

IMT patents seismic piler

AT INTERMAT 2009, Italy-based IMT International presented a new patented system for piling in seismic areas.

The drilling system is a machine capable of preparing the ground with a soil-mixing system and inserting steel tubes of diameters up to 38in (965mm) to reach depths greater than 40m.

The IMT equipment has two hydraulic devices to connect casing tubes and clamp the steel tube that will be inserted through a rotation-translation movement.

In California, the use of a tube closed at the bottom and inserted in virgin ground is commonly used. IMT has also supplied the machines for soil-mixing.

Several machines have been at work in Japan for a number of years now on new buildings, and for the reconstruction of buildings that are no longer in compliance with the latest regulations for anti-seismic constructions.

In this case, the type of drilling requires the use of different kinds of equipment necessary for driving casing (a casing oscillator), the execution of soil-mixing (a drilling machine) and, finally, for the laying of steel tubes (a vibrator and powerpack with crane).

The process of carrying out the entire pile by one single machine that does not need to be moved is achieved through the use of a particular rotation device of the upper part of the mast and lifting ropes, whereby it is possible to work on the same axis, both with the lower rotary (exposed) and the two upper ones for soil mixing.

The three working phases for the entire execution of the pile can be described as follows:

■ The driving of the casing and partial internal emptying is carried out with the machine

having the two soil-mixing rotaries lifted by means of the main winch and rotated, the lower rotary predisposed with a casing tube extracted from the previous pile, and the kelly bar with a tool on its lower end lifted by an auxiliary winch.

■ The soil-mixing phase is carried out with the casing, tool and kelly bar removed, with the mast rotated for the alignment of the double rotaries with the lower rotary. This phase consists of a descent with injection of the water-cement mixture that comes out of the cutting tool; passing through the tube, and a swivel joint positioned above the rotary while the mixing tool turns in the opposite direction. The ascent phase is similar, but with greater power supplied to the mixing tool.

■ The soil-mixing tools are disconnected and the corrugated steel tube lifted by means of the auxiliary winch. The upper part of the mast and, consequently, the soil-mixing rotaries and steel tube (that is, therefore, in axis with the lower rotary) are rotated. Then, the tube is lowered inside the lower rotary, clasped by the hydraulic clamp that is inside the rotary, and inserted into the ground by means of the push force of the hydraulic translation cylinders and rotary rotation. When the casing has been lifted up, the machine is ready to make another pile.

IMT said it will soon be able to provide information regarding the resistance and capacity of the piles carried out with this procedure and, given that they have shown exceptional resistance to seismic stress and can be verified after such events, use of this procedure is very likely to expand rapidly.

