

Steel Deck Diaphragm Test Database V1.0

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About the authors

P. O'Brien was a Masters student at Virginia Polytechnic Institute and State University (Virginia Tech) and the primary creator of version 1.0 of this database. Associate Professor M.R. Eatherton and Professor W.S. Easterling also of Virginia Tech University served as co-advisors on the research. Professor B.W. Schafer of Johns Hopkins University, and Professor J.F. Hajjar of Northeastern University also contributed to the oversight and creation of the database.

CFSRC Information

The Cold-Formed Steel Research Consortium (CFSRC) is a multi-institute consortium of university researchers dedicated to providing world-leading research that enables structural engineers and manufacturers to realize the full potential of structures utilizing cold-formed steel. More information can be found at www.cfsrc.org. All CFSRC reports are hosted permanently by the Johns Hopkins University library in the DSpace collection: <https://jscholarship.library.jhu.edu/handle/1774.2/40427>.

SDII Information

The Steel Diaphragm Innovation Initiative (SDII) is a multi-year industry-academic partnership to advance the seismic performance of steel floor and roof diaphragms utilized in steel buildings through better understanding of diaphragm-structure interaction, new design approaches, and new three-dimensional modeling tools that provided enhanced capabilities to designers utilizing steel diaphragms in their building systems. SDII was created through collaboration between the American Iron and Steel Institute and the American Institute of Steel Construction with contributions from the Steel Deck Institute, the Metal Building Manufacturers Association, and the Steel Joist Institute in partnership with the Cold-Formed Steel Research Consortium; including, researchers from Johns Hopkins University, Virginia Tech, Northeastern University, and Walter P Moore.

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Abstract

From the 1950's to the present, a substantial number of large-scale tests have been conducted on steel deck diaphragms or concrete on metal deck diaphragms. The data, papers and reports for these tests are located in scattered references and many are not publically available. As part of the Steel Diaphragm Innovation Initiative (SDII), a database of over 750 past experiments on metal deck diaphragms was created. The information contained in this database can be useful for several applications including evaluating strength and stiffness prediction equations, assessing resistance and safety factors, and investigating ductility of diaphragms.

The database contains fields related to 1) specimen identification and reference, 2) the test setup including information about the geometry, loading type, deck orientation, beam sizes, steel deck geometry, and concrete slab information if applicable, 3) fastener information including sidelap fasteners, structural fasteners, and shear studs, 4) information about materials including deck material and concrete fill material, and 5) test results for selected specimens including stiffness, strength, and ductility.