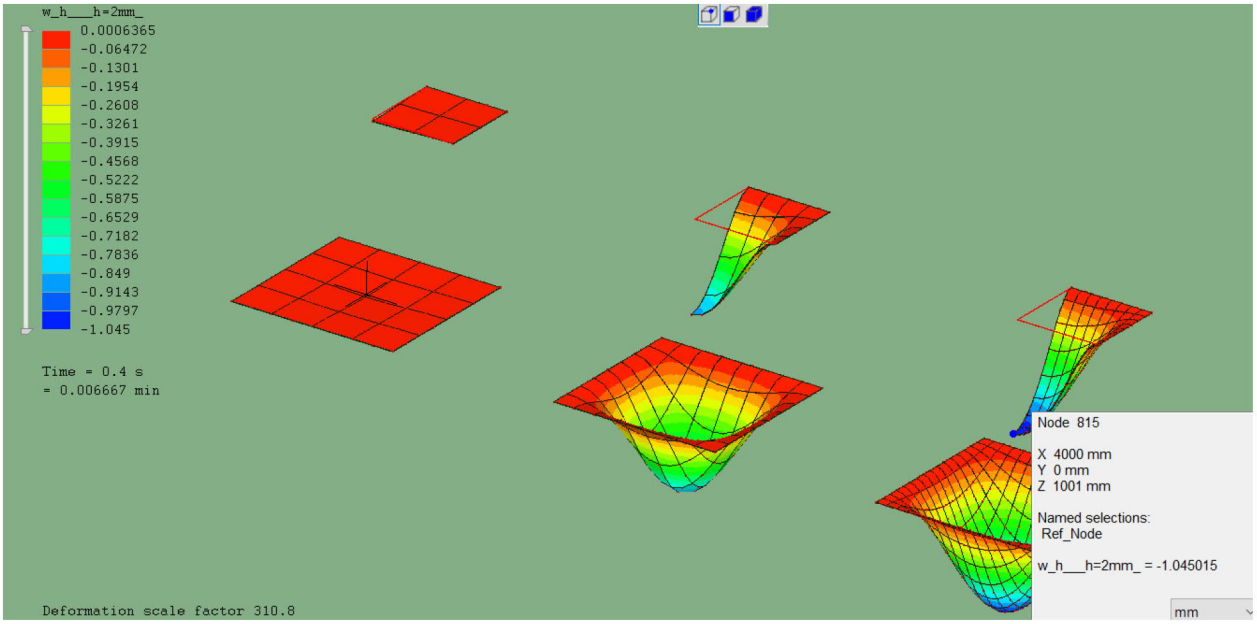
6.9 PROBLEM 8 : NONLINEAR BENDING OF AN ISOTROPIC PLATE

Nonlinear bending of a clamped isotropic square plate subjected to top surface uniform pressure is investigated to verify the the nonlinear capability of current work. The geometry, loading, material properties, finite element mesh and nondimensional vertical deflection at the center of the plate are shown in Figure 6.15. The displacement of current work are smaller than the analytical solution. This is due to the numerical displacement-hardening error introduced by the modified Newton Raphson method [79].



Correct result is only reached with a 8x8 mesh . S8R Helps a little on the 4x4 mesh giving 0.97 -w/h.

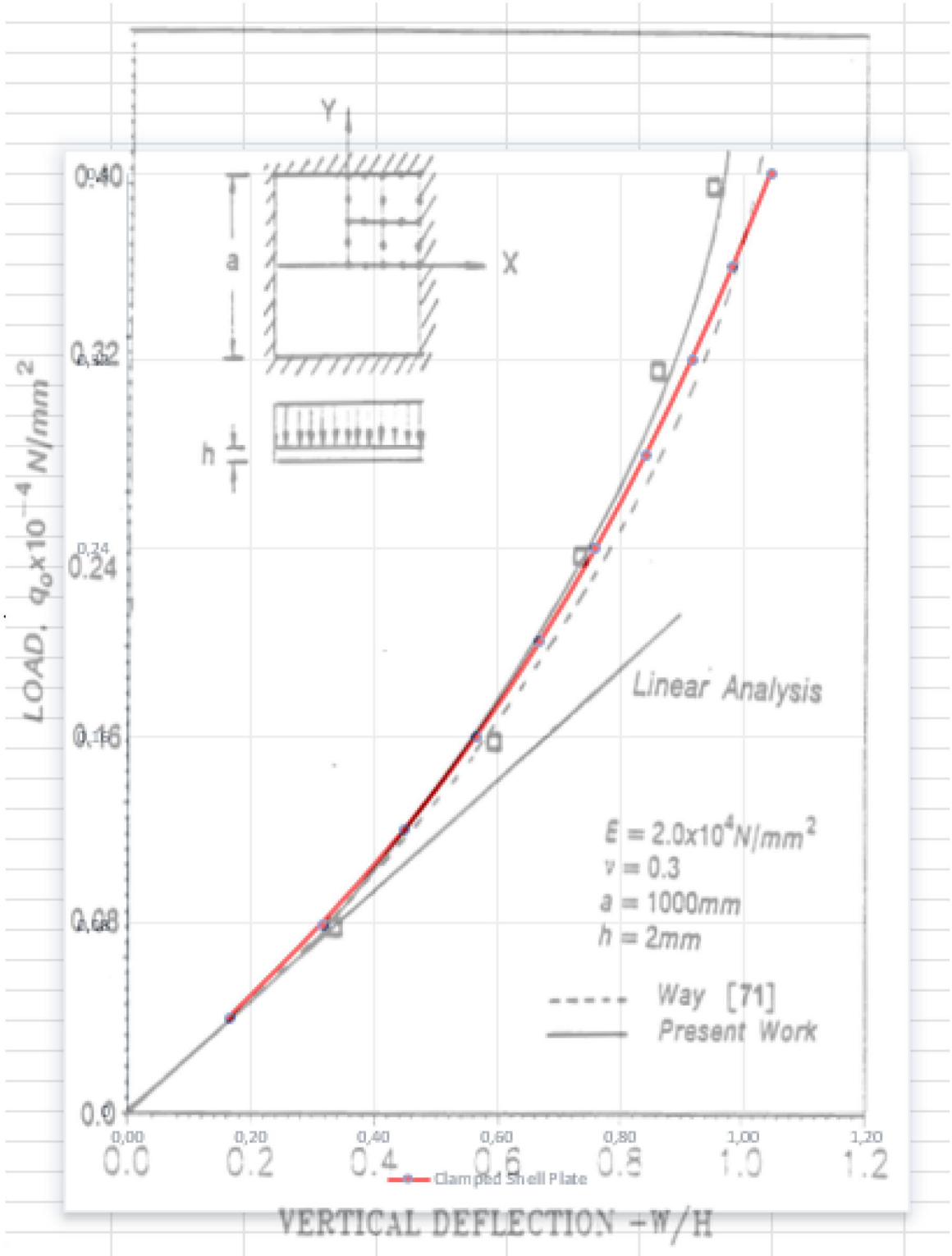


Figure 6.15 Bending of a clamped isotropic square plate under uniform normal pressure

71. Liu, C.F., "Geometrically nonlinear analysis of composite laminates using a refined shear deformation shell theory," Ph.D. Thesis, VPI&SU, Blacksburg, VA, 1985.