



ZERO WASTE PILING

Our team worked with Finnish suppliers Junttan to develop a mechanical cutter system with the potential to reduce precast piling waste to zero. Optimum use of the pile cutter by BBGE has the potential to save up to 2,000 tonnes of CO₂ per year.

BASIC TECHNIQUE

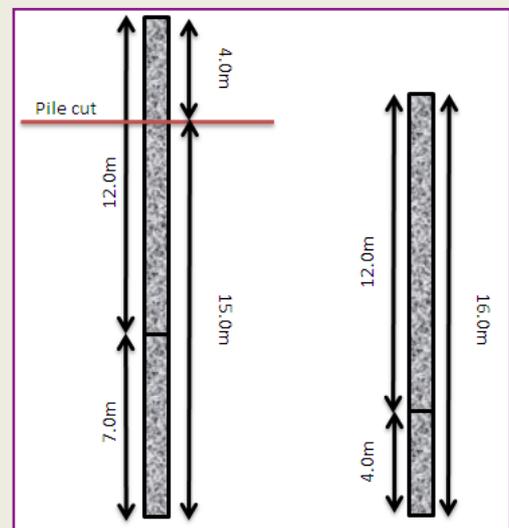
The 400mm diameter circular diamond-tipped twin blades are fixed to the mast of a Junttan rig and rotate between 1,600 and 3,200rpm to slice horizontally through the pile; the entire operation of clamping, cutting and waste removal takes less than 2 minutes.

Water is injected onto the cutting blades throughout to help suppress dust, lubricate the blades and reduce excess heat caused by the cutting. Piles can be cut as little as 50mm above the working platform, on piles up to 350mm² which provides fewer obstructions to other trades and enhancing site access.

The system works by re-using the trimmed section as the lead part of the next pile, meeting all requirements for compressive strength without resulting in loss of pile performance since the trimmed section has the same strength/jointing capability as other sections. A minimum trimmed section length of 3m is required to perform the process.

DEMONSTRATING THE PROCESS

The figure below details the proposed driving sequence of piles on a recent BBGE project which utilized the pile cutter. Pile lengths were envisaged to be driven between 14.0m and 15.0m with a cut off level between 300mm and 600mm above platform level. The diagram shows visually how the pile off-cuts are re-used as the lead section of the subsequent pile.



EXAMPLE DRIVING SEQUENCE



PREPARING TO USE THE PILE CUTTER



PILE CUTTER WORKING AT GRANGEMOUTH

THE BENEFITS

The cutting system can provide significant environmental benefits. Using the recently developed EFFC-DFI Carbon calculator it has been estimated that each metre of precast pile manufactured and delivered to site in the UK produces 40-60kg of carbon dioxide. For BBGE alone, the reduction in pile waste from optimum use of the cutter has the potential to save up to 2,000 tonnes of CO₂ a year.

Health and safety benefits are also realised as system the removes the need to trim piles using hand-held steel saws. The remote operation eliminates the risk of Hand-Arm Vibration Syndrome (HAVS) and people-plant interface is greatly reduced. Moreover no tall sections of precast pile protrude from the ground creating a risk to site workers. If all piles are trimmed down to near ground level then greater areas of site can be used by other trades.

FUTURE APPLICATIONS

This system has been patented by BBGE in the UK and additional applications are also being considered, for example use with steel tube piles. As trialling continues to optimise the process and further data is collated it is expected the system will gain widespread acceptance and use across the UK.

GRANGEMOUTH CASE STUDY

In 2012 BBGE trialled the pile cutter at Grangemouth – a project to build a new ASDA supermarket in Scotland. This was the first use of the mechanical cutting system on a construction site in the UK. The project required 4,500 235mm & 275mm square piles installed in lengths of 9-15m, driven to depths ranging from 9 to 31m. Flared heads were also used on 3,500no. piles to help spread the load of a building over a greater area.

The utilisation of the cutting system saw a saving of up to 3,600 metres of pile waste that would otherwise have been produced. The total length of piles required to complete this project was therefore reduced – saving on cost, carbon production associated with manufacturing and transportation as well as reducing waste.

The process has significant benefits for the environment as each metre of precast pile manufactured and delivered to site in the UK produces around 40-60kg of harmful carbon dioxide gases. For example, on the Grangemouth project it is estimated that approximately 180,000kg CO₂ was saved as a direct result of the application of this process.

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