PRELIMINARY INVESTIGATION INTO THE DAMAGE OF HORIZONTAL STABILIZER OF MOTOR GLIDER DUE TO LOW ENERGY IMPACT.

Piotr Czarnocki
Institute of Aeronautics and Applied Mechanics
Nowowiejska 24, 00-665 Warsaw, Poland

pecz@meil.pw.edu.pl

Abstract. The investigation presented focuses horizontal stabilizer of AOS 71 electric engine powered motor glider. Preliminary loading cases analysis indicated that the stresses due to the anticipated flight loads acting on the stabilizer will be low and therefore the load caring skin can be made with a hybrid glass/carbon fibre fabric of 200g area weight only. A classical tail lay out chosen for the AOS 71 results in a relatively low placement of the stabilizer which makes it very vulnerable to an accidental damage that can occur during operation and maintains. Drop tests carried out showed that such structure is vulnerable to low energy impacts in the range below 20J. To estimate how much such a damage effects stiffness and strength of the stabilizer a FE analysis was carried out for the stabilizer with varying damage size and location. To validate the FE model the tests were carried out with the use of a typical stabilizer section.