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Sommario/riassunto	This report describes 3-dimensional (3D) digital image correlation to measure the 3D shape, displacement, and in-plane strain field, during testing of gusset plate structural connections. Twelve full-scale bridge gusset plate connections of various geometries and boundary conditions were tested at the the Federal Highway Administration (FHWA) Turner-Fairbank Highway Research Center (Ocel et al., 2012). These experiments are part of the verification of numerical models as part of NCHRP Project 12-84 Guidelines for the Load and Resistance Factor Design and Rating of Riveted and Bolted Gusset Plate Connections for Steel Bridge. The measurements described here are in regards to the tests performed to failure (i.e., maximum load carrying capacity of the connection). During each of the twelve tests to failure, a series (typically about 150) of image pairs were taken for subsequent digital image correlation analysis. Although all of the image pairs were processed, only a very small portion of the results are presented here. It is intended to give general access to the overall data set for use by other researchers. Overall the measurements, showed reasonable

uncertainties on the order of 150 $\mu\text{m/m}$ of maximum in-plane shear strain, and the measured out of plane initial shapes of the plates typically matched qualitative inspections of the connections. The layout, calibration, and measurement procedure associated with the digital image correlation system are described in detail to aid in understanding of the results. The results shown here include a sample of the measured and derived variables for one experiment at two conditions to inform the reader of the type of data that is available. The results also include an abbreviated set of results that show the evolution of the out of plane shape and maximum shear strain field at four points in loading from the initial condition to failure.
