An isolation pocket form is placed on around a footing for a support column, and then covered with a lid which has a sharp peripheral rim extending upwardly. Concrete is then poured around and over the form and lid, forming an initially continuous concrete floor which can be used as a casting bed for making wall slabs. The sharp-bottomed grooves produced in the concrete by the rim are preferential fracture sites, so that, after the wall slabs have been removed, the concrete portion overlying the isolation pocket can easily and cleanly be broken out.
FRACTURE-INDUCING LID FOR ISOLATION POCKET FORM

[0001] This application is a continuation-in-part of application Ser. No. 10/235,836, filed Sep. 6, 2002.

BACKGROUND OF THE INVENTION

[0002] This invention relates generally to the construction of large buildings of the type in which the structure of the building is supported atop vertical columns embedded in and extending upwardly from a concrete floor slab. More specifically, the invention relates to methods of creating isolation pockets about the bases of such support columns as the surrounding subgrade and concrete floor is formed to allow for adjustment of the column positions and concrete encasement of the column bases.

[0003] Many large buildings, such as warehouses, shopping malls, and the like, are constructed with a superstructure that is supported at predetermined intervals atop vertical columns that are embedded at their bases within and extend upwardly from the concrete floor slab of the building. When constructing such buildings, concrete footings are generally cast into the ground at prospective locations of the support columns. The threaded ends of embedded anchor bolts protrude upwardly from the footings.

[0004] My U.S. Pat. No. 5,224,313 describes a method of constructing isolation pockets on the footings by using isolation pocket forms that are prefabricated of a durable non-corrosive material and are adapted to remain embedded within the building floor after construction is complete. The prefabricated form preferably is shaped as a rectangular box having outwardly extending flanges along its bottom edges and having an open top bounded by an upper peripheral lip of the form. In use, the support column footings are cast in the usual way and one of the prefabricated stay-in-place forms is secured to each footing, surrounding the anchor bolts. The form can be held in place by concrete nails or other suitable fasteners driven through the lower peripheral flanges of the form and into the concrete material of its corresponding footing.

[0005] Prior methods, including that disclosed in my prior patent, interrupted the floor surface at the location of the isolation pockets. This made such floors less useful for new "tilt-up" construction techniques in which wall slabs are cast right on the floor surface. It would be better to be able to form isolation pockets beneath the continuous surface of a concrete floor, so that the floor would initially have an uninterrupted surface and could function as a casting bed for tilt-up wall slabs. If this were done, it would be necessary to facilitate the removal of the concrete covering the isolation pockets after the wall slabs had been removed.

[0006] The present invention provides a better way for a contractor to produce an initially uninterrupted floor surface, and to remove the concrete temporarily covering the isolation pockets. Originally, contractors built a temporary isolation pocket from wood or styrofoam at a level about two inches below the finish floor elevation. This temporary wooden isolation pocket was affixed to the footing and then was filled with soil, sand or gravel. The slab was cast up to and over the filled wooden box. Once the concrete hardened, the floor has a smooth and uniform appearance, which allowed for the casting of "tilt-up" wall panels having a uniform smooth texture with no appearance ("ghost") of an isolation pocket on the wall panel. After the tilt-up wall panel had been erected into its final position as a wall unit within the building, the contractor had to remove the 2" temporary concrete covers. Conventionally, the first step of this removal involved using a concrete saw to cut-out the shape (usually square) of the isolation pocket to enable removal of the 2" concrete, the (soil, sand or gravel) fill material, and finally the wooden box and all of its attachment anchors.

[0007] There were numerous problems with this prior method. First, removing the 2" concrete cover requires one to accurately locate and cut out the exact shape and position of the actual isolation pocket. Cutting out the cover this way is expensive and dangerous. There are a minimum of four anchor bolts in the footing (within these confines) that extend 3" to 6" above the top of the footing—which hamper shoveling out of the fill material. Thirdly, removal of the temporary wooden forms is difficult because the forms are confined, and have been in the ground long enough to have been swollen by soil moisture. Removal of styrofoam causes problems as well, because concrete and styrofoam form a tenacious bond. Contractors are wont to remove stuck styrofoam with claw hammers and solvents such as gasoline. Gasoline and styrofoam react to form napalm, creating a serious safety hazard. After these items have been removed, the contractor is left with a haphazard isolation pocket, usually with chipped and non-uniform edges and a large quantity of material that has no significant value for reuse, and therefore must be properly disposed of. The wasted concrete has very little potential as recycled concrete, because it is contaminated with soil, sand or gravel. If naturally occurring soil was utilized as a fill material, there is a great possibility of it causing discoloration of the slab.

[0008] In addition, the wooden form contains nails, which cause numerous safety hazards whether left alone or discarded.

SUMMARY OF THE INVENTION

[0009] An object of this invention is to provide a lid for an isolation pocket form that enables a contractor to form a temporary 2" concrete cover over the isolation pocket to make the slab surface smooth and continuous so that it can be used as a uniform casting bed.

[0010] Another object is to produce fracturing-inducing grooves in a concrete floor around the periphery of the isolation pocket form so that the temporary concrete cover can be easily and cleanly broken out, permitting removal of the form lid and subsequent placement of the support column on the footing.

[0011] The form lid according to this invention has a substantial peripheral rim extending upward. The rim produces a groove which creates straight cleavage planes when pressure is applied to the concrete covering the lid. After this peripheral crack has been induced, the 2" of concrete is easily lifted out and then disposed of. Finally, the lid itself is removed with the aid of a lid removal tool which may be supplied with the lid. Now there is no more work to be done prior to placing the column. The contractor is left with a straight and uniform edge around his isolation pocket. He saves considerable time and labor while eliminating numerous safety hazards, and also obtains a nice appearance and perfect function.
BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a perspective partially sectioned view of a prior isolation pocket portion of a concrete floor slab, as shown in my prior patent;

[0013] FIG. 2 is a perspective expanded view of the form shown in FIG. 1;

[0014] FIGS. 3 and 4 show another embodiment of the isolation pocket form, as shown in my prior patent;

[0015] FIGS. 5 and 6 are, respectively, top and bottom perspective views of a lid designed to promote deliberate fracture of overlying concrete; and

[0016] FIGS. 7-18 are sectional views, taken on a vertical plane, showing the steps of the method performed with the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] The floor structure 11 shown in FIG. 1 includes a generally rectangular concrete footing 12 that is formed with an upper load bearing surface 13. A set of anchor bolts 14 (only two of which are exposed in FIG. 1) are embedded within and extend upwardly from the upper surface 13 of the footing 12. The anchor bolts 14 provide means for securing the base plate 16 of a vertical support column 17 to the footing 12 using threaded nuts.

[0018] A generally rectangular open top form 19 is defined by four side panels 21 joined together at their ends. Each of the side panels 21 has a lower flange 23 that extends outwardly from the side panel along its bottom edge. The form 19 is mounted atop the footing 12 surrounding and isolating the base of support column 17 and is secured in place by means of concrete nails or other suitable fasteners 24 driven through the flanges 23 and into the concrete material of the footing 12. The form 19 is constructed from four similar side panels 21, and each panel 21 can be fabricated of a resilient, corrosion-resistant material such as polyethylene, polypropylene, polystyrene, or other suitable materials.

[0019] A set of corner braces or brackets 20 (FIG. 2) are disposed in the junctions of adjacent side panels 21 and are secured to each adjoining panel by means of appropriate fasteners such as rivets 36. The brackets 20 serve to brace and provide rigidity to the form 19. Further, the brackets 20 provide for easy assembly of the forms 19 in the field such that the forms can be shipped in a compact disassembled configuration to save shipping costs. The brackets 20 are preferably formed of a metal. With this configuration, the form 19 creates an isolation pocket around the base of support column 17.

[0020] The floor slab, generally indicated at reference numeral 26, includes a layered compacted subbase 27 that provides support for the concrete slab surface 28 of the floor. The subbase 27 shown in FIG. 1 comprises a layer of compacted gravel 29 supported atop a layer of compacted soil 31. While such a gravel/soil subbase is common in the construction industry, it will be understood by persons of skill in this art that the subbase 27 might well be formed of a variety of materials other than soil and gravel.

[0021] The material of the subbase 27 is compacted against the exterior surface of the form 19, which forms a barrier against migration of the subbase materials into the isolation pocket defined by the form 19. A layer 18 of grout is sandwiched between the baseplate 16 of the support column 17 and the upper surface 13 of the footing or pier 12. This layer 18 of grout serves to transmit load pressures through the column 17 and into the footing 12, stabilizes the footing 12, and protects the under side of the baseplate 16 and the anchor bolts 14 from moisture intrusion and corrosive elements.

[0022] While only one isolation pocket and support column 17 is shown, it will be understood that a large building such as a warehouse include scores or even hundreds of columns. In constructing these buildings, concrete footings 12 are typically cast in the ground at the prospective locations of the support columns 17. The footings 12 usually are cast around the anchor bolts 14 so that when the footing hardens the anchor bolts are embedded securely within and extend upwardly from the footings. With the footings 12 cast and thoroughly hardened, an isolation pocket form 19 can be secured to the upper surface of each footing surrounding and isolating the anchor bolts 14 of the footing. The form can be secured in place by suitable fastening means driven through the form flanges 23 and into the concrete of the footings 12. In this regard, it has been found expedient to fasten the forms to the footings using concrete nails fired from a conventional stud gun.

[0023] FIGS. 3 and 4 illustrate a second version of the form, which is particularly suited to manufacture through an injection molding process and is therefore economical. The isolation pocket form 37 is constructed of plural similar injection molded plastic panels 38 that are joined together at their ends to define the form. Each panel 38 comprises a wall 35 having a generally rectangular exterior face 39 and a lower flange 41 along its lower edge. An array of vertical buttresses 42 is integrally formed with each panel 38 and the buttress 42 extend between the panel outer face 39 and its lower flange 41. The buttresses provide rigid support for the flanges 41 and also increase the resiliency and strength of the panel outer faces 39.

[0024] The end vertical edges of each panel 38 are formed with locking protrusions 44 and 45, with the protrusions 44 at one end being formed to engage and lock with protrusions 45, so that the opposing ends of adjacent panels can be secured when the form 37 is constructed. In this regard, and as with the embodiment of FIG. 2, the forms can be shipped in a disassembled configuration and the panels can be secured together on site to create the forms 37.

[0025] The exterior face 39 of each panel 38 also is formed with a pair of spaced parallel horizontal ribs 49 and 50. The horizontal ribs 49 and 50 extend in a direction transverse to that of the buttresses 42 on the outside face of each panel 38. The ribs are joined to the exterior face 39 of the panels and to the vertical buttresses 42. In this way, the ribs 49 in conjunction with the buttresses 42 provide for a strong resilient structure that can withstand the compaction of subbase material and the casting of a concrete slab against its outer surface.

[0026] FIGS. 5 and 6 show, from above and below, respectively, an isolation pocket form lid 60 designed to promote deliberate fracture of concrete which has been cast over the lid to form a continuous floor surface for tilt-up wall slab construction.
[0027] The lid 60 has, preferably, a height of one and one-half inches. Its horizontal dimensions are chosen so that it fits closely within the top of the form. The lid is bounded by peripheral flanges 78, and, as one can see in FIG. 6, the bottom of the lid has an array of mutually perpendicular reinforcing ribs 80, to give the lid strength and rigidity. The reinforcement enables the lid to support substantial weight.

[0028] The slots 82 in the top of the lid allow one to insert a hook-type tool (not shown) to lift the lid out of the form.

[0029] The remaining figures show the method performed according to this invention. At FIG. 7, a tilt-up contractor has poured a footing whose upper surface is at an elevation of 1'-0" below his finish floor elevation.

[0030] After the footing is cast, but prior to casting the floor slab, the contractor sets a 10' tall isolation pocket form 37 atop the footing, using appropriate hardware, as shown in FIG. 8.

[0031] On top of the isolation pocket form (FIG. 9), the contractor places the lid of FIGS. 5-6, which is three inches deep. The bottom half of the lid (1.5") sits within the isolation pocket form, while the top half extends vertically above the isolation pocket form. Since this top half is 1.5" high, it is 0.5" below finish floor elevation.

[0032] As shown in FIG. 10, backfill “B” of soil and subgrade material (such as gravel or sand) are then placed against the isolation pocket form up to the intended elevation of the underside of the slab (i.e. 4" to 6"). When the floor slab “F” is poured (FIG. 11), there is 2" of concrete above the lid and 4" to 6" of concrete thickness around the form. When the slab has cured sufficiently, tilt-up wall panels “W” (FIG. 12) may be cast at locations right over the column isolation pockets, without leaving any noticeable marks on each tilt-up wall panel after it is raised (FIG. 13) to its vertical position.

[0033] Finally, the concrete cover “C” above the isolation pocket form lid is broken out (FIG. 14) by applying sufficient pressure to crack the concrete along planes extending vertically upward from the perimeter of the lid. The pressure may be applied by a truck tire, an impact tool such as a hammer, or by the a heavy weight. The weight or impact stresses the concrete above the lid, and since the sharp edge of the lid rim produced a sharp-bottomed groove in the concrete, stress is concentrated at the groove, causing it to fracture along a line tracing the location of the rim. The fracture is clean and straight, so the concrete above the lid, and the lid itself, can be easily lifted out, as shown in FIG. 14. Thereafter, structural members “P” can be installed or adjusted on the footing (FIG. 15) still protected by the form. Now grout “G” is placed (FIG. 16) between the column base plate and the footing, and expansion filler strips “E” (FIG. 17) are placed around the periphery of the pocket. Finally, the pocket is filled with concrete (FIG. 18).

[0034] Since the invention is subject to modifications and variations, it is intended that the foregoing description and the accompanying drawings shall be interpreted as only illustrative of the invention defined by the following claims.

I claim:

1. A lid for an isolation pocket form for use in concrete floor construction, said form having a wall bounding a closed area and a lid seating surface, said lid being shaped and sized to cover the closed area and to rest upon said seat, the lid having an upper surface and a peripheral rim extending upward above said upper surface,

whereby concrete can be poured and cured over said lid so as to form a slab with an uninterrupted upper surface on which tilt-up wall slabs can be cast, said peripheral rim producing a groove in the concrete to generate clean fractures wherein when pressure is applied to an area of the concrete floor overlying the lid.

2. The invention of claim 1, wherein the lid has an array of reinforcing ribs to give the top strength and rigidity.

3. The invention of claim 1, wherein said rim has a substantially sharp top edge to facilitate fracture and removal of overlying concrete.

4. The invention of claim 3, wherein said sharp top edge lies substantially in a horizontal plane parallel to said seat, so that the groove produced in the concrete floor is at a substantially uniform depth below the surface of the floor.

5. The invention of claim 1, wherein said rim extends at least one inch above said upper surface.

6. A method of pouring and curing a concrete floor having isolation pockets, and using the floor temporarily as a casting bed for wall slabs, said method comprising steps of:

placing at least one footing for a support column,

placing an isolation pocket form on or around the footing,

covering the form with a removable lid having a raised peripheral rim designed to provide preferential fracture lines subsequently hardened concrete, the rim being below the design elevation of the floor,

placing aggregate or fill material around the form up to a level substantially below the level of the lid rim,

pouring concrete over the aggregate or fill material and the isolation pocket form to a level above the level of the rim so that the isolation pocket form is completely covered by the concrete,

allowing the floor to harden,

applying force to the floor above the isolation pocket form so as to fracture the concrete along said preferential fracture lines, and then

removing the concrete within the fracture line from above the isolation pocket form.

7. The method of claim 6, comprising, between the allowing an applying steps, steps of:

pouring a least one wall slab on top of said floor,

allowing the wall slab to harden, and

removing the wall slab from above the isolation pocket.

8. The method of claim 6, comprising a further step of removing the lid from the isolation pocket form.

9. The method of claim 8, comprising a further step of attaching a support column to the footing.

10. The method of claim 9, comprising a further step of filling the pocket around the column with concrete.

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