

## A COMPOSITE RESPONSE FACE THE FRAGILE IMPACT AND IMPACT OF COMPOSITE MATERIALS

### ATECA KNOW-HOW RECOGNIZED

Created in 1981, **ATECA** has always had the ability to meet needs of its customers including the aeronautical field. Small company based in **MONTAUBAN** she won its place through special processes : heat treatment, brazing and laser (cutting, drilling and welding).

Since its launching, **ATECA** perpetuates a research and innovation in materials and advanced systems to maintain an edge in competition. This requires the use of porous materials (hollow spheres and metal fibers) and their integration into systems energy absorbers.

This R&D activity is fairly basic. Indeed, **ATECA** has been able to deposit in the aviation industry a little over ten patents. Note that for some **ATECA** had the chance to collaborate especially with **EUROCOPTER** and **SAFRAN**.

### FROM THE MARKET DEMAND TO A MEETING

Today, the use of composite materials is growing fast in aerospace applications. The race against weight gain to ISO performance of metallic materials such as titanium or stainless steel is increasingly difficult. Why? The composite material as noble as it can never replace at 100% metallic materials : the first offers some advantages in terms of weight, the second in terms of mechanical strength. However, in the composite aircraft industry is recognized as a material rather exceptional. Unfortunately it is very sensitive to impact and shocks.

Given the technical choices are two alternatives : either the composite is avoided despite the request or it selects composite solutions consisting of increasing considerably the volume of parts. The final solution is the most used, because even by doubling the volume and because of the density of the metal compared to composite, there will still gain weight. However it could be more consistent through solutions to protect surfaces.

Today **ATECA** and **C&T** have pooled their technical strengths and complementary skills to offer an innovative patented solution to protect composite parts :

' a damping composite layer/ Skin '

The first results confirm the common good cushioning layer that will help to avoid over-dimensioning of composite structures to protect against impacts. This will provide :

A protective capacity of the composite substrate

A low specific mass

An Implementation and a very simple maintenance.

This product consists mainly of three layers each having a specific function: a substrate of hollow spheres and an outer layer. **ATECA** and **C&T** have been careful to select in particular materials commonly used and qualified in the field of aeronautics.

### DAMPER LAYER IN COMPOSITE

The product will make available a whole range of properties and advantages for the aerospace industry. Mastering the ability to absorb the shock absorbing layer.

An implementation easy to manufacture, even for complex shapes.

The ability to absorb mechanical shocks without significant alteration of the substrate.

The qualification of aeronautical parts constraints.

The visualization of the Impact effects.

Simplifying maintenance.

### Use

Shock absorption / protection against impacts

The hollow spheres are sized according to their tensile strength (density hollow spheres of about 0.36 kg/dm<sup>3</sup>).

### A JOINT PROJECT SUPPORTED BY MIDI-PYRENEES REGION

Today **ATECA** and **C&T** stepped up their efforts particularly on the online maintenance process to propose a solution that can be used directly on operating aircraft is on track or in a maintenance platform.

This final phase took place with the help of the region and DRIRE with financial assistance through the call for proposals **EPICEA 2008**. This development program will conclude at the end of 2010, is part of a comprehensive implementation of a composite rod with high mechanical properties (1,8 m for 500T) with this present damping composite layer. This development program includes the following companies: **SKF AF, BTS INDUSTRIE, Clement Ader institute and of course ATECA C&T.**

By this action, **ATECA** and **C&T**. will be able to offer a viable and very competitive technical solution with over-weight and safety margins only technical solutions to address the fragility of the composite and in particular delamination layer components during impact or shocks.

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