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SURFACE COVERING COMPOSITIONS

This invention relates to surface covering compositions, for example for use on floors, walls and ceilings, and particularly to such compositions based on flexibilised cement.

Surface covering compositions based on flexibilised cement, especially rubber-modified cement, are known. Such compositions are useful to provide a corrosion-resistant level surface on uneven sub-surfaces and are particularly useful for covering the metal framework surfaces inside ships, especially ship decks, but they may be used on other sub-surfaces, e.g. the floors of factories and other buildings.

For some applications it is now desired to improve the flame-resistance of such coverings, particularly when used inside ships. Various materials are known to confer flame-resistance or flame-retardancy when incorporated in some polymer compositions; however, it is difficult to find a material which not only confers flame-resistance but also can confer this property when employed in a small amount and does not confer undesirable properties (e.g. toxicity) or reduce the desirable mechanical properties of the covering.

The present invention comprises a flame-resistant flexible surface-covering composition comprising cement, rubber and aluminium hydroxide.

The cement may be any hydraulic cement, e.g. portland or high-alumina cement or a mixture of them.

The rubber may be natural or synthetic or both but is preferably natural rubber. Usually it is employed in the form of a latex containing the usual additives such as stabilising and vulcanisation ingredients, especially cold-curing ingredients. Alternatively, vulcanisation ingredients may be incorporated separately.

The composition preferably also contains stone particles such as gravel and/or sand. An example of a suitable stone particle size is up to about 3 mm across.

It may be desirable also to include a small amount

of additional water in the composition.

Preferably the aluminium hydroxide, also known as alumina trihydrate, is the ortho form. Alternatively or additionally, the meta form, e.g. that occurring naturally as bauxite, may be employed.

The aluminium hydroxide in the composition has the desirable properties that it is flame-retardant, non-toxic and stable at normal temperatures such as those occurring inside ships, it decomposes endothermically at elevated temperatures and thereby removes heat from the environment, and its decomposition products are non-toxic and non-flammable and indeed include water vapour which dilutes the oxygen in the environmental air. Moreover, it is found surprisingly that it improves mechanical properties of the covering, especially the strength properties, and enables a reduction of the proportion of stone particles, especially fine sand grains, which are conventionally employed.

Only a relatively small amount of aluminium hydroxide is necessary. The minimum amount depends on the amount of rubber in the composition. A preferred weight ratio of aluminium hydroxide to rubber is at least 0.5:1, for example 0.2 parts of aluminium hydroxide to 1 part of rubber latex containing 40% rubber. The upper limit of the proportion of aluminium hydroxide present may be determined by economic considerations, ease of processing and the mechanical properties desired.

A suitable method of production of the composition is by dry-mixing the cement with the aluminium hydroxide and then mixing the product with rubber latex and, if desired, stone particles and/or additional water.

The composition possesses the advantages that it has good adhesion to steel, it is capable of application in a thin layer e.g. up to about 3 mm, it has good flexibility and high bending strength, it is non-toxic, it is corrosion-resistant, and it has good flame-resistance. The composition can be formulated to meet the high standard of flame-resistance set by the IMCO Res.A 214 (VII) test.

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The composition is particularly suitable for levelling uneven surfaces such as those resulting from the weld seams and rivet heads in ship deck frameworks. If desired, a hard-wearing and/or decorative top surface covering, e.g. vinyl polymer tiles or sheet, may be applied to the covering of the invention.

The invention is illustrated by the following Examples.

EXAMPLE I

A covering composition was made up from the following constituents:

16 kg of a dry mix consisting of:

12.5 kg cement mix (portland cement and high alumina cement)

3.5 kg aluminium hydroxide (ortho)

5 kg stabilised natural rubber latex (40% rubber)

50 kg gravelly sand (diameter up to 3 mm)

ca.3 kg water, the exact amount of which depends on the moisture content of the gravelly sand.

The covering resulting from this composition adhered well to steel and had a high bending strength and flexibility. The strength characteristics were better than those of a covering without added aluminium hydroxide. The covering satisfies the requirements specified for a flame-retardant covering.

EXAMPLE II

A covering composition was made up from the following constituents:

19.5 kg dry mix, consisting of:

12.5 kg of the cement mixture referred to in Example I

7 kg aluminium hydroxide (ortho)

5 kg stabilised natural rubber latex (40% rubber)

50 kg gravelly sand (diameter up to 3 mm)

ca.3 kg water

The properties of the covering resulting from this composition were comparable with those referred to in Example I.



CLAIMS:

1. A flame-resistant flexible surface-covering composition comprising cement, rubber and aluminium hydroxide.
- 5 2. A composition according to claim 1 in which the aluminium hydroxide comprises ortho aluminium hydroxide.
3. A composition according to claim 1 or 2 in which the weightratio of aluminium hydroxide to rubber is at
10 least 0.5:1.
4. A composition according to any of the preceding claims which comprises also stone particles.
5. A composition according to claim 4 in which the stone particles comprise gravel and/or sand.
- 15 6. A composition according to any of the preceding claims comprising a lower proportion of fine stone particles than is present in an equivalent composition which does not contain aluminium hydroxide.
7. A composition according to any of the preceding
20 claims in which the rubber consists of or includes natural rubber.
8. A composition according to any of the preceding claims in which the rubber is incorporated in the composition as a latex.
- 25 9. A composition according to any of the preceding claims comprising ingredients for vulcanisation of the rubber.
10. A composition according to any of the preceding claims in which the cement is portland or high-alumina
30 cement or a mixture of them.
11. A composition according to any of the preceding claims comprising water.
12. A flame-resistant flexible surface-covering composition substantially as described in either of the
35 foregoing Examples.
13. A composition according to any of the preceding claims when applied to level an uneven surface.
14. A composition according to any of the preceding



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claims when applied to a steel surface.

15. A composition according to any of the preceding claims when applied to a surface inside a ship.

16. A composition according to any of the preceding claims when applied to a ship deck.

17. A method of producing a surface-covering composition according to any of the preceding claims in which cement and aluminium hydroxide are dry-mixed and then the product is mixed with rubber latex and, if desired, stone particles and/or additional water.

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