

CORRIGE

Ces éléments de correction n'ont qu'une valeur indicative. Ils ne peuvent en aucun cas engager la responsabilité des autorités académiques, chaque jury est souverain.

COMPOSITES SOFTEN IMPACT

CORRIGÉ INDICATIF

1 - Traduction

Les composites atténuent l'impact

Les chercheurs découvrent des amortisseurs d'énergie des plus efficaces grâce à des études sur simulation d'accidents

Un projet européen de recherche de trois ans a conclu que de la mousse prise en sandwich entre des revêtements de kevlar et de fibre de carbone peut absorber l'énergie de manière efficace lors de la chute d'un hélicoptère sur l'eau.

Le projet de 4,5 millions d'euros (5,8 millions de dollars), intitulé « résistance à l'impact des hélicoptères sur l'eau : conception de structures utilisant des outils de simulation avancés » (CAST) a examiné différents types de structures composites et d'outils de simulation informatique standard qui, les chercheurs le savaient, nécessitaient des améliorations. Les modèles informatiques étaient adaptés afin de prendre en compte les différents matériaux en composites et leurs capacités à absorber l'énergie.

« Nous avons découvert que les composites absorbent l'énergie de manière beaucoup plus efficace que les métaux et nous avons établi que les modèles existants (de simulation de composite) n'étaient pas assez précis, » déclare Rade Vignjevic, professeur de mécanique appliquée et président du groupe de mécanique structurelle des impacts et de la résistance aux chocs à l'Université de Cranfield.

La taille et la forme des cônes varieraient selon le type de l'hélicoptère et selon qu'il est utilisé principalement pour des vols au-dessus de l'eau ou de la terre. Les chercheurs de CAST ont découvert que les impacts sur l'eau pourraient être pires pour les cellules que les chocs au sol.

2 - Essai

"Improvements: what does the word suggest to you in the world of aeronautics?"

In any domain, we want and need to improve, it is in our genes. We keep trying to improve our living conditions mainly through invention of new tools, development of new technologies with the idea of going always further, doing always better.

In aeronautics, improvements could be summarised by a few adjectives such as quicker, quieter, easier, cheaper and safer referring to the main preoccupations of these days.

One target is speed: carrying passengers and goods in minimum time. So the engines have to be more powerful and resistant, the structure has to be designed to be as streamlined as possible, the weight must be reduced.

Another aim is noise reduction, both inside the plane and mostly in and around airports. Engines have to be more silent and airports built in non-residential areas.

Making piloting and maintenance easier is also under study and commonality is developing fast. No more specialisation, mechanics and pilots will be more polyvalent and efficient on different planes. This method reduces time and cost. For passengers, better access to airports should be thought of and less waiting would be welcome. The departure times should be better organised and schedules respected.

Cost is a permanent worry as the price of fuel keeps rising. Engines should consume less, the fuel embarked should be calculated more stringently not to jettison too much kerosene before landing. This would make the maintenance of their fleet cheaper for airlines. From the point of view of the passengers, the fares would be reduced if bigger planes could carry more people. This is now well on the way with the A 380 and the likes of it.

Safety is a master word today and much is done to offer more security to passengers. As terrorism is on everyone's mind in this period, in airports and on board, more controls, searches should be carried out and more security personnel should be present. From the point of view of the state of the planes, more regular inspections should be scheduled to prevent technical failures. Computerised devices and tools greatly help mechanics in their task. Some of those technical improvements have simplified maintenance.

Many of the improvements suggested here are interdependent. Others could have been mentioned such as more comfort but those developed correspond to the concerns of the time. Improving is a normal evolution. Correcting and adjusting belong to the same process and should not be neglected.

(280 à 300 mots)