

MEASURING ABSORBED HUMIDITY IN A COMPOSITE MATERIAL

Main Technological Area —> Materials | Sensors

Keyword —> hygroscopic | humidity | honeycomb structure | polymer | composite

In aeronautics, like other kind of constructions, sandwich structures are often used, i.e. structures made up of two outer skins, separated by a very light core, generally made up of a honeycomb structure that separates them, allowing great flexural stiffness with a limited increase in weight.

The sandwich structure with honeycomb core is however vulnerable to a problem that may limit its service life, also reducing the reliability thereof: the possibility of liquid water entering the core. The problem of the entry of liquid water may occur when the skin has breakages (even at a microscopic level) that compromise the integrity, or even, for very thin skins, porosity. Thus, there is the need of making available a system for detecting the presence of free liquid water in sandwich structures.

TECHNICAL SPECIFICATIONS

The object of the invention is a system for detecting liquid water in a sandwich structure, the sandwich structure comprising two outer skins and a honeycomb core that rigidly interconnects the outer skins, and wherein a plurality of cells closed at opposite ends by the two outer skins are further configured to be in fluid communication with each other. The system also comprises at least one sensor placed within one of said cells, said sensor being sensitive to the presence of free liquid water, and a processing unit configured to receive an output signal provided by the sensor and to issue a warning in the event of the presence of free liquid water within said cells.

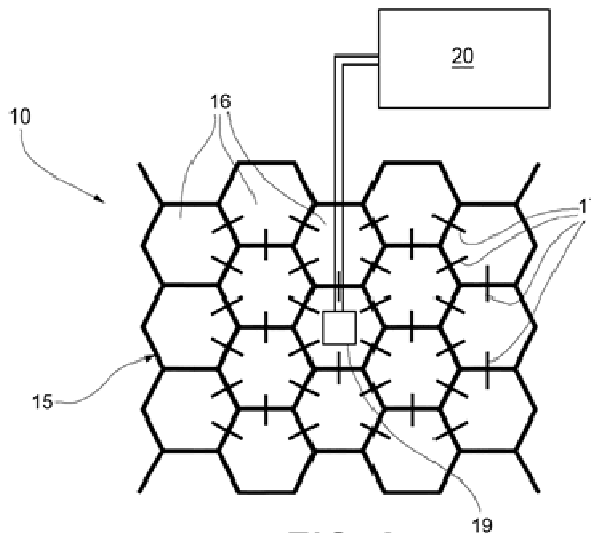


Figure 1 – Schematic cross-section view of a portion of a sandwich panel, fitted with a monitoring system

INNOVATIONS/ADVANTAGES

- Continuous and accurate detection of liquid water within the sandwich structure
- Certification process of the structures under conditions more advantageous than performing in-lab measurements
- Scalability of the solution for covering a more extended structure
- Increment of reliability and service life of sandwich structure, without frequent service interruptions for checks



FIELDS OF APPLICATION

<i>Aerostructures</i>	Materials for aeronautical components
<i>Building Automation</i>	Sandwich structures - floors/walls/foundation monitor and drainage system
<i>Automotive</i>	Car parts
<i>Railways/Marine</i>	Non-structural parts/chassis/cabins/hulls
<i>Environmental sensing</i>	Outdoor and garden structures, walls, tents

PATENT INFORMATION

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