

# case study

## Eurocopter

### Reducing Composite Component Deflection Loads by 35%

During the lifetime of a helicopter, every superfluous pound of weight costs the owner thousands of Euros. These costs arise due to the additional fuel needed to move the extra mass thus limiting the amount of cargo the helicopter can transport. To build lighter helicopters, Eurocopter, Europe's largest helicopter manufacturer, uses lightweight materials such as composites. However, the design of composite components can be complex as the material consists of different layers oriented in various directions resulting in countless possible ways to combine the material.



## solution

Eurocopter selected Altair ProductDesign to assist with the design assessment of a composite helicopter tailboom with Eurocopter contributing its aviation expertise and Altair ProductDesign providing experience of composite design and optimization. The purpose of the project was to improve the performance of the tailboom while ensuring the weight did not increase.

By understanding the loads applied to the helicopter tailboom when in use, Altair ProductDesign's standard process for designing composite components was used, consisting of a three-stage optimization of the part powered by HyperWorks. The first optimization run defined the layer distribution, showing the optimal shape and thickness of each composite patch. The second optimization routine delivered the discrete thickness of the patches and the exact number of ply layers needed. The final step automatically 'shuffled' the composite layers, varying each ply orientation to create the best performing lay up possible.

## result

At the end of the development cycle, Altair ProductDesign in conjunction with Eurocopter engineers, successfully improved the buckling load cases by 10% and the deflection at the end of the tailboom by more than 35% without any increase in the helicopters weight or impact on fuel efficiency. This optimization method for composite components will be further integrated into Eurocopter's design process, helping them to continue to design and manufacture the world's leading helicopters.