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(54) **Wall reinforcing strip**

(57) The object of the invention is a wall reinforcing strip, which is a perforated metal strip (1), where perforations cover 20 to 80%, preferably 40% of the surface area of the metal strip (1), and the thickness/width ratio of the metal strip (1) is maximum 1/30, preferably 1/100. The edges of the metal strip (1) are equipped with toothings (3), the perforations are uniformly distributed and circle-shaped.

The wall reinforcing strip is characterized by that the perforations are arranged in rows (2), their size is the same by row, and the location of the rows (2) is symmetric.

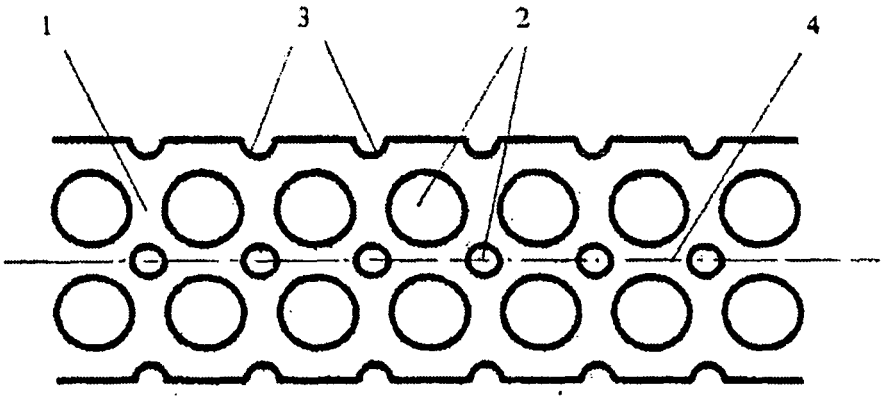

Figure 1

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Description

[0001] The object of the invention is a wall reinforcing strip for use in the construction industry, which wall reinforcing strip is a perforated metal strip, where perforations cover 20 to 80%, preferably 40% of the surface area of the metal strip, and the thickness/width ratio of the metal strip is maximum 1/30, preferably 1/100.

[0002] Perhaps the most important task of construction works is to construct walls for houses/buildings capable of carrying the future loads in the long term. One of the biggest problems of construction is that the stability of large-surface partition walls is often unsatisfactory. Another often occurring problem is that in certain parts of building-walls (e.g. corners, junctions, areas around doors and windows) the load differs from that of the other wall sections, therefore cracks may occur in these parts.

[0003] At present prestressed soft-iron wires are used most frequently to increase the stability of walls. The disadvantage of the use of soft-iron wires is that their proper placement on the wall elements, especially the proper prestressing, uniform distribution, and fixing of the wire is difficult, as the smooth-surface wire easily slips in the binding material - mortar. The drilling - dowelling required for proper fixing is generally omitted due to the significant additional work. Another problem is that, depending on the load the given wall part will be subjected to, the load-carrying capacity of a single prestressed wire placed in every other row in accordance with the regulations is generally insufficient.

In summary: the application of the soft-iron wire wall reinforcement used in practice is difficult, complicated, often faulty and in many cases inadequate.

[0004] Utility model No. U0500157 discloses a metal strip reel, where the metal strip has projections. The metal strip has several coils, and a retaining device securing the reel against unwinding at the free end, which forms a releasable connection between a first point close to the free end of the metal strip and a second point in a metal strip segment, which is part of a different coil, or a point on the spool. The formed connection is a shape-mated connection, where the retaining device comprises two spatially separated functional ends, the first end comprises a lug ring, which snugly accommodates the entire width of the metal strip and catches a projection of a first coil of the metal strip. The second end of the retaining device comprises a hook, which latches into a second projection of a second coil of the metal strip. The product according to the model is for use mainly in packaging equipment.

[0005] The aim of the invention is to provide an alternative solution multiplying the advantageous effects of soft-iron wire wall reinforcement, minimizing the potential for errors as a result of the simpler technology, and having other advantageous characteristics: because of its strip form it has high transverse stability in itself, therefore prestressing is not required, due to its featured surface it is fixed well in the mortar even without nailing or dowelling, and the large material cross-section achievable with a thin design results in an extreme load-carrying capacity, allowing multi-purpose application (partition wall reinforcement, application as a joining element in junctions, and the reinforcement of load-bearing wall sections carrying different loads). It is simple to use as a joining element in junctions, it ensures a very stable connection between the wall elements. The strong fixing in mortar and the high load-carrying capacity makes it especially suitable for taking the tensile and shear forces arising during any later wall displacement, therefore by proper design, by applying it in the whole structure, buildings can be made earthquake-proof by means of the wall reinforcing strip.

[0006] The invention is based on the recognition that the resulting stability of sandwich structures made of materials having different properties is better than that of the components separately. The tensile and bending strength of traditional wall materials (ceramic and other bricks, gas concrete products) is far lower than their other properties (e.g. compressive strength), on the other hand metal strips have good tensile loadability as well. A typical sandwich structure is composed of two layers capable of withstanding high tensile forces, and a core of high compressive strength embedded between them. In walls constructed this way bending in the vertical direction due to non-uniform load changes into a tensile force at points further away from the force, which is easily bearable for both a strip and a properly sized stressed wire. Forces acting perpendicularly to the plane of the wall are much more dangerous, as here even a small displacement of a not properly prestressed wire slipping in the mortar may lead to the formation of cracks.

The wall reinforcing strip according to the invention significantly increases the stability of walls because:

- its load-carrying capacity is the multiple of that of the generally used wires (typically 5-10 times higher)
- the amount and size of the perforations is such that mortar of any grain size or adhesive can set through the perforations, and this in itself, and by means of the toothings along the edges of the strip prevents the slipping, displacement of the metal strip.
- the strip can considerably withstand bending forces acting on its edges even in itself, and embedding between the wall elements significantly strengthens this property by preventing buckling on the force side.

[0007] At the junctions of walls both the reinforcement of the junctions and the construction of individual joints in the junctions is possible with the application of the wall reinforcing strip. The wall reinforcing strip is especially suitable for this task because it can be well embedded in any type of mortar and adhesive, it is highly resistant to tensile and shear forces, thereby it allows the formation of a stable connection between the wall elements.

[0008] Thus the object of the invention is a wall rein-

forcing strip, which is a perforated metal strip, where perforations cover 20 to 80%, preferably 40% of the surface area of the metal strip, and the thickness/width ratio of the metal strip is maximum 1/30, preferably 1/100.

The perforations can be of any shape, e.g. circle, oval, square, rectangle, but preferably they are circle-shaped. The size of the perforations can be varying, e.g. for circle-shaped perforations the perforations can be of different diameters. The location of the perforations on the metal strip is arbitrary, it can be asymmetric or symmetric, but preferably the location of the perforations is symmetric. The material of the metal strip is preferably surface-treated high strength steel plate.

[0009] According to a preferred embodiment the two edges of the metal strip are equipped with toothings, the teeth are preferably at equal distances from each other, furthermore the perforations are uniformly distributed and arranged in rows on the metal strip. The size of the perforations is preferably the same by row. The location of the rows is symmetric, with the proviso that one row is along the axis of symmetry of the metal strip.

[0010] According to another embodiment the number of rows of perforations on the wall reinforcing strip is three, and the rows are arranged in such a way that the diameter of the middle row of perforations located along the axis of symmetry of the wall reinforcing strip is smaller than the diameter of the perforations of the outer rows. The two edges of the metal strip are equipped with toothings. The perforations and toothings are axially symmetric and the number of axes of symmetry is two by repeated pattern unit, furthermore rows of different perforations are shifted symmetrically compared to each other in such a way that the perforations of rows of larger perforations are in line with each other and the perforations of the middle row are in line with the teeth of the toothings. The smallest widths of the plate parts remaining between the perforations of the middle perforated row and the nearest larger perforations are equal, as the proper strength/load-carrying capacity of the wall reinforcing strip can be ensured only this way. In the embodiment the smallest distances between the adjacent perforations in any direction and the distances of the perforations of the two larger perforated rows from the edges of the metal strip are equal.

[0011] The invention is presented in Figure 1 showing a top view of an embodiment of the wall reinforcing strip according to the invention.

In Figure 1 the perforations on the metal strip 1 are arranged in three rows 2 in such a way that a row 2 of smaller diameter is in the middle, along the axis of symmetry 4 of the metal strip 1, and two rows 2 of larger diameter are on the two sides of the middle row 2. The edges of the metal strip 1 are equipped with toothings 3, the distances between the teeth are the same. It can be seen that the perforations and the toothings 3 are axially symmetric and the number of axes of symmetry is two by repeated pattern unit. The rows 2 of different perforations are shifted symmetrically compared to each other in such a way that the perforations of rows 2 of larger perforations are in line with each other and the perforations of the middle row 2 are in line with the teeth of the toothings 3.

From the point of view of the strength of the wall reinforcing strip the location of the perforations compared to each other is important. Therefore the smallest widths of the plate parts remaining between the perforations of the middle perforated row 2 and the nearest larger perforations are equal. The distances of the perforations of the two larger perforated rows 2 from each other and from the edges of the metal strip 1 are also equal.

[0012] In the application of the wall reinforcing strip according to the invention the wall reinforcing strip is laid on a binding material applied to the appropriate wall part. As coarser mortar or even concrete can set through the perforations of larger diameter, the binding force between the wall elements is not reduced, at the same time the wall reinforcing strip is embedded in a stable manner. The thickness of the invention allows application in a very thin (even 1 to 2 mm) layer of adhesive mortar as well.

The toothings 3 of the edges of the metal strip 1 prevent the slipping of the joint, even if there is not enough binding material on the surface of the wall reinforcing strip, or the made interstice is too narrow.

The middle row 2 of smaller diameter allows fixing either with wire, by nailing or screwing.

Any traditional plate shears are suitable for cutting the wall reinforcing strip.

[0013] If the purpose of the use of the wall reinforcing strip according to the invention is the reinforcement of wall junctions, the ensuring of a stable connection between wall elements, then preferably a piece of wall reinforcing strip shall be placed in each row of the connecting wall in such a way that it is embedded in both walls to an appropriate depth (min. 2/3rd of the wall thickness).

[0014] A wall reinforcing strip made of surface-treated high strength steel plate can withstand a tensile force of minimum 5000 N (a load-carrying capacity of about ½ ton), this roughly corresponds to the performance of a 4 mm thick soft-iron wire.

[0015] For the construction of partition walls it is recommended to place the product according to the invention in a mortar bed along the whole length of the wall in at least every other row.

[0016] For the construction of earthquake-proof buildings the wall reinforcing strip shall be applied in the whole structure, in a bearing wall of average size even 2 to 3, or more wall reinforcing strips per row shall be placed between the wall elements beside each other in parallel. For such purposes the application of wall reinforcing strips with increased load-carrying capacity may be justified.

[0017] In the construction industry the product according to the invention can be used as a traditional suspension strip, as the middle perforated row 2 allows fixing with wire, or by nailing, and the structural design of the invention facilitates bending without breaking, and allows

screwing.
The product according to the invention can also be applied embedded directly in the adhesive under floor tiles, with its use the breaking of floor tiles mainly above expansion gaps and foundation cracks can be prevented.

[0018] The product according to the invention is in the form of a reel before use, thus its delivery and storage is simple and requires little space.

[0019] The wall reinforcing strip according to the invention is an important addition to walls constructed of traditional wall materials, applied in a sandwich structure it significantly increases the stability of walls, and as a junction element it joins the connecting walls to each other in a stable manner.

List of references

[0020]

1 metal strip
2 row
3 toothing
4 axis of symmetry

Claims

1. A wall reinforcing strip, wherein the wall reinforcing strip is a perforated metal strip (1), where perforations cover 20 to 80%, preferably 40% of the surface area of the metal strip (1), and the thickness/width ratio of the metal strip (1) is maximum 1/30, preferably 1/100.

2. The wall reinforcing strip according to claim 1, wherein the edges of the metal strip (1) are equipped with toothings (3).

3. The wall reinforcing strip according to claims 1 or 2, wherein the perforations are uniformly distributed and circle-shaped.

4. The wall reinforcing strip according to any of claims 1 to 3, wherein the perforations are arranged in rows (2) and their size is the same by row.

5. The wall reinforcing strip according to claims 1 to 4, wherein the location of the rows (2) is symmetric, with the proviso that one row (2) is along the axis of symmetry (4) of the metal strip (1).

6. The wall reinforcing strip according to claims 1 to 3, wherein the number of rows (2) is three.

7. The wall reinforcing strip according to any of claims 1 to 6, wherein the diameter of the perforations of the middle row (2) is smaller.

8. The wall reinforcing strip according to any of claims 1 to 7, wherein the perforations and the toothings (3) are axially symmetric and the number of axes of symmetry is two by repeated pattern unit, furthermore rows (2) of different perforations are shifted symmetrically compared to each other in such a way that the perforations of rows (2) of larger perforations are in line with each other and the perforations of the middle row (2) are in line with the teeth of the toothings (3).

9. The wall reinforcing strip according to any of claims 1 to 8, wherein the smallest widths of the plate parts remaining between the perforations of the middle perforated row (2) and the nearest larger perforations are equal.

10. The wall reinforcing strip according to any of claims 1 to 9, wherein the distances of the perforations of the two larger perforated rows (2) from each other and from the edges of the metal strip (1) are equal.

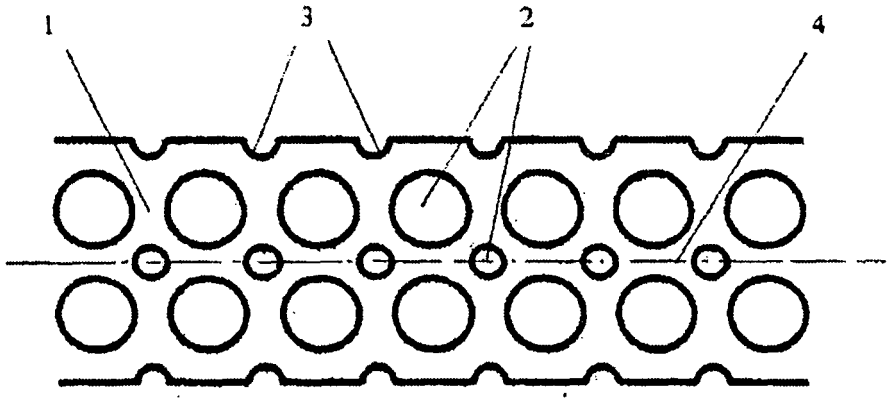

Figure 1