A LINTEL AND STIFFENER

Background and Field

This application relates to a lintel and a stiffener for building construction. A lintel is used to support a load over an opening in masonry walls and a stiffener for use to support masonry walls.

Traditionally stiffeners and lintels are made of concrete or steel. Concrete lintels are heavy to transport and install while steel lintels, though lighter in weight, have issue with fire resistance and water seepage.

The object of the present application to provide a stiffener and lintel which addresses the disadvantages of the concrete or steel stiffeners and lintels.

Summary

The present application incorporates a steel hollow section encased in lightweight concrete.

The application comprises:

(1) An aerated lightweight concrete outer layer made from fly-ash and slag and added gas foam to protect the inner steel hollow section.

(2) A steel hollow section inner layer to give structural support and efficient transfer of wall board loads and wind loads and to provide needed connection surface between the wall boards.

(3) An adjustable top and bottom base plate to allow for flexibility to cater to different height configurations, and

(4) Fibreglass mesh between inner steel hollow section and outer aerated lightweight concrete layer to give added bonding between the lightweight concrete and steel hollow section and strengthen the tensile properties of the lightweight concrete.

(5) Fire-resistant materials.

The present application also provides a lintel or stiffener with a steel hollow section as a core and protected and encased by aerated lightweight concrete. In the lintel or stiffener, deformation can be formed on profile. The deformation can also be formed on lightweight concrete. The aerated lightweight concrete can have rebar or FRP (Fibre reinforcement polymer). The deformation can be any type of FRP with lightweight concrete. The deformation can be of steel or size.

Advantages

The application brings together benefits of steel and aerated lightweight concrete in one composite product.

The advantages of this application are;

(1) The new product is sustainable and environmentally friendly as the aerated lightweight concrete are made from recycled material.

(2) The outer lightweight concrete encasing the inner steel hollow section, can be a finished wall by itself or if other finishes is needed, provides a good base for other material.

(3) The lightweight concrete is able to bond with the structure and other walls

(4) The inner steel hollow section, being encased in lightweight concrete, is protected while at the same time provides the structural support for the wall.

(5) The adjustable steel top and bottom base plate enables adjustment of the product to accommodate and different length, width and height allowing for great flexibility to suit site conditions.

(6) The whole assembly is lightweight to enable ease of transport and installation.

Brief Description of the Drawings

An embodiment of the application will now be described, by way of example, with reference to the accompanying drawings in which,

Figure 1 is an end view of a lintel and stiffener according to a preferred embodiment of the present application;

And Figure 2 shows internal structure of Figure 1 and structural design and excellent fire rated of present application;

Figure 3 shows an end view of a variation of the preferred embodiment of Figure 1 which is adapted to support building units of a different dimension.

Detailed Description of the Preferred Embodiment

LINTEL AND STIFFENER mainly used for the connection between internal and external building wall and upper load of door and window's opening, reflecting the stability of the building wall and systematic and integrity.

Figure 1 shows the section of the application illustrating the installation method of the application as a stiffener to support a vertical wall between a high level reinforced concrete ("RC") beam and a RC floor slab 100.

Present application utilizes GGBS LIGHTWIEIGHT CONCRETE as the surface layer(101), the steel hollow section(102) is used as the transmit structural forces, adjustable top plate(103,106) and adjustable base plate(103,106) can be inserted into the steel hollow section(102) used for regulating height, adjustable top plate(103,106) consists of steel hollow section and iron plate fused together. Adjustable base plate (103,106) consists of steel hollow section and iron plate fused together. And after being adjusted to an appropriate height, steel hollow section (102) adjustable top plate (103,106) and adjustable base plate (103,106) are fixed by the bolts (105). Fix and tighten the top plate and base plate with expansion bolts (105) on the surface of the building structure so that it may play a role in solid forces. When LINTEL AND STIFFENER in factory, first of all to stay out of each 100mm gap, there is only steel hollow section and no GGBS lightweight concrete. After the lintel and stiffener and wallboard have installed, so that can be directly applied to cement grouting (104) of structure, in order to achieve stability of the whole structure and tight binding between lintel and stiffener and wallboard. Vertical height of STIFFENER of the application can maximize the reach 12meters, and horizontal can be add Lintel by actual needs. LINTEL AND STIFFENER connects with welding or expansion bolts (105) as an integration. Bonding lintel and stiffener to structure concrete with expansion bolts directly. It becomes an integration, place L bracket in accordance with technical standards for the construction when wall construction. This bracket connects steel hollow section (102) with self-tapping screws can be scored into stiffener directly. Its function is to more effective connection between wall and stiffener. Strengthening the integrity of the wall.

Figure 2 detailed section of the lightweight lintel and stiffener.

In use, the surface layer (107+101) of the present application is synthetized by fiberglass mesh (107) and GGBS LIGHTWIEIGHT CONCRETE (101), a combination of both (107,101) leading to the reinforced bond performance with steel hollow section (102). The section also shows the inner fire rated (108) of the steel hollow section (102), use for fire rated enhance of lintel and stiffener. By adding the inner fire rated (108) prolong the fire rated period effectively.

Figure 3 shows that the section of the adjustable top and bottom base plate (103, 106) structure and use. Adjustable top and bottom base plate (103, 106) can effectively solute and adjustable in the installation problems caused by adjusting the height difference. The steel hollow section (103) with base plate (106) can be insert to hollow section (102) to adjust top and bottom plate (106). To achieve construction buildability.

CLAIMS

(1) A lintel with a steel hollow section as a core and protected and encased by aerated lightweight concrete;

wherein the lintel comprises an adjustable top plate and an adjustable base plate.

(2) A lintel according to claim 1, wherein a profile of the lintel is deformable.

(3) A lintel according to claim 1 and 2 wherein the lintel comprises a lightweight concrete providing the profile.

(4) A lintel according to claim 3, wherein the lightweight concrete comprises rebar.

(5) A lintel according to claim 2, wherein the lightweight concrete comprises fibre reinforcement polymer.

(6) A lintel according to claim 1, wherein the lintel is deformable in size.

(7) A lintel according to claim 1 further comprising an expansion bolt for fixing the adjustable top plate and the adjustable base plate.