



ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

ΔΙΑΛΕΞΗ

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στο Αμφιθέατρο

«ΕΥΘΥΜΙΟΣ ΜΑΣΤΡΟΓΙΑΝΝΗΣ»

στο κτίριο του Τμήματος Πολιτικών Μηχανικών
της Πολυτεχνικής Σχολής του Πανεπιστημίου Πατρών

**«Compensation grouting for limiting settlements
of two railway bridges
induced by a twin-tunnel excavation»**

από τον

Dr. Robert THURNER

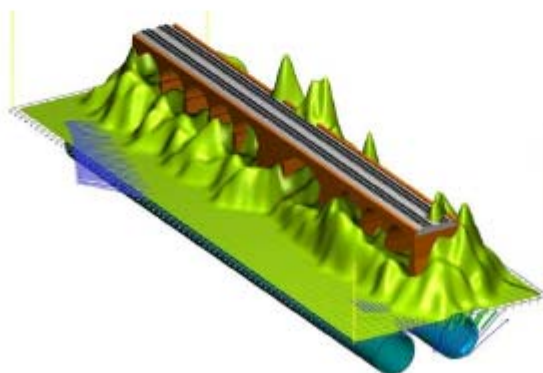
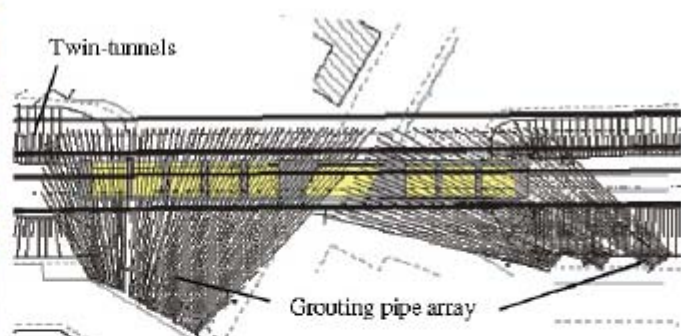
Keller Grundbau Des.m.b.H

ABSTRACT

For the construction of the high speed railway line Rome-Milan, tunnelling operation took place directly underneath the alignment of the existing railway line in the city centre of Bologna. To minimize the effects of the tunnel excavation countermeasures were implemented for the protection of two railway bridges. The twintunnel excavation underneath these historical railway bridges was performed utilizing the Compensation Grouting technique in order to limit the effects of (differential) settlements induced on the bridges.

The tunnelling was made with two 9.4 m diameter EPB-shield machines with a cover of about 20 m. The excavation was performed in very heterogeneous alluvial strata. In the first part of the alignment the tunnels were excavated in lacustrine clay and loose sandy deposit below the water level, in the second part it consisted of Savena river deposits with mainly gravel and sand strata, locally with a high percentage of fines (lenses of clay and silt). The groundwater level was found underneath the tunnel excavation.

Compensation grouting was seen as the only measure to control and limit the deformations. For the grouting operations, two arrays of grouting pipes (TAMs) were installed by means of Horizontal Directional Drilling technique. With these curved drillings the pre-treatment of the ground and the consequent lifting of the structures were performed. All the activities were monitored with a hydraulic liquid levelling system. To prove the feasibility of the Compensation grouting concept, a real-scale field test was conducted prior to the grouting operation. Details of this compensation grouting work concerning concept, design, execution and quality management are given in this presentation.



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Present Position

2007 – present Managing Director for Southern East Europe
2001 – 2006 Head of the R&D-department of Keller South East Europe

Education / Research

1996 – 2000 Ph.D. thesis on Probabilistic analysis using deterministic Finite Elements calculations in Geotechnics.
Graz University of Technology, Austria
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1990 – 1996 Degree in Civil Engineering (Dipl.-Ing.)
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Numerical modelling of geotechnical problems
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