One solution for two structural problems in slabs

Invention aims to protect concrete slabs from expansive soils and decrease heat loss

A variety of inventions has contributed to the art of casting concrete slabs. Each of the previously patented inventions has attempted to solve either the problem of slab movement due to soil expansion or the problem of heat loss through a slab, but they have not provided a single solution to both of these problems.

Inventor Daniel P. Gallagher Jr. of Niwot, Colo., has now patented a lightweight rigid slab assembly that can be used over expansive soils without movement or damage to itself or to interior walls resting on the slab. It also provides thermal insulation to substantially reduce heat loss through the slab.

Titled simply the "Insulated Concrete Slab Assembly," Gallagher's invention uses several different form patterns, making it flexible enough to use in many different applications.

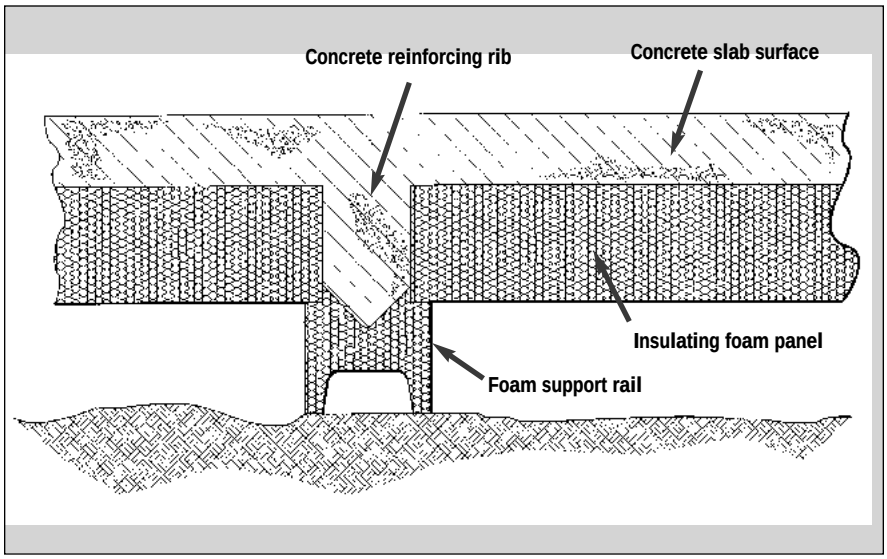
Construction of Gallagher's cast-in-place invention results from concrete placement into thermally insulating preshaped forms made of a material such as foamed polymer. The shapes of the forms cast strengthening ribs directly into the slab. Members, resting on the soil, support workers and fresh concrete during placement. After the concrete has hardened, the ribs act as structural beams, which allow the slab to carry its load without resting fully on the soil.

In one type of assembly, the support members are made of a degradable material, which disintegrates, eventually leaving the slab unsupported by the soil. In another type, the forms use resilient rails or rails with degradable pads resting on the soil as support members. The rails permit the soil to expand without applying damaging uplift pressure to the slab.

In both cases, after casting, the forms remain in place, and function as thermal insulation for reducing heat loss through the slab and into the underlying soil. The hardened slab can be supported entirely by the foundation walls or by a grid of compliant support members resting on the soil. When supported by the foundation walls, the slab can be suspended with sufficient clearance from the soil to prevent contact even with maximum expansion. Also, the slab be can anchored or keyed into the foundation walls to provide lateral support for the foundation walls against lateral forces generated by the surrounding soil.

The drawing shows a cross-sectional view of a second embodiment of the invention. In this embodiment, the slab assembly includes an alternate configuration of the slab, insulating forms and rails. Rails resting on the excavation floor support simple rectangular foam panels. The rails have linear indentations for control of panel placement. They also include compliant legs for support of the slab during construction. During casting, concrete flows into the separation between the panels and forms the reinforcing ribs. Under extreme conditions where the soil expands sufficiently, the triangular edge of the rib can be designed to split or collapse the rail before forces become sufficient to damage the slab.

This second embodiment is lower in cost than the first embodiment because most of the material in the insulating forms is in the inexpensive rectangular panels. Only the insulating rails have a complex shape. ■



One version of the Insulated Concrete Slab Assembly uses rails to support the slab on the bottom of an excavation. All versions use a concrete rib formed when concrete is placed into gaps between insulation panels. The rib and insulation surrounding it prevent slab movement and heat loss.

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