COST ACTION CA17107

WG2 TEXTILES IN AUTOMOTIVE AND AERONAUTICS

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1. OBJECTIVES OF THE MEETING

Aims of the working session:

- Knowing the participants and their competences better for further project ideas and collaboration opportunities.
- Brainstorming to identify new project ideas.
- Establishing a roadmap for longterm actions of the Working Group.

2. PROJECT IDEAS

- Piezoresistive sensors- presence detections- printed
- Thermal regulation / phase change materials for interiors
- Textile sensors and fibres – semi conductive coatings for different functions
- Monitor the vital parameters – sensors in composites
- Sensor for delamination detection
- Sensor for self-healing materials
- New textile for interior design combined with functional elements
- Damage sensors- real time- inside composites
- Thermo insulation / regulation inside automobiles
- Integrate sensors in front panels for increased interactivity
- Development of lightweight materials
- Self-healting polymeric composites
- Lightweight structures
- Lightweight materials for metallic components
- Recyclability – increase the percentage
- Natural fibres reinforced polymers
- Increase the mechanical performance / toughness of composites
- Decrease the weight
- Higher durability – more durable textile materials – anti abrasion coatings
- Electro-active textiles – Motion
- Alive fabrics – fabrics able to change shape / colour / porosity
- Antimicrobial / self-cleaning coatings
- Parasites/bacterial detection

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- Self-cleaning / coating/ lotus effect- improve antimicrobial properties
- Multifunctional textiles – antimicrobial / flame resistance
- Antiseptic coating / fibres with antiseptic properties

3. ROADMAP

- **Long term roadmap: 3 project ideas decided by WG2 participants**
    - **WG2 - IDEA N°1 - Smart textiles for improving the passenger experience**
    - **WG2 - IDEA N°2 – Lightweight sustainable components based on bio polymers and natural fibres**
    - **WG2 - IDEA N°3 – Textiles smart composites to improve mechanical performance and monitor damage**

- **Short-term roadmap**

WG2 - IDEA N°1
WHY?

The main challenges will focus on the optimization of comfort via the integration of new textile fibres and structures with enhanced thermal performance, breathability and enhanced surface technologies using sustainable processes for selfcleaning, selfhealing, UV (Ultraviolet) and IR (Infrared) reflection properties with emphasis on the integration of ICT and ubiquitous sensing and actuation functionalities to develop new interactive surfaces and new self-lighting surfaces textile structures.

WHAT? Description of the action(s)
The main topics are:
- Antimicrobial / antiseptic / easy cleaning
- Flame retardancy
- Thermal management / PCMs
- Self-healing
- Vital parameters
- Colour change materials / shape change materials

WITH? Partners, equipment, fundings,…
Check for interested partners.

WG2 - IDEA N°2
WHY?

For the automotive and aeronautic sectors the main challenges focus on the integration of new sustainable fiber and polymers. Also incorporating new yarn functionalities in order to overcome some of the drawbacks of the use of natural based materials in terms of performance, durability and reproducibility and development of new 3D textiles for reinforcing structures for composite components and parts.

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WHAT? Description of the action(s)
The main topics are:
- Recyclability
- Lightweight
- Thermoplastic composites

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WG2 - IDEA N°3
WHY?
Develop new high performance composite structures for automotive and aeronautic applications, high thermal performance and an ability to adapt to external conditions with an outstanding and inclusive design. The main challenges focus on the integration of fully integrated and printed electro active and interactive sensors and actuators that enable the development of ubiquitous sensing and interactive surfaces, while also integrating fully embedded (or printed and/or fibre and yarn integrated) haptic feedback systems via both lighting integration and mechanical stimuli responses and integration of fully customizable self-lighting materials based on active fibres and yarns, and integration or programmable textile matrixes for interactive sensing.

Moreover auxetic fiber based structures will be develop to improve impact absorption capability of the structural components while piezoresitive sensors will be integrated in the fibrous structure to monitor damage extension and location. This information will be used to activate the self-healing capabilities of the composite materials in order to automatically repair the damaged components.

WHAT? Description of the action(s)
The main topics are:
- Self-healing
- Sensing
- Auxetic structures
- Piezoresistive sensors

WITH? Partners, equipment, funding,…
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