

Determination of composite slab strength using a new elemental test method

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Composite slabs utilizing cold-formed profiled steel decks are commonly used for floor systems in steel framed buildings. The behavior and strength of composite slabs are normally controlled by the horizontal shear bond between the steel deck and the concrete. The strength of the horizontal shear bond depends on many factors and it is not possible to provide representative design values that can be applied to all slab conditions a priori. Thus, present design standards require that the design parameters be obtained from full-size bending tests, which are typically one or two deck panels wide and a single span. However, because these full-size tests can be expensive and time consuming, smaller size specimens, referred to as elemental tests, are desirable and have been the subject of a great deal of research. Details for a new elemental test method for composite slab specimens under bending are presented. Test results consisting of maximum applied load, end slips, and failure modes are presented and compared with the results of full-size specimens with similar end details, spans, etc. It is shown that the performance of the elemental test developed in this study is in good agreement with the performance of the full-size specimens. Application of test data to current design specifications is also presented.