AUTOMATIC CONNECTION VALVE BETWEEN FORMWORK AND CONCRETE PUMPING PIPES

DuraBuild, a consortium of research laboratories of Ghent University, is seeking partners interested in manufacturing and commercializing automatic connection valves for real applications on construction site or in concrete plants.

Introduction

Concrete walls, columns or slabs are generally fabricated by casting concrete into formworks. The casting process is traditionally executed from the top of open formworks, using special procedures such as vibrating the concrete in order to compact it. Advancement in concrete technology and novel technical challenges have led to the development of self-compacting concrete (SCC), which, in contrast to traditional concrete mixtures, does not need vibration energy to be compacted and can be pumped under pressure into the formwork. Filling of the formwork with concrete thus can be done under pressure from the bottom of the formwork. When the concrete pumping process is terminated, the pumping pipe can be removed. However, removal of the pumping pipe is difficult, as back flow of the concrete out of the formwork has to be avoided. Available shutters often require a complex handling procedure before the pumping pipe can be fully disconnected.

Technology

Researchers at Ghent University have developed an automatic connection valve, connecting formwork and pumping pipe, which automatically opens when the concreting operation starts, and automatically closes when the pumping pipes are disconnected after completing the filling process. The valve itself and the pipe connection part can be recuperated after de-moulding. Furthermore, the visual appearance of the valve on the hardened concrete surface is minimized. Through the special shape of the valve, the flow of the concrete is not disturbed significantly.

Applications

The newly developed automatic connection valve can be applied in real conditions, for on-site casting or for casting operations in concrete plants. It could become part of a formwork system, or could be considered as a separate system to be used in combination with classical formwork systems.

Advantages

- The valve automatically opens when the concreting operation starts, and automatically closes when the pumping pipes are disconnected after completing the filling process.
- The valve itself and the pipe connection part can be recuperated after striking the formwork.
- The visual appearance of the valve on the hardened concrete surface is minimized.
- Through the special shape of the valve, the flow of the concrete is not disturbed significantly.

State of development

Several prototypes have been built, and an optimization of the valve has been obtained by means of gravitational tests and large scale pumping test.

Partnership

Ghent University is looking for a partner who will build and commercialize the automatic connection valve.

Intellectual property
Granted European patent: EP2675967

Figure
The picture on the left shows a general view of the connection valve, as implemented in a formwork. The pictures on the right show the inside of the connection valve after disconnection of the pipe and washing out (top), and the finished hardened surface after removal of the valve (bottom).



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