

## NEWS

Πρόσφατη κατάρρευση τμήματος οδών Γερμανίας  
προληπτικά από βαθιά διπλανή εκμετάλλευση.

# Ground anchors could hold key to Cologne metro collapse

By Jessica Rowson

INVESTIGATIONS INTO the collapse of the six storey city archive building in Cologne are focusing on the construction of a nearby underground light railway. A crossover section of the railway was being built using diaphragm walls and was still unfinished when the collapse occurred last month.

The 37m deep, 1m thick diaphragm walls had been in place for two years before excavation of the ground between them began last year.

Ground anchors drilled into predominantly river gravels supported the diaphragm walls prior to collapse. The base slab for the structure had not been cast at the time of the collapse.

The archive building collapsed on 3 March along with residential properties on either side. Two people were killed. About 1,000m<sup>3</sup> of concrete had to be pumped into the underground excavation to prevent further soil movement before rescuers could get on to the site. Groundwater was also pumped out of the excavation.

Cologne police said the collapse was caused by the ground under the building slipping into the underground excavation. "Earth

under the archive building slid into the tunnel of the subway, causing the building to collapse," said a city of Cologne spokesman.

"In some areas, they were still excavating [at the time of the collapse] and in some areas they had reached bottom and were laying reinforcement," said a city transport authority, Kölner Verkehrs-Betriebe (KBV), spokesman.

The groundwater level in Cologne is relatively high at about 12m below the surface and the site of the collapse was about 300m from the River Rhine.

Work on this section of the rail project was being carried out by a joint venture comprising Bilfinger Berger, Weiss & Freytag and Züblin.

It was unable to comment as GE went to press. Cracks had been noticed in the archive building since 2007 but the structure had been declared safe by structural engineers.

The archive building collapsed almost without warning.

KBV has sent engineers to assess stability of other surrounding buildings and is reviewing its procedures for the remainder of the construction work on the project,

## "NO UNDERPINNING WAS CARRIED OUT"

Cologne's City archive building had not been underpinned or compensation-grouted despite its proximity to the underground works being carried out for the Cologne North-South light railway, a Cologne transit authority Kölner Verkehrs-Betriebe (KBV) spokesman has revealed.

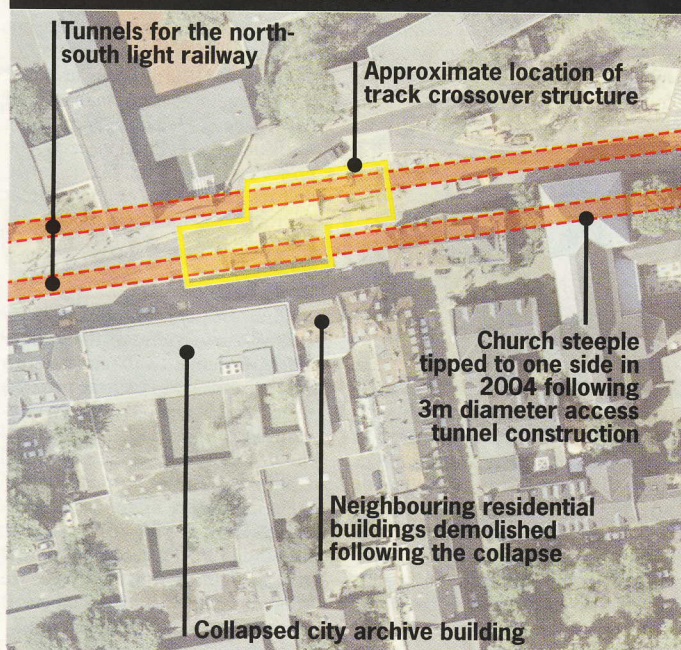
"No underpinning or compensation grouting was carried out for the archive building as there was no indication that this was necessary," said a KBV spokesman.

A selection of buildings had been underpinned and 48 were stabilised by compensation grouting prior to the railway work commencing.

In addition, monitoring of the neighbouring underground excavation had not picked up any unusual movements prior to the collapse.



## LOCATION OF UNDERGROUND STRUCTURE



## CROSS SECTION OF EXCAVATION

