1077-49-2081 **David R. Adams**, Dept of Mathematics, University of Kentucky, Lexington, KY 40506-0027, **Volodymyr Hrynkiv***, Dept of Computer and Mathematical Sciences, University of Houston-Downtown, Houston, TX 77002-1014, and **Suzanne Lenhart**, Department of Mathematics, University of Tennessee-Knoxville, Knoxville, TN 37996-1300. *Optimal control of a biharmonic obstacle problem.*

We consider a variational inequality of the obstacle type where the underlying partial differential operator is biharmonic. We consider an optimal control problem where the state of the system is given by the solution of the variational inequality and the obstacle is taken to be a control. For a given target profile we want to find an obstacle such that the corresponding solution to the variational inequality is close the target profile while the norm of the obstacle does not get too large in the appropriate space. We prove the existence of an optimal control and derive the optimality system by using approximation techniques. Namely, the variational inequality and the objective functional are approximated by a semilinear partial differential equation and the corresponding approximating functional respectively. (Received September 21, 2011)