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Thermo-active precast

Climate control in buildings, whereby savings can be made on energy and emissions, has been a major issue of recent years. Yet, the reality has often been limited to wrapping structures in thick polystyrene panels or fibreboards. With new buildings, much is also currently being made of the expensive passive construction method. However, both possibilities – and this is also many experts' opinion – overlook the inhabitants of such buildings and their requirements in terms of an appropriate indoor atmosphere. This type of construction also involves relatively expensive manufacturing methods, so that any savings can only be expected after a number of years. With commercial construction, the concrete core activation system, in which a building structure's planar components are utilised as heating and cooling areas, has gained much ground in recent times.



Manufacturing the pipe grid

Water-conducting pipe systems are embedded in the concrete of the floors, and sometimes the walls as well, of these concrete core activation systems. The pipe systems can then heat up or cool down the surrounding concrete so that these flat components can be employed for controlling indoor temperature.

Depending on how the pipe systems are installed, the concrete can be utilised for both heat and cold storage (located in the component's centre) or for rapid response temperature control (located near the surface).

The advantages of such systems are:

- Elimination of heating units and resultant gain in room surface area



Once the pipe grid has been positioned in the pallet, the reinforcement is inserted

- Large areas for inductive climate control instead of limited local heating units
- No dust turbulence as with conventional heating systems and thus especially suitable for allergic persons
- No drafts or air movements caused by air-conditioning units
- No drying out of rooms due to heating or air-conditioning units, thus generating a more healthy room climate
- Suitable for all low temperature heating systems and regenerative energy systems due to low supply flow temperatures (solar thermal and geothermal heating, etc.)

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Given the way the system is designed, contracts for concrete core temperature control systems have, in almost all cases up to now, been tendered and carried out with in-situ concrete so that this market has to a large extent remained closed to the precast industry.

The new Lotter-Roth Thermal System places precast production facilities in the position of being able to manufacture thermo-active



Prepared pallets with pipe grid and reinforcement





Concreted thermo-active floor element

concrete construction components in an uncomplicated manner without having to change existing production sequences. In the course of its development, special attention was paid to ensuring that continually changing layouts and dimensions plus the flexibility needed with regard to recesses and inserted components can be handled within the context of normal production sequences in a precast production facility.

The Lotter-Roth Thermal System is a construction component activation system that is located near the surface, which means that the water-conducting pipe systems are inserted under the reinforcement with a view to guaranteeing relatively rapid adjustments in temperatures. With a modern electronic control unit, this makes it possible to employ floors and walls for heating or cooling and to maintain a uniform indoor atmosphere throughout the year by means of radiant energy. Sustainable savings on energy can accordingly be made and pleasant, year-round room temperatures be attained by exploiting regenerative energy sources or low temperature heating systems.

The construction industry nowadays relies to a great extent on prefabricated components due to stipulations in respect of high quality workmanship and shortened construction times. The Lotter-Roth Thermal System enables thermo-active components to be prefabricated, thus enabling the advantages of a modern, energy-saving climate control system to be combined with those of prefabrication in a precast production facility. The precast components are set in place as usual at a construction site and can subsequently be connected up to heating or cooling systems by trade specialists. This eliminates any time-consuming installation work at a construction site and the accompanying danger of damage. The patented Lotter-Roth Thermal System is based on spacer bars made from special

plastics, which also enable its utilisation in respect of fire resistance 90 stipulations and which secure both the horizontal and vertical positioning of the pipe systems. In addition, these plastic rails act as spacers for the lower reinforcement so that no other components are necessary for this purpose. A pipe that will later conduct water is installed in these bars. Due their special design, the pipe is kept in place without any additional attachments during the manufacturing of the pipe grid and precast component. Individual rails make it possible to carry out any given precast component cross-section (angled sections, recesses, etc.). Insert components can be built in without any great effort.

It makes sense to produce the pipe grid away from the pallet so as not to hold up production progress by assembly work. Assembly frames and aids render the manufacturing process uncomplicated and protect the pipes from damage. Once the pipe grid has been completed, it is inserted into a pallet at the precast production facility. Afterwards, the reinforcement is installed and the precast component is concreted as is customary.

The variety and flexibility desired in production can be maintained by manufacturing the pipe grid in-house at a production facility. Prefabricated standardised modules would signify the imposition of great limitations. ■

FURTHER INFORMATION

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