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(51) INT CL:
B32B 3/24 (2006.01) **B32B 5/28** (2006.01)

(56) Documents Cited:
WO 2005/021853 A2 **US 20090075039 A1**
US 20070196681 A1 **US 20040229043 A1**
US 20040219335 A1 **US 20040161597 A1**

(58) Field of Search:
INT CL **B32B**
Other: **WPI, EPODOC, RM26, RM25**

(54) Title of the Invention: **'Hessix' natural fibre laminate**
Abstract Title: **Natural fibre laminate**

(57) A natural fibre laminate which is a low cost laminate material with properties such as high tensile strength, excellent impact resistance and blast absorption It is lightweight and is easier to work with, all of which can be beneficial in a wide variety of applications and replace fibreglass/GPR and carbon fibre laminates. The laminate is made from layering or "sandwiching" natural fibres (such as hemp, linen, bamboo, coco fibre, palm leaves, cotton, silk, jute or hessian) with a core mesh material made from metal or other man-made materials. The layers are bound with a resin such as phenol resin, epoxy resin, fluorine resin, or acrylic resin. Oil-free or recycled resins may be used.

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'Hessix' Natural Fibre Laminate

DESCRIPTION

BACKGROUND:

This invention relates to the manufacture of high impact and stress resisting laminates from a combination of resins or compounds with reinforced, woven and non-woven natural fibre cloth. The name of the laminate material is "Hessix".

STATEMENT OF INVENTION:

The invention is for the production and manufacturing of laminate material using sheets of cloth made from natural fibres such as: hemp, linen, bamboo, coco fibre, palm leaves, cotton, silk, jute or hessian. These natural fibres replace materials such as those used in fibreglass/GPR or carbon fibre but the production and manufacture of the Hessix natural fibre laminate material utilises similar resin or compounds as are normally used in the production of fibreglass/GPR or carbon fibre laminated materials.

To add tensile strength, absorb high impacts, retain shape under high pressure and to resist stress from any direction, a layer of metal or manmade material mesh is placed at the core or "sandwiched" between the sheets of natural fibre.

The manufacturing process sees one or more natural fibre cloths/sheets impregnated with resins or binding compounds, then the metal or manmade core material (mesh) is added to the impregnated natural fibre cloths/sheets and then further layers of impregnated natural fibre cloths/sheets are added.

To create a strong bond or create a variety of shapes of the Hessix natural fibre laminate material, high pressure heat or vacuum is applied. This aspect of the manufacturing process needs to ensure high penetration and the minimisation/elimination of air pockets to achieve a high tensile strength of the Hessix natural fibre laminate material.

As part of the manufacturing process, a variety of colours/dyes can be added to the binding materials, natural fibres or surface of the Hessix natural fibre laminate material to produce a laminate in a desired colour or shade.

Resins such as Phenol resin, Epoxy resin, Fluorine resin, Acrylic resins or similar (or any mixture or combination thereof) may be used in the manufacturing process. In order to retain the environmentally friendly credentials of the Hessix natural fibre laminate material, a variety of oil free resins or resins made from recycled materials would be the preferred choice of binding material.

ADVANTAGES:

This Hessix natural fibre laminate material has an advantage over existing laminates as it is environmentally friendly, can be manufactured at a lower cost than comparable materials and with a high tensile strength.

On high impacts such as direct blows, the natural fibres used in the Hessix natural fibre laminate material will not shatter unlike, for example, the glass fibres used in fibreglass/GPR laminates. Further, natural

fibres have certain advantageous elastic qualities unlike, for example, carbon laminates. The mesh core of the Hessix natural fibre laminate material gives a superior shape retaining quality and added strength.

The superior properties achieved from the Hessix natural fibre laminate material can be applied in the construction, aerospace, furniture, blast absorption, automotive sectors and renewable energy systems (for example, turbines). The Hessix natural fibre laminate material has an advantage in marine applications, tidal and hydro power systems, which benefit from the use of bamboo as the natural fibre having a degree of algae growth resistance.

Hessix natural fibre laminates have an advantage over fibreglass/GPR laminates as they are easier to work with. Hessix natural fibre laminates have far less tendency to splinter and the tools and instruments used to work with Hessix natural fibre laminates are not blunted unlike, for example, the blunting caused by the glass present in fibreglass/GPR laminates, and no specialised tools are needed to work with Hessix natural fibre laminates.

Hessix natural fibre laminates are lighter than, for example, fibreglass/GPR laminates and less mass is needed to achieve an equivalent tensile strength.

To achieve a high material strength or to withstand especially high impact(s) the size, thickness or actual core material (mesh) of the Hessix natural fibre laminate can be chosen to suit the purpose of the required application. Similarly, the mixture or combination of different natural fibres used in the Hessix natural fibre laminate can be chosen to suit the purpose of the required application.

Natural fibres can be spun, woven or placed in differing styles, thicknesses, densities, combinations and mixtures to achieve stiffness, flexibility, durability, visual impact or certain fire or blast resistant properties of the Hessix natural fibre laminate.

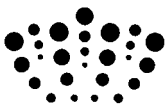
SYNONYMS AND ACRONYMS:

Natural fibre laminate, Natural fibre composite, Natural fibre resin, Hessix.

'Hessix' Natural Fibre Laminate

CLAIMS

- 1) The Hessix natural fibre laminate made from layering/"sandwiching" natural woven or non-woven fibres with a core material (mesh) made from metal or other man-made materials will have a wide range of applications to replace fibreglass/GFR and carbon fibre laminates.
- 2) Hessix natural fibre laminates are environmentally friendly and can be carbon neutral and made from renewable sources, as most natural fibres are taken from re-growing plants without the need of replanting.
- 3) The Hessix natural fibre laminate can be manufactured at a lower cost than laminates with similar properties, for example fibreglass/GFR and carbon fibre laminates.
- 4) The Hessix natural fibre laminate has a high tensile strength, excellent impact resistance and blast absorption properties, is lightweight and is easier to work with.
- 5) By modifying the natural fibres and core material (mesh) of the Hessix natural fibre laminate it is possible to tailor the properties of the material to specific applications.



Application No: GB1110790.1

Examiner: Mr Rhys J. Williams

Claims searched: 1-5

Date of search: 28 September 2011

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-5	US 2007/0196681 A1 (BIGGS) See paragraphs [0056] & [0057] particularly.
X	1-5	WO 2005/021853 A2 (FREUDENBERG) See WPI abstract no. 2005-241957 particularly.
X	1-5	US 2004/0161597 A1 (DI SANTE) See paragraph [0012] particularly.
X	1-5	US 2004/219335 A1 (FUSCO) See paragraph [0062] particularly.
X	1-5	US2004/0229043 A1 (SPOHN) See paragraphs [0041] & [0042] particularly.
X	1-5	US 2009/0075039 A1 (OULD BOUGRISSA) See paragraph [0026] particularly.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

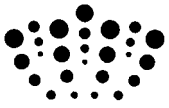
Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

B32B

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, RM26, RM25



International Classification:

Subclass	Subgroup	Valid From
B32B	0003/24	01/01/2006
B32B	0005/28	01/01/2006