The dynamic fatigue properties of commercial closed-cell/non-crosslinked polyethylene (PE) foams were investigated for applications of structural loading and packaging design. The compressive properties were studied in terms of maximum dynamic fatigue stress set at various void sizes, maximum test amplitudes and test speeds, the results being compared with those obtained under static compression conditions. Local temperature rise under cyclic loading and dynamic compression set were also investigated. All the experimental results were obtained using a universal tensile testing machine and the data were recorded using a high speed data logger coupled to a personal computer. The static compressive stress was affected by test speed, but this was not the case for maximum amplitude. These two variables were found to influence the maximum dynamic fatigue stress of the foam in association with increased fatigue in the material, excessive rupture of the cell structure and ductile–brittle characteristics of the foam.