

MAIN LANDING GEAR FREEFALL CONTROL MODULE: A CAM APPLICATION IN AIRCRAFT COMPONENT DESIGN & ANALYSIS

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ABSTRACT

This thesis research attempted to analyze some processes of cam design and improvements in aircraft applications, especially in the Learjet Model 45 main landing gear's freefall control module. A simplified corresponding linkage mechanism and a computer-generated model were put into different analysis packages for better understanding of the original part design and operations. With FORTRAN programs and MECHANICA software, kinematic and dynamic analyses including motion positions, velocities, accelerations, forces, and moments, etc. were emphasized on the simplified linkage mechanism, whereas structure and finite element analyses were specialized on the computer-generated model. Recent versions of actual revisions for ease of operations and for functional improvements were discussed by means of industry standard drawings. Finally, a finite element analysis using ANSYS for part and assembly satisfaction and possible future redesigns were also proposed.

It was concluded that application of cam in the mechanism greatly enhanced its performance than that of the corresponding simplified linkage. Many more options could be decided to functionally and operationally improve the design using various computer-aided packages. Detailed results from further syntheses and analyses would be needed to justify any redesign in the future.