Deformation analysis of the propagation saw test

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We present results of high speed photography films which show that the scale of slope normal deformation prior to unstable fracture in the propagation saw test (PST) is on the order of 1 mm. Tests were filmed at up to 1200 frames per second and the slab was seeded with tracing particles immediately above the weak layer. Particle tracking software measured the displacement, velocity and acceleration of each particle frame by frame during the test. The pixel resolution in close-up films was as high as 0.1 mm per pixel. The films consistently show that the majority of the slope normal deformation (collapse) of the weak layer occurs after the fracture has propagated within the weak layer. The films also show that the weak layer provides some residual support to the slab following the saw cut. We discuss several implications of these findings.