Conventional braced frames have a tendency to form soft or weak stories, concentrating damage in a few stories while the rest of the frame contributes little to the structure’s ability to dissipate energy. A two-story one-bay “strongback” (SB) retrofit was tested under quasi-static cyclic loading conditions to assess the SB system’s ability to alleviate this soft or weak story behavior. The SB system employs an elastic mast that runs over the height of the structure, forcing similar drift demands in adjacent stories; thus engaging multiple stories in an imposed linear mode. The test utilized braces arranged in a “lambda” configuration, comprised of a buckling restrained brace (BRB) acting as an energy dissipating “fuse” and two HSS braces acting as a strong truss, or “mast,” intended to spread interstory drifts over the entire frame height. Results show that the SB test was effective in limiting a soft or weak story mechanism, and the “strongback” was able to impose a nearly uniform drifts in each story throughout the duration of the test. Calibrated numerical results were able to capture the general response of the frame, including fracture of the BRB.