TALK ON "CONSTRUCTION REVOLUTION USING PRESS-IN PILING" ON 5 MAY 2004

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Sixty-five participants attended a talk on "Construction Revolution using Press-in Piling" by Dr Goh Teik Lim on 5 May 2004 at Bangunan Ingenieur. Dr Goh began the talk by outlining the environmental restraints associated with piling works in built-up areas. Dynamic pile driving contributes a great source of ground vibrations and noise, generated from piling machines used during pile installation. Design codes place limits on the ground vibrations and noise created by these machines. These limits are intended to prevent disturbance to humans and damage (both cosmetic and structural) to nearby buildings. Conventional designs and construction methods are easily applicable to areas that have no environmental restraints. However, in an urban environment, the number of restrictions can turn a simple project into one that is virtually impossible. This has largely been attributed to the noise emissions and ground vibrations which would not be accepted by most tolerant urban communities. Drilled shafts, slurry walls and other cast-in-place foundation or retaining wall systems alleviate some of these problems but add additional problems of their own with large bulky machines and reliance on dusty concrete trucks.

Dr Goh went on to describe the Press-in Method of piling using the Silent Piler as a revolutionary development to solve most of the problems associated with pile driving in urban areas. This innovative piling technique allows pre-fabricated piles or panels to be hydraulically jacked-in into the ground using the 'reaction force' principle. The press-in machine 'walks' along the pile wall, gripping on previously installed piles, where the next pile is immediately adjacent to the previous one. Innovations in material usage have resulted in a whole series of machines dedicated to working in an urban setting, allowing the Silent Piler to press-in various piles of different shapes and materials, including steel and concrete sheet piles.

Dr Goh described the innovations associated with this press-in method of pile installation. These innovations include:

i) **Piling into hard ground**
In certain hard ground conditions, cobbles and stones may be present to create very difficult piling conditions. In conventional sheet pile driving, for example, the sheet pile is forced in deliberately causing the interlocks and pile tips to be damaged. To overcome this difficulty, the press-in piling method uses auxiliary techniques either by water jetting or integral augering.

ii) **Piling in sensitive areas and in limited working space**
The press-in method allows piling in sensitive areas, where access and spatial concerns are an issue. The ability to carry out piling operation without the use of staging allows the installation of piles over water, as well as on sloped ground. Similarly, press-in piling can be carried out in very tight confined spaces where limited access space is available.

iii) **Zero tolerance**
The press-in method allows piles to be installed in sites where piling right up against adjacent structures and boundaries is required to make maximum use of land. This method is effective for total utilisation of available land, especially in areas where conventional construction equipment cannot gain access.

iv) **Piling in restricted overhead space**
The press-in piling system allows piling operations under strict overhead limitations, such as under a bridge or existing structures.

Dr Goh illustrated the applications of the system in several projects, including:

- Retaining walls in road widening works.
- Piling adjacent to a railway track.
- River front and tidal defence works.
- Construction of cut-and-cover tunnel.
- Construction of underground parking.

During discussion, Dr Goh highlighted other features of the press-in piling system, including speed of construction, environmentally-friendly method, aesthetics, and safety of the operation. ■