

July 21, 2011
Sumitomo Forestry Co., Ltd.

Sumitomo Forestry Develops “Sumirin Tapered Pile”

Soil Reinforcing Pile Realizes High Performance, Shortened Construction Time, and Reduced Cost
—Brings Numerous Benefits for Homebuyers—

Sumitomo Forestry Co., Ltd. (Head Office: Chiyoda-ku, Tokyo; President and Representative Director: Akira Ichikawa) has successfully developed the Sumirin Tapered Pile (ST Pile) as a way to reinforce foundation soil for detached houses and other small-scale buildings in places with poor soil.

The newly developed ST Pile is a steel shell pile with a 1 to 150 taper angle that reduces the energy required during boring and achieves the same load-bearing capacity with fewer piles than conventional piles. Because the ST Pile shortens construction time and reduces costs, Sumitomo Forestry will demonstrate to its customers the merits of this pile by actively using it in *Sumitomo Forestry Home* houses where specific soil criteria are met.

Sumitomo Forestry developed the ST Pile together with Nippon Steel Corporation (Head Office: Chiyoda-ku, Tokyo; Representative Director: Shoji Muneoka) based on Sumitomo Forestry’s patent-pending technology for reinforcing foundation soils. The tapered steel tube used in the ST Pile is manufactured at Nippon Steel’s Nagoya Works steel plant using a spinning fabrication* process.

*A fabrication technique whereby general structural carbon steel tubes are spun and squeezed to give them a tapered end

■ Background

Since fiscal 2005, Sumitomo Forestry has been working at its Tsukuba Research Institute on the development of a new soil reinforcing pile to replace end-bearing piles, which are driven through poor soil layers to rest on an underlying load-bearing stratum (bedrock). Also aiming to reduce the number of piles needed for soil reinforcement, the company decided to focus its research on friction piles, which are used to support buildings on poor soil by employing friction between the outside surface of the pile and the surrounding soil, with the end goal of reducing construction time and reducing costs. Its research led to the development of the ST Pile, a tapered steel shell bore displacement pile with a 1 to 150 taper angle from top to bottom and with no corrugation. By boring the tapered steel shell piles into the ground, this method takes full advantage of friction surrounding the pile. The General Building Research Corporation of Japan (GBRC) has validated the load-bearing performance of this pile. The ST Pile also makes it possible to draft house designs based on the results of the Swedish weight sounding test, a relatively simple geotechnical investigation method.

■ Technology Overview

The ST Pile is a tapered steel shell pile with a taper angle of 1 to 150. It achieves friction-generated load-bearing capacity by being installed according to a prespecified method. ST piles can be installed with standard equipment used for foundation construction work. Because ST piles have a tapered end with a smaller diameter than straight piles, they require less energy when boring. The tapered shape of these piles provides frictional resistance at least 1.5-fold that of straight piles, meaning there is no need to reach bedrock. Even with regional subsidence caused by a shifting ground level, this friction pile system will not pop out of the ground, but rather will cause the soil to move together with the foundation while

maintaining the necessary bearing capacity.

Based on its success in developing the highly effective ST Pile and aggregating various technical research, Sumitomo Forestry will actively use the ST Pile in *Sumitomo Forestry Home* houses with anticipation of the many benefits it will bring for customers, including shorter soil reinforcement construction times and reduced costs.