

Malmesbury Town Wall



The 12th Century Town Wall at Malmesbury in Wiltshire is being restored as part of an ongoing conservation project involving the Conservation Department of North Wiltshire District Council in conjunction with English Heritage.

The random rubble wall is constructed from locally quarried limestone up to 1.50 metres in thickness, however erosion of adjoining earth and the effects of time had taken their toll resulting in localised delamination and rotation

In order to maintain the structural integrity of the wall, English Heritage advised the specification of Cintec ground anchors for a number of phases for the work.

Stability was returned to the wall by inserting Cintec ground anchors through the thickness of the wall and into the clay and limestone behind.



Diamond drilling (right) and anchor insertion (below).



The anchors were installed through the joints of the stonework following the completion of gravity grouting of extensive voids within. To facilitate this process, clay was used to seal the open joints between the stones in order to retain the original historic grouting. This was later removed and the wall pointed with lime mortar to match the original material. The Cintec ground anchors were tested to a working load of 15kN. Other, smaller Cintec anchors were also used for wall consolidation.

Load - Start	Time Held	Load - End	Extension	Extension	CINTEC TEST CERTIFICATE	Test Date:	20/08/97
2	2 Mins.	2				Install date:	06/08/97
4	2 Mins.	3.75				Type of Test:	Tensile loading
6	2 Mins.	6				Anchor Type	20 x 20 x 4000mm
8	2 Mins.	8				Embedment Depth	1000mm
10	2 Mins.	10				Bore Hole Diameter	40mm
12	5 Mins.	12				Base Material	Clay/Rubble
14	2 Mins.	14			Required Load	12 Kn	
Company Name:			Engineers Name:		Comments	Grout Type	Presstec standard
Quicksons			John Avent		Anchor Material	Stainless Steel	
Company Address:			Engineers Address:		Position		
Unit 1			Mann Williams				
Whiteway Court			4 Palace Yard Mews				
Cirencester			Bath				
Gloucestershire			BA1 2N11				
Persons Present		Company		Position			
Dennis Lee		Cavity Lock Systems Limited		Technical Advisor			
John Brooks		Cavity Lock Systems Limited		Area Sales Manager			
Andy		Minerva Stone Conservation		Foreman			

The Anchoring of a Retaining Wall at Nantgarw Pottery Works.



Insertion of 3m Cintec Anchor (left), and its inflation using cementitious grout, (above).

Nantgarw pottery rivalled that of Swansea in the 17th Century for its high quality earthenware, in recognition of its historical importance, the local authority wished to restore one of the now derelict bottle kilns. The location of the proposed rebuilt kiln was immediately adjacent to an ancient stone retaining wall. The 2 metre high wall was constructed from random rubble using local stone and was bedded and jointed using black ash mortar. There was concern that this wall would not withstand the additional imposed loading from the rebuilt kiln.

The structural engineers, Ove Arup working in conjunction with Protectahome, opted to specify Cintec ground anchors to stabilise the wall and provide resistance to the additional horizontal forces imposed by the kiln.

Cintec ground anchors were installed horizontally through the bed joints and into the ground infill retained behind it. This infill comprised mainly of broken brick, stone, clay, pottery shards and other assorted material. The core drilling technique employed to create the holes also revealed many voids within it, a significant feature of the Cintec anchor is its ability to bridge such gaps by retaining the flow of grout with its polyester sleeve. The 3 metre long Cintec anchors were installed at 1 metre horizontal intervals and tested to a working load of 15kN each.



The process of diamond drilling (above), with the subsequent core samples produced, (left).

