The present work investigates how well different finite element modeling techniques can predict bending and torsion behavior of a wind turbine blade. Two shell models are investigated. One model has element offsets and the other has the elements at the mid-thickness surfaces of the model. The last two models investigated use a combination of shell and solid elements. The results from the numerical investigations are compared with measurements from testing of a section of a full-scale wind turbine blade. It is found that only the combined shell/solid models give reliable results in torsion. Both the combined shell/solid models and the shell model with element offsets are found to give reliable bending results. For the combined shell/solid models, convergence tests show that it is necessary to have 3 solid elements through the thickness of the sandwich cores and the adhesive bonds.