GRASS: FLAME RETARDANT ARTIFICIAL TURF: SAFE AND SUSTAINABLE

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ABSTRACT

Artificial grass is mainly composed of organic polymers with a consequent potential fire hazard. However, the behaviour of artificial grass in case of fire has been poorly studied and is thus misunderstood.
The GRASS project has two objectives: informing the public that natural turf has a different fire behaviour than artificial turf and improving fire behaviour of artificial turf by developing innovative, eco-friendly and industrially applicable processes.
In the project, constant consultations take place with a resonance group of stake holders represented by producers, installers, sports organisations, governments and end users.
The involvement of the resonance group is sufficient guarantee that the new processes emanating from this project will be acceptable for all actors involved in the artificial turf sector (from production and end usage to recycling) and that they will be put into practice.

Key Words: artificial turf, flame retardancy, sustainability

1. INTRODUCTION

The European market for artificial grass is currently of ± 50 million square meters per year with an annual growth ranging from 12 to 15%. But contrary to the self-extinguishing character of natural grass, artificial turf is flammable as it is mainly composed of organic polymers. Thus, fire hazard is important, with potentially consequences on human beings, buildings and the environment. Moreover, the fire behaviour of artificial grass is sometimes neglected considering outdoor applications (sport stadiums and landscaping).
Currently, protection against fire is mainly obtained by the incorporation of sand into the artificial grass structure, and occasionally using a damping infill material fire retarded with halogenated compounds. However, halogenated derivatives are suspected to present health toxicity, some of them already being banned. On the other hand, the presence of sand complicates the recycling of artificial grass as it can hardly be removed from the structure.
The actual solutions are thus not fully satisfactory motivating the present research work.
The scientific objective of the GRASS Interreg FWVL project is to improve the fire behaviour of artificial grass developing innovative and environmentally-friendly processes that can be applied industrially.
The objective towards the society is to inform public and other stake holders like governments, fire brigades, sport organisations,

2. METHODS

2.1 Study of fire behaviour of existing artificial turf

As a bench mark for the project a database is set up of over 20 different structures which were all tested according EN ISO 9239. The data obtained were analysed towards the contribution of each layer and the structure as a whole. The behaviour of the different types of artificial turf could be examined. The optimum design was studied.

2.2 Development of a bench scale test

Fist an evaluation of the properties of each layer is made using mass loss calorimetry according to the ISO 13927 procedure. With the results the kinetics and degradation mechanism could be analysed. Next a bench scale test was developed. This test is needed to allow a fast screening of the materials.

2.3 Improvement of FR properties of the artificial turf

The partners involved in the project will investigate the different solutions to improve the FR properties of the artificial turf. Various ways will be studied such as mass modification, development of FR fibres and development and use of FR infill, leading to the development of eco-friendly flame retardant material. The interaction between UV stabilizer and FR additives will be evaluated.
Yarns using the flame retardants will be extruded and small scale artificial turf will be produced to evaluate the results.

2.4 Sustainability of the proposed approach

The sustainability of the proposed approach is followed close by using Life Cycle Analysis and keeping in mind the recycling of the developed artificial turf.

2.5 Feasibility of the results

A resonance group with stake holders such as industrial companies, governments, fire brigades, sport organisations will evaluate the feasibility and applicability of the proposed improvements. Only those positively evaluated will be used in the small scale tests.

2.6 Communication

Project results will not only be communicated via publication in scientific magazines or contributions in congresses, but also towards the broader public and by workshops for the stake holders.