated clay imparts to the rocks (Figure 3.5). Like diffuse stylolites, argillaceous material that is completely disseminated throughout the limestone cannot be separated from the limestone and will become part of the crushed aggregate.

Insoluble Residues

Data on insoluble residue percentages of aggregate samples KU-1 to KU-10 were determined by the author, whereas percent insoluble residue for aggregate samples KDOT-1 to KDOT-20 were determined by the Materials and Research Division of KDOT as part of their testing protocol. Other data concerning insoluble residues, including grain size distributions and compositions, were determined by the author for samples KU-1 to KU-10 only. See Appendix 2 for sample preparation techniques and procedures for collecting insoluble residue data.

Percent Insoluble Residue

Percent insoluble residue represents the weight percent of aggregate composed of acid insoluble residue determined by digesting crushed aggregate samples in dilute hydrochloric acid, weighing the filtered residues, and calculating the total percentage by weight.

Insoluble Residue Grain Sizes & Aggregate Clay Percentage

Grain size distributions of the insoluble residues were determined for each aggregate sample tested for this study (KU-1 to KU-10). This was accomplished by weighing the residues, dispersing them in water, and sieving them. Following sieving, the mass of each fraction retained on the sieves and the mass of the fine fraction that passed through the finest sieve was determined and a percentage of the original sample was calculated for each grain size.

Using the percentage of each sieved residue composed of clay-sized material, a value was calculated that represents the weight percentage of the original aggregate mass composed of clay-sized material. This value is referred to as the aggregate clay percentage. Insoluble residue grain size data were not available for samples taken by KDOT.

Insoluble Residue Composition

Mineralogical compositions of insoluble residues of samples KU 1 to KU-10 were determined using x-ray diffractometry. These data were not available for samples taken by KDOT.

Results

In order to evaluate the hypotheses outlined at the beginning, data concerning the geologic variables must be evaluated relative to the results of the KDOT physical tests. Durability factor is the most important measurement in determining if an aggregate is a class 1 aggregate. For this reason, geologic variables are compared to the results of ASTM Test C666-92, Procedure B, which KDOT uses to determine durability factor. Other important test results used in KDOT's determination of whether an aggregate qualifies as class 1 include the expansion percentage and the modified freeze-thaw (soundness) ratio. Therefore, some geologic variables were also compared to these results and correlations are discussed where applicable. Because durability factor is so highly correlated to expansion percentage (Fig. 3.6), it is apparent that in most cases only one of these variables need be compared to lithologic