Madagascar: Εντυπωσιακοί σχηματισμοί στους θερμοπίδακες του Analavory

Madagascar: Ασβεστόλιθοι στο Εθνικό Πάρκο Tsingy de Bemaraha Strict Nature Reserve

Αρ. 81 – ΑΥΓΟΥΣΤΟΣ 2015

ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Τα Νέα της Ε Ε Ε Ε Γ Μ

81

ΠΡΟΣΚΛΗΣΗ ΤΑΚΤΙΚΗΣ ΓΕΝΙΚΗΣ ΣΥΝΕΛΕΥΣΗΣ

Αθήνα 9 Ιουλίου 2015

Καλούνται τα μέλη της Ελληνικής Επιστημονικής Εταιρείας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής να προσέλθουν στη Γενική Συνέλευση που θα γίνει την Τετάρτη 9 Σεπτεμβρίου 2015 και ώρα 6:30 μ.μ. στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών ΕΜΠ στην Πολυτεχνειούπολη Ζωγράφου.

Σε περίπτωση που δεν επιτευχθεί η απαιτούμενη απαρτία, η Γενική Συνέλευση θα γίνει την Τετάρτη 30 Σεπτεμβρίου 2015 στον ίδιο χώρο και χρόνο, εφ' όσον υπάρξει απαρτία με συμμετοχή του ¼ των μελών που έχουν εκπληρώσει τις οικονομικές τους υποχρεώσεις (μέχρι και το 2015) προς την ΕΕΕΕΓΜ.

Σε περίπτωση που δεν επιτευχθεί πάλι απαρτία, η Γενική Συνέλευση θα γίνει την **21η Οκτωβρίου, ημέρα Τετάρτη και ώρα 6:30 μ.μ.** στον ίδιο χώρο, οσαδήποτε οικονομικώς ως άνω ενήμερα μέλη και αν είναι παρόντα.

Τα θέματα της ημερήσιας διάταξης είναι:

1. Ενημέρωση για τις αποφάσεις της Γενικής Συνέλευσης της 13ης Μαΐου 2015.
2. Απολογισμός πεπραγμένων της Εκτελεστικής Επιτροπής από την τελευταία Γενική Συνέλευση της 24ης Οκτωβρίου 2013 μέχρι σήμερα.

(συνέχεια στην σελ. 3)

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

Goblin Valley State Park, Utah, US

Mono Lake, California, US

(συνέχεια από την πρώτη σελίδα)

ΠΡΟΣΚΛΗΣΗ
ΤΑΚΤΙΚΗΣ ΓΕΝΙΚΗΣ ΣΥΝΕΛΕΥΣΗΣ

Αθήνα 9 Ιουλίου 2015

Καλούνται τα μέλη της Ελληνικής Επιστημονικής Εταιρείας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής να προσέλθουν στη Γενική Συνέλευση που θα γίνει την Τετάρτη 9 Σεπτεμβρίου 2015 και ώρα 6:30 μ.μ. στην Αίθουσα Εκδηλώσεων της Σχολής Πολιτικών Μηχανικών ΕΜΠ στην Πολυτεχνειούπολη Ζωγράφου.

Σε περίπτωση που δεν επιτευχθεί η απαιτούμενη απαρτία, η Γενική Συνέλευση θα γίνει την Τετάρτη 30 Σεπτεμβρίου 2015 στον ίδιο χώρο και χρόνο, εφ' όσον υπάρξει απαρτία με συμμετοχή του ¼ των μελών που έχουν εκπληρώσει τις οικονομικές τους υποχρεώσεις (μέχρι και το 2015) προς την ΕΕΕΕΓΜ.

Σε περίπτωση που δεν επιτευχθεί πάλι απαρτία, η Γενική Συνέλευση θα γίνει την **21^{η} Οκτωβρίου, ημέρα Τετάρτη και ώρα 6:30 μ.μ.** στον ίδιο χώρο, οσαδήποτε οικονομικώς ως άνω ενήμερα μέλη και αν είναι παρόντα.

Τα θέματα της ημερήσιας διάταξης είναι:

1. Ενημέρωση για τις αποφάσεις της Γενικής Συνέλευσης της 13^{ης} Μαΐου 2015.
2. Απολογισμός πεπραγμένων της Εκτελεστικής Επιτροπής από την τελευταία Γενική Συνέλευση της 24^{ης} Οκτωβρίου 2013 μέχρι σήμερα.
3. Έγκριση απολογισμού πεπραγμένων και απαλλαγή της Εκτελεστικής Επιτροπής από κάθε ευθύνη.
4. Συζήτηση απλοποίησης διαδικασιών της ΕΕΕΕΓΜ εν όψει προετοιμασίας τροποποίησης καταστατικού.
5. Διάφορες ανακοινώσεις.
6. Εκλογή νέας Εκτελεστικής Επιτροπής και Εξελεγκτικής Επιτροπής.

Ο ΠΡΟΕΔΡΟΣ	Η ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΑΣ
ΧΡΗΣΤΟΣ ΤΣΑΤΣΑΝΙΦΟΣ	ΜΑΡΙΝΑ ΠΑΝΤΑΖΙΔΟΥ
Δρ. Πολιτικός Μηχανικός	Δρ. Πολιτικός Μηχανικός

ΠΡΟΣΚΛΗΣΗ
ΥΠΟΒΟΛΗΣ ΥΠΟΨΗΦΙΟΤΗΤΩΝ ΓΙΑ ΤΗΝ ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΚΑΙ ΤΗΝ ΕΞΕΛΕΓΚΤΙΚΗ ΕΠΙΤΡΟΠΗ ΤΗΣ ΕΕΕΕΓΜ

Η Εκτελεστική Επιτροπή της ΕΕΕΕΓΜ αποφάσισε την σύγκληση της τακτικής Γενικής Συνέλευσης της Εταιρείας την 9^{η} Σεπτεμβρίου 2015. Η Γενική Συνέλευση αυτή θα είναι και εκλογική.

Σύμφωνα με το Άρθρο 7 του Καταστατικού, καλούνται τα ταμειακώς ενήμερα τακτικά μέλη να υποβάλουν υποψηφιότητα για την Εκτελεστική Επιτροπή ή την Εξελεγ-κτική Επιτροπή με καταληκτική ημερομηνία την **31^{η} Ιουλίου 2015**.

Οι υποψηφιότητες θα πρέπει να αποσταλούν στην ηλεκτρονική διεύθυνση της γραμματείας της ΕΕΕΕΓΜ:

secretariat@hssmge.gr

Τα ψηφοδέλτια θα καταρτισθούν μετά την 17^{η} Αυγούστου 2015 και θα αποσταλούν με ηλεκτρονικό ταχυδρομείο στα μέλη εγκαίρως.

Αθήνα, 10 Ιουλίου 2015

Ο Πρόεδρος

Χρήστος Τσατσανίφος

ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

ΨΗΦΟΔΕΛΤΙΟ ΕΚΤΕΛΕΣΤΙΚΗΣ ΕΠΙΤΡΟΠΗΣ

ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ Ανδρέας
ΒΕΤΤΑΣ Παναγιώτης
ΓΚΑΖΕΤΑΣ Γεώργιος
ΙΩΑΝΝΙΔΗΣ Κωνσταντίνος
ΜΠΑΡΔΑΝΗΣ Μιχαήλ
ΜΠΕΛΟΚΑΣ Γεώργιος
ΝΤΟΥΛΗΣ Γεώργιος
ΞΕΝΑΚΗ Βάλια
ΠΑΝΤΑΖΙΔΟΥ Μαρίνα
ΠΑΧΑΚΗΣ Μιχαήλ

ΨΗΦΟΔΕΛΤΙΟ ΕΞΕΛΕΓΚΤΙΚΗΣ ΕΠΙΤΡΟΠΗΣ

ΑΛΕΞΑΝΔΡΗΣ Ανάργυρος
ΚΟΖΟΜΠΟΛΗΣ Απόστολος
ΤΥΡΟΛΟΓΟΥ Παύλος

ΑΡΘΡΑ

Young IGS Member Achievement Awards

Kuo-Hsin Yang

This Young IGS Member Achievement Award was given to Kuo-Hsin Yang, Associate Professor in the Department of Civil and Construction Engineering at National Taiwan University of Science and Technology (Taiwan), for his research work on GRS structures and his contribution to education and promotion on geosynthetics in Taiwan.

Research

Dr. Yang has conducted researches and projects on the analysis, design and case study of GRS structures using both numerical (limit equilibrium and finite element) and physical (centrifuge and field monitoring) modeling. The aim is to provide better understanding of the performance of GRS structures with complex geometrics (narrow or multi-tier wall) or under natural disaster conditions (heavy rainfall or seismic loadings). This section summarizes the results of his research work, published in Mohamed et al. (2014, 2013) and Liu et al. (2012), focused on investigating the performance and failure mechanism of multi-tier walls with various offset distances.

GRS walls in a tiered configuration are acceptable alternatives to conventional retaining wall systems because of several benefits such as cost, stability and construction constraints, and aesthetics. In addition, drainage swales or ditches can be installed along the toe of each tier to minimize the surficial flow induced erosion and water infiltration induced instability. A tiered wall is a transitional structure between a single wall and slope (Fig. 1) that can reduce construction costs and increase system stability compared with a single wall. Because of its configuration, the tiers interact and mutually affect each other. The upper and lower tiers interact through the equivalent surcharge from the upper tier acting on the lower tier, and the vertical and lateral deformation of the lower tier influencing the behavior of the upper tier. Consequently, this interaction can cause additional wall deformation and reinforcement loads in both the upper and lower tiers.

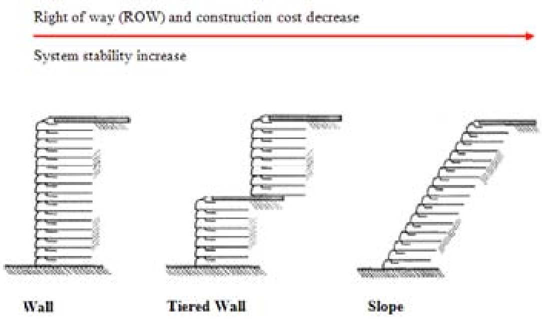


Figure 1. GRS structures with various configurations.

Current design methods for analyzing GRS multitier walls are based on the lateral earth pressure method, an extension of the design method for analyzing single tier reinforced walls. The design approaches in these guidelines are con-sidered empirical and are geometrically derived based on the relative distance or offset distance, *D*, between upper and lower tiers. These guidelines do not fully address the interactive mechanism be-tween two tiers: only consider the addi-tional vertical stresses from the overlying wall tiers acting on the lower tiers but do not account for the influence of the lower tier on the upper tier.

The author conducted a series of numer-ical analyses of GRS two-tier walls with various offset distances. The objectives were fourfold: 1) to evaluate the applica-bility of LE and FE methods for analyzing GRS two-tier walls; 2) to investigate the performance and failure mechanism of GRS two-tier walls with various offset distance; 3) to investigate the interac-tive mechanism between two tiers; 4) to examine the design methods for multitier walls in current design guide-lines. The FE simulations were first verified according to the centrifuge test (Fig. 2). The FE results were then used to investigate the influence of offset distance on additional vertical stress from the upper tier wall, mobilization and distribution of reinforcement tensile loads, and horizontal deformation at the wall faces.

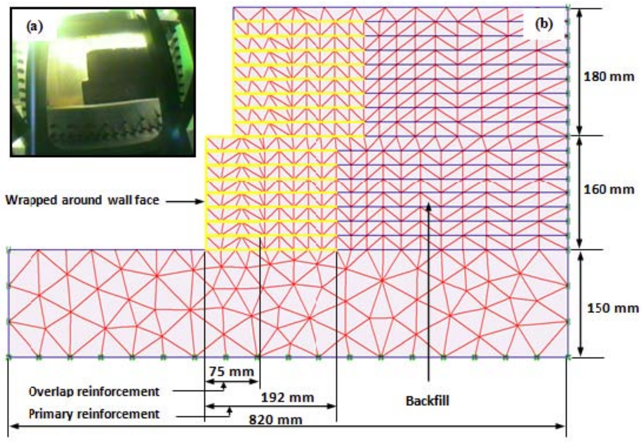


Figure 2. GRS two-tier wall model: (a) centrifuge at initial condition; (b) finite element setup and initial mesh.

The study results demonstrated favorable agreement between FE, LE and the centrifuge model in locating the failure surface (Fig. 3). For compound wall case, the maximum tension lines in FHWA design guidelines depict failure surfaces at a long distance from the wall face, particularly for the upper part of the upper tier.

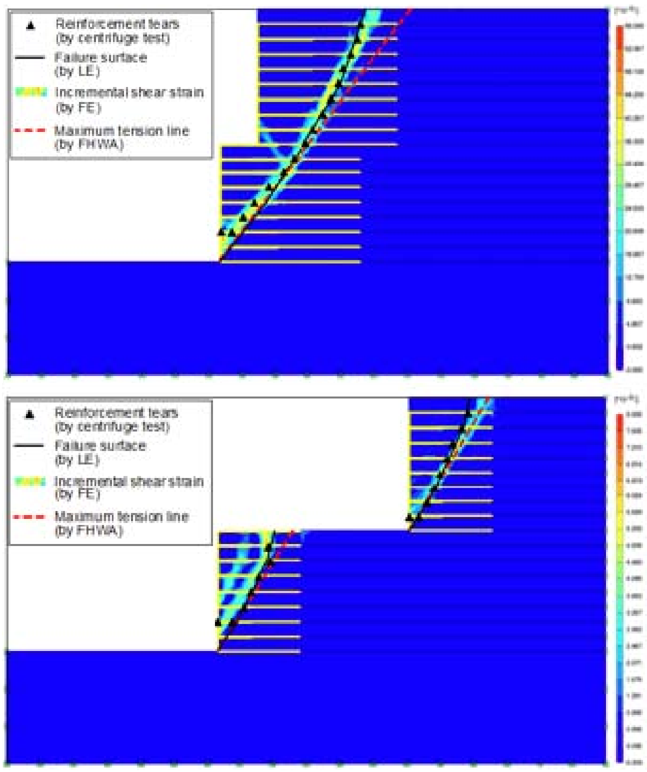


Figure 3. Predicted and measured locations of failure surfaces from two-tier wall model: (up) compound wall; (down) independent wall.

The FE results indicated that as the offset dis-tance increased, the reinforcement tensile load and wall deformation decreased in both the upper and lower tiers, suggesting that the two tiers mutually affect each other and the interac-tion attenuates as the offset distance increased. The maximum tensile loads of all reinforcement layers at the wall failure predicted using FE analysis and LE method assuming uniform dis-tribution of reinforced tensile loads were compa-rable. The critical offset distance *Dcr* shown in Fig. 4 is the offset distance beyond which two tiers act independently. In Fig.4, *Dcr* = 0.73*H2* (where *H2* is the height of the lower tier wall) was identified when the decreased max(*Tmax*) value with increased *D* reached a constant value. The *Dcr* value recommended by the FHWA is approximately 1.5 times greater than those determined using FE in this study. Consequently, using the *Dcr* value provided in the current design guidelines would likely result in a conservative design because of predicting a longer offset distance for two tiers to become independent.

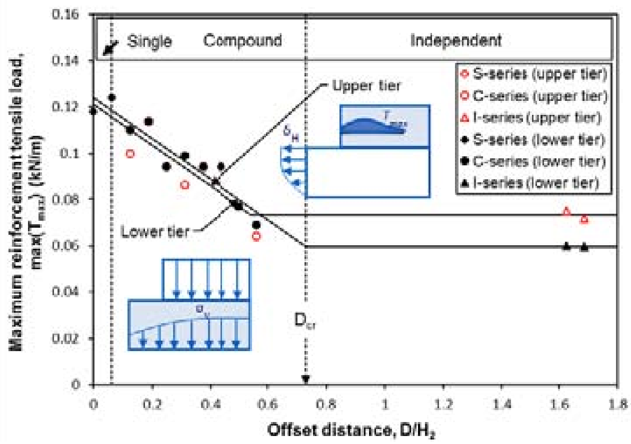


Figure 4. Effect of offset distance on maximum reinforcement tensile load

Education

Dr. Yang regularly teaches "Design of reinforced earth retaining structures" in the graduate course and delivers a three-hour lecture for the subject of "Introduction and application of geosynthetics" in the "Soil mechanics II" course for undergraduate students. The aim is to increase geosynthetic education at both graduate and undergraduate levels in the civil engineering program in Taiwan. He also organized a small-scale paper MSE wall competition for students to let students get hands-on experience on design and build for reinforced soil structures in a fun way. Students are learning by doing and gain much confidence in their design (Fig. 5).

Figure 5. Small-scale paper MSE wall competition: (left to right) discuss on students' design; place 25kg surcharge; success after placing large loading (three people stand on the top of the paper MSE wall).

Acknowledgements

Centrifuge modeling tests was conducted by Dr. W-Y Hung at the National Central University, Taiwan. The finan-cial support for Dr. S. Mohamed during his Ph.D. study was provided by the Taiwan Ministry of Education under the grant for "Aim for the Top-Tier University Project". The author also thanks Dr. C-N Liu, professor at the National Chi-Nan University, for the research collaboration and valuable comments.

Reference

Mohamed, S., Yang, K-H and Hung, W-Y, (2014) "Finite Element Analyses of Two-Tier Geosynthetic-Reinforced Soil Walls: Comparison Involving Centrifuge Tests and Limit Equilibrium Results", *Computers and Geotechnics*, 61, 67-84.

Mohamed, S., Yang, K-H, and Hung, W-Y, (2013) "Limit Equilibrium Analyses of Geosynthetic-Reinforced Two-Tiered Soil Walls**:** Calibration from Centrifuge Tests", *Geotextiles and Geomembranes*, 41, 1-16.

Liu, C-N, Yang, K-H, Ho, Y-H, and Chang, C-M (2012) "Lessons Learned from Three Failures on a High Steep Geogrid-Reinforced Slope", *Geotextiles and Geomembranes*, 34, 131-143.

(IGS News, Vol. 31, No. 2 (2015))

Young IGS Member Achievement Awards

Behavior of Geosynthetics and Geosynthetic-Reinforced Soil Retaining Walls through Model Testing and Advanced Numerical Analysis

Hoe I. Ling, Columbia University, New York, NY, USA

Introduction

Geosynthetic-reinforced soil retaining walls (GRS-RWs) have been developing very rapidly in the past few dec-ades, where they are used in transportation infrastructure con-struction. They gradually gained acceptance as per-manent structures in railways and highways, as well as in the pri-vate sector. It was a natural progression for engi-neers to later start construct them in the earthquake-prone regions.

Japan has developed GRS-RWs with a rigid facing, while modular-block facing walls are rather popular in North America. In the 1995 Kobe earthquake, various kinds of retaining walls systems were subjected to strong earth-quake shaking (and several more earthquakes in subse-quent years). In North America, the popular modular-block facing reinforced soil retaining walls were subjected to mi-nor shaking during the 1994 Northridge earthquake. We gained much confidence in the earthquake performance of GRS-RWs, but were troubled by their lack of good per formance during the 1999 Chi-chi earthquake in Taiwan [1].

In this short article, I would like to summarize some of our research projects related to the earthquake response of GRS-RWs. Verbal descriptions are given, and relevant publi-cations are listed for interested readers to refer to.

Simplistic Approach

In 1994, Dov Leshchinsky and I started working on imple-menting a rigid-plastic stick-slip procedure to determine permanent displacement of GRS-RWs [2, 3]. By examining the different failure modes under earthquake (pseudo-static) loading, we found that the direct sliding mode of failure may become predominant under strong shaking. Comparisons of sliding displacement were made for several case histories as reported in literature. Subsequently, the study was extended to include vertical components of ac-celerations [4]. We noticed the effects of vertical ac-celeration, which increases the required reinforcement length and force when acting downward, but led to a re-duced sliding stability when acting upward. A comparison was made to the sliding out for Tanata Wall during Kobe earthquake.

Seismic Response and Advanced Numerical Analysis

From the displacement obtained in a rigid-plastic analysis, we tried to move a step further by analyzing the cyclic re-sponse of GRS-RWs. While the finite element procedures have been established for the dynamic response of struc-tures, we certainly need to have a reasonable soil model for simulating the cyclic behavior of soils and geo-synthetics. The constitutive models for granular materials were formu-lated using generalized plasticity [5]. Constitu-tive modeling of sand itself is an independent subject of research and the challenging part is the pressure and den-sity dependency of sand behavior, as well as the effects of cyclic loading – den-sification behavior for dry soils (likewise, liquefaction for saturated loose sand). Cyclic tensile loading tests were con-ducted for several types of geosynthetics [6] and their cy-clic behavior was formulated using bounding surface plastic-ity [7]. In the modeling of cyclic behavior of geosynthetics, we tried to accommodate the nonlinear S-shape loading curve of some geosyn-thetic materials due to their manu-facturing process. The constitutive models of sand and geosynthetics have been implemented into a special pur-pose geotechnical finite element program and the proce-dures were validated exten-sively with laboratory test re-sults. We were able to validate the analysis with a series of shaking table tests con-ducted in a centrifuge at the Tokyo Institute of Technology [8]. Note that the wall facing used in the centrifuge was not made of modular blocks. Paramet-ric studies have also been conducted to investigate the ef-fects of soil proper-ties, reinforcement layouts, earthquake motions, etc., on the wall response [9].

Large Scale Shaking Table Tests as "Benchmarks"

The physical models, especially reduced scale models, have been a traditional method of geotechnical testing in the laboratory. In order to overcome the scale effects, either enhanced gravity testing or field testing is conducted. In the enhanced gravity models such as centrifuge, simulation of prototype behavior of geosynthetics, blocks and soil-structure interaction is not fully possible. Field testing, on the other hand, does not allow for a full control of testing conditions and characterization of material properties. Thus, large scale testing is considered a good alter-native to cen-trifuge model testing and field testing. That is, no scale re-duction is needed yet the cost can still be affordable. Large scale testing is possible only at several limited facilities world wide where the shaking table is of acceptable size, which allows for actual shaking motions. We collaborated with Dr. Yoshiyuki Mohri (currently a Professor at Ibaraki University) of the National Institute of Agricultural Engineer-ing, Japan. The shaking table is of dimensions 6 m×4 m, having a payload of up to 500 kN, and maximum three-dimensional accelerations of 1g in each direction. A rigid steel box was fabricated that accommodated a wall of height 2.8 resting on a foundation of 0.2 m. Several series of studies were conducted on geosynthetic-reinforced soil retaining walls having modular-block facing using actual horizontal and vertical components of Kobe earthquake rec-ords. The details of the walls are summarized in the table below:

Wall #		1	2	3	4	5	6	7
Backfill		Sand				Clayey Sand		
Earthquake Motions (Kobe JMA)	Vertical Acceleration	no		yes				
	Times of Shaking	2 (half, full intensities)			4 (half, full, full, full)			
Reinforcements	Major Layers (polyester, 35 kN/m)	2.05 m		1.68 m Double-layer reinf in Wall 4		1.68 m Lip removed for fac-ing blocks in Wall 7		
	Top layer (polyvinyl alcohol, 20 kN/m)	2.05 m		2.52 m		2.52 m	1.68 m	
	Vertical Spacing	0.6	0.4			0.4	0.8	

The first phase of study was using sandy soil as backfill [10], whereas clayey soil was used in the second phase of study [11]. The walls were heavily instrumented with over 100 channels: strains in geogrid layers, facing lateral dis-placements, backfill settlements, and earth pressures acting at the facing blocks and bottom of backfill. The tests with multiple shakings, with intensity as large as that of the Ko-be earthquake, confirmed the earthquake per-formance of the wall system. The heavily instrumented walls also acted as the benchmarks for validation of numer-ical procedures. Note that in addition to modular-block facing walls, a total of 5 walls having geocell facing have also been tested in a separate study [12].

As a more economical means of studying the behavior of GRS-RWs, the previously validated numerical procedure is required. This has been achieved by comparing the ana-lyzed results with the full-scale walls. The aim was to achieve a satisfactory agreement of the response (both in space and time) not only qualitatively, but also quantita-tively [13]. The generalized plasticity model has then been unified against sand of different densities [14]. Up to this stage, we have studied numerically the response of walls having sandy soil as backfill. The benchmarks have been used by other groups of researchers in validating their nu-merical procedures, as discussed in [15].

Summary

A number of GRS-RW projects have been accomplished in North America using the same modular blocks and geosynthetics as described in the large-scale testing. Recently, the same wall system has been used for highway intersection project in Sofia, Bulgaria, considering high seismic load with a height of over 12 m, for a total distance of more than 2.1 km. The wall, before completion of construction, was subjected to the Pernik earthquake (M= 5.6) in 2012. A satisfactory performance was confirmed [16].

The study on the earthquake response of GRS-RWs has become multi-disciplinary, which requires knowledge beyond traditional geotechnical engineering. It is learned that well documented studies are needed in advancing our state-of-art and state-of- practice.

Acknowledgments

The studies as described have been sponsored by a number of agencies and industries, including US National Science Foundation, Japan National Research Institute of Agricultural Engineering, Allan Block, and Huesker Syn-thetic GmbH. The assistance provided by the collaborators and former students, as well as the recognition by the IGS Award Committee, is especially appreciated.

References

[1] Ling, H.I., Leshchinsky, D., and Chou, N.N.S. (2001). "Post-earthquake investigation on several geosynthetic-reinforced soil retaining walls and slopes during 1999 Ji-Ji earthquake of Taiwan." Soil Dynamics and Earthquake Engineering, 21(4), 297-313.

[2] Ling, H.I., Leshchinsky, D., and Perry, E.B. (1996). "A new concept of seismic design of geosynthetic-reinforced soil structures: Permanent displacement limit." Earth Reinforcement, Ochiai, Yasufuku & Omine, Eds., Balkema, 797-802.

[3] Ling, H.I., Leshchinsky, D., and Perry, E.B. (1997). "Seismic design and performance of geosynthetic-reinforced soil structures." Geotechnique, 47(5), 933-952.

[4] Ling, H.I. and Leshchinsky, D. (1998). "Effects of vertical acceleration on seismic design of geosynthetic-reinforced soil structures." Geotechnique, 48(3), 347-373.

[5] Ling, H.I. and Liu, H. (2003). "Pressure-level dependency and densification behavior of sand in a generalized plasticity model." Journal of Engineering Mechanics, ASCE, 129(8), 851-860.

[6] Ling, H.I., Mohri, Y., and Kawabata, T. (1998). "Tensile properties of geogrids under cyclic loadings." Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 124(8), 782-787.

[7] Ling, H.I., Liu, H.B., Mohri, Y., and Kawabata, T. (2001). "A bounding surface model for geogrid." Journal of Engineering Mechanics, ASCE, 127(9), 963-967.

[8] Ling, H.I., Liu, H., Kaliakin, V., and Leshchinsky, D. (2004). "Analyzing dynamic behavior of geosynthetic-reinforced soil retaining walls." Journal of Engineering Mechanics, ASCE, 130(8), 911-920.

[9] Ling, H.I., Liu, H. and Mohri, Y. (2005). "Parametric studies on the behavior of reinforced soil retaining walls under earthquake loading." Journal of Engineering Mechanics, ASCE, 131(10), 1056-1065

[10] Ling, H.I., Mohri, Y., Leshchinsky, D., Burke, C., Matsushima, K., and Liu, H. (2005). "Large scale shaking table tests on modular-block reinforced soil retaining wall." Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 131(4), 465-476.

[11] Ling, H.I., Leshchinsky, D., Mohri, Y., and Wang, J-P. (2012). "Earthquake response of reinforced segmental retaining walls backfilled with substantial percentage of fines." Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 138(8), 934-944.

[12] Ling, H.I., Leshchinsky, D., Wang, J-P., and Rosen, A. (2009). "Seismic response of geocell retaining walls: Experimental studies." Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 135(4), 515-524.

[13] Ling, H.I., Yang, S., Leshchinsky, D., Liu, H., and Burke, C. (2010). "Finite element simulations of full-scale modular block reinforced soil retaining walls under earthquake loading." Journal of Engineering Mechanics, ASCE, 136(5), 653-661.

[14] Ling, H.I. and Yang, S. (2006). "A unified sand model based on the critical state and generalized plasticity." Journal of Engineering Mechanics, ASCE, 132(12), 1380-1391.

[15] Ling, H.I. (2011). Discussion on: Numerical simulation of geosynthetic-reinforced soil walls under seismic shak-ing [Lee, K.Z.Z., Chang, N.Y., Ko, H.Y., 2010. Geotextiles and Geomembranes 28, 317–334], Geotextiles and Geomembranes, 29(2), 168-169.

[16] Alexiew, D., Leite-Gembus, F., and Jossifowa, S. (2013). "Geogrid-reinforced segmental block walls for a highway intersection project: Design and specific solutions." Design and Performance of Geosynthetic-Reinforced Soil Structures (Symposium Honoring Research Achievement of Professor Dov Leshchinsky, Bologna, Italy), 283-296.

(IGS News, Vol. 31, No. 2 (2015))

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

Για τις παλαιότερες καταχωρήσεις περισσότερες πληροφορίες μπορούν να αναζητηθούν στα προηγούμενα τεύχη του «περιοδικού» και στις παρατιθέμενες ιστοσελίδες.

Sardinia 2015 International Waste Management and Landfill Symposium, 5-9 October 2015, Santa Margherita di Pula, Italy, www.sardiniasymposium.it

GE Basements and Underground Structures Conference 2015, 6 - 7 October 2015, London, UK, http://basements.geplus.co.uk

EUROCK 15 ISRM European Regional Symposium & 64th Geomechanics Colloquy, 7 – 9 October 2015, Salzburg, Austria, www.eurock2015.com

Shotcrete for Underground Support XII New Developments in Rock Engineering, TBM tunnelling, Deep Excavation and Underground Space Technology, October 11-13, 2015, Singapore, www.engconf.org/conferences/civil-and-environmental-engineering/shot-crete-for-underground-support-xii

5th International Symposium on Geotechnical Safety and Risk (ISGSR 2015), 13-16 October 2015, Rotterdam, The Netherlands www.isgsr2015.org

International Workshop on Tsunamis in the World: from Source Understanding to Risk Mitigation, 14 to 16 October, 2015, Heraklion, Greece, www.gein.noa.gr/itw2015

LTBD2015 3rd International Workshop on Long-Term Behaviour and Environmentally Friendly Rehabilitation Technologies of Dams Hohai University, Nanjing, October 17-19, 2015, LTBD2015@gmail.com

COST TUI208 International Workshop Civil Engineering Applications of Ground Penetrating Radar, 19–20 October 2015, Athens, Greece, http://pavnet.civil.ntua.gr

HYDRO 2015, 26-28 October 2015, Bordeaux, France, www.hydropower-dams.com/pdfs/hydro2015.pdf

International Conference on Engineering Geology in New Millennium, 26-31 October 2015, New Delhi, India, http://isegindia.org/pdfs/1st%20circular-international-IAEG.pdf

6th International Conference on Earthquake Geotechnical Engineering, 2-4 November 2015, Christchurch, New Zealand, www.6icege.com

SEOUL 2015 - 25th World Road Congress Roads and Mobility – Creating New Value from Transport, 2–6 November, 2015, Seoul, Republic of Korea, http://www.aipcrseoul2015.org

4° Πανελλήνιο Συνέδριο Αναστηλώσεων, Νοέμβριος 2015, Θεσσαλονίκη, www.etepam.gr.

The 15th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering, 9-13 November 2015, Fukuoka, Japan, http://www.15arc.org

Tunnels and Underground Construction 2015, 11-13 November 2015, Žilina, Slovak Republic, www.tps2015.sk

15th Pan-American Conference on Soil Mechanics and Geotechnical Engineering, 15 - 18 November 2015, Buenos Aires, Argentina, http://conferencesba2015.com.ar

GEOMATE, 16 -18 November 2015, Osaka, Japan, www.geomate.org

VIII South American Congress on Rocks Mechanics, 15 - 18 November 2015, Buenos Aires, Argentina, http://conferencesba2015.com.ar

Sixth International Conference on Deformation Characteristics of Geomaterials IS Buenos Aires 2015, November 15th to 18th 2015, www.saig.org.ar/ISDCG2015

waterproof membranes 2015

17 - 19 November 2015, Bonn, Germany
www.amiplastics.com/events/event?Code=C691#5155

The 9th AMI international conference, **Waterproof Membranes 2015**, will take place at the Maritim Hotel in Bonn, Germany from **17-19 November 2015**. The conference begins with an evening Welcome Cocktail Reception on the 17th November followed by a 2-day programme on technical developments and market trends in the roofing and geomembrane waterproofing industry. A tabletop exhibition will run alongside the conference.

Waterproof Membranes 2015 will provide a global forum for all companies involved in bitumen, thermoplastic, elastomeric and liquid waterproofing membranes. The conference will give the opportunity to open discussion on the latest technology and market developments in membranes, materials and applications. In a sector in which there is often a range of alternative solutions that are increasingly offering enhanced product performance or multi-functional capability the conference provides the forum to review the extensive opportunities on offer to the building, civil engineering and other industries.

Waterproof Membranes 2015 will offer superb opportunities to network and interact with engineers, specifiers, researchers and commercial personnel working for the world's leading membrane producers; raw material and component suppliers; machinery manufacturers; and institutes or companies involved in the research, testing and certification of membranes.

GIULIA ESPOSITO, CONFERENCE ORGANISER
Applied Market Information Ltd.
6 Pritchard Street, Bristol, BS2 8RH, United Kingdom
Tel: +44 (0) 117 314 8111
Fax: +44 (0) 117 311 1534
Email: ge@amiplastics.com

JTC-1 TR3 Forum Slope Safety Preparedness for Effects of Climate Change, 18 and 19 November 2015 Naples, Italy, www.cmcc.it/events/workshop-slope-safety-preparedness-for-effects-of-climate-changes

GeoME 2015 - 7th International Conference GEOSYNTHETICS Middle East, 16 & 17 November 2015, Abu Dhabi, UAE, www.geosyntheticsme.com

Slope Engineering and Geotechnical Asset Management Conference 2015, 18-19 November 2015, London, United Kingdom, slopes.geplus.co.uk

TBM DiGs Tunnel Boring Machines in Difficult Grounds, 18-20 November 2015, Singapore, www.tbmdigs.org

Arabian Tunnelling Conference & Exhibition: Innovative Underground Infrastructure - And Opportunities, 23-25 November 2015, Dubai, UAE, www.atcita.com

Geo-Environment and Construction, 26-28 November 2015, Tirana, Albania, Prof. Dr. Luljeta Bozo, lulibozo@gmail.com; luljeta_bozo@universitetipolis.edu.al

ICSGE 2015 - The International Conference on Soft Ground Engineering, 3-4 December 2015, Singapore, www.geoss.sg/icsge2015

The 1st International Conference on Geo-Energy and Geo-Environment (GeGe2015) 4th and 5th December 2015, Hong Kong, http://gege2015.ust.hk

2015 6th International Conference Recent Advances in Geotechnical Engineering and Soil Dynamics, December 7-11, 2015, New Delhi (NCR), India, wason2009@gmail.com; wasonfeq@iitr.ernet.in, sharmamukat@gmail.com; mukutfeq@iitr.ernet.in, gvramanaiitdelhi@gmail.com, ajay-cbri@gmail.com

Southern African Rock Engineering Symposium an ISRM Regional Symposium, 5 January 2016, Cape Town, South Africa, http://10times.com/southern-african-rock

Environmental Connection Conference
February 16–19, 2016, San Antonio, Texas
www.ieca.org/conference/annual/ec.asp

This is IECA's premier educational event for the erosion, sediment control and stormwater industry. **Environmental Connection** combines intense, full and half day training courses with topic-focused technical sessions and the largest expo of its kind.

Over 4 days, **Environmental Connection** provides peer–reviewed education, products and technology which address four educational tracks:

- Erosion and Sediment Control
- Stormwater Management
- Surface Water Restoration
- MS4 Management

ASIA 2016 - Sixth International Conference on Water Resources and Hydropower Development in Asia, 1-3 March 2016, Vientiane, Lao PDR, www.hydropower-dams.com/pdfs/asia20161.pdf

GeoAmericas 2016 3rd Panamerican Conference on Geosynthetics, 11 – 14 April 2016, Miami Beach, USA, www.geoamericas2016.org

International Symposium on Submerged Floating Tunnels and Underwater Structures (SUFTUS-2016), 20-22 April 2016, Chongqing, China, www.cmct.cn/suftus

World Tunnel Congress 2016 "Uniting the Industry", April 22-28, 2016, San Francisco, USA, http://www.wtc2016.us

International Symposium "Design of piles in Europe - How did EC7 change daily practice?", 28-29 April 2016, Leuven, Belgium, www.etc3.be/symposium2016

7th In-Situ Rock Stress Symposium 2016 - An ISRM Specialised Conference, 10-12 May 2016, Tampere, Finland, www.rs2016.org

84th ICOLD Annual Meeting, 16-20 May 2016, Johannesburg, South Africa, www.icold2016.org

2nd International Conference on Rock Dynamics and Applications (RocDyn-2), 18 – 20 May 2016, Suzhou, China http://rocdyn.org

13th International Conference Underground Construction Prague 2016 and 3rd Eastern European Tunnelling Conference (EETC 2016), 23 to 25 May 2016, Prague, Czech Republic, www.ucprague.com

GEOSAFE: 1st International Symposium on Reducing Risks in Site Investigation, Modelling and Construction for Rock Engineering - an ISRM Specialized Conference, 25 – 27 May 2016, Xi'an, China, www.geosafe2016.org/dct/page/1

14th International Conference of the Geological Society of Greece, 25-27 May, Thessaloniki, Greece, www.ege2016.gr

NGM 2016 - The Nordic Geotechnical Meeting, 25 - 28 May 2016, Reykjavik, Iceland, www.ngm2016.com

International Mini Symposium Chubu (IMS-Chubu) New concepts and new developments in soil mechanics and geotechnical engineering, 26 - 28 May 2016, Nagoya, Aichi, Japan, www.jiban.or.jp/index.php?option=com_content&view=article&id=1737:2016052628&catid=16:2008-09-10-05-02-09&Itemid

19SEAGC – 2AGSSEAC Young Geotechnical Engineers Conference, 30th May 2016, Petaling Jaya, Selangor, Malaysia, seagc2016@gmail.com

19th Southeast Asian Geotechnical Conference & 2nd AGSSEA Conference Deep Excavation and Ground Improvement, 31 May – 3 June 2016, Subang Jaya, Malaysia, seagc2016@gmail.com

ISSMGE TC211 Conference Session within the framework of the 19th Southeast Asian Geotechnical Conference “GROUND IMPROVEMENT works: Recent advances in R&D, design and QC/QA”

ISL 2016 12th International Symposium on Landslides Experience, Theory, Practice, Napoli, June 12th-19th, 2016, www.isl2016.it

4th GeoChina International Conference Sustainable Civil Infrastructures: Innovative Technologies for Severe Weathers and Climate Changes, July 25-27, 2016, Shandong, China, http://geochina2016.geoconf.org

6th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics August 1-6, 2016, Greater Noida (NCR), India, www.6icragee.com

EUROC 2016 - ISRM European Regional Symposium Rock Mechanics & Rock Engineering: From Past to the Future, 29-31 August 2016, Ürgüp-Nevşehir, Cappadocia, Turkey http://eurock2016.org

3rd ICTG – 3rd International Conference on Transportation Geotechnics 4 - 7 September 2016, Guimaraes, Portugal, www.civil.uminho.pt/3rd-ICTG2016

IAS’5 5th International Conference on Geotechnical and Geophysical Site Characterisation, 5-9 September 2016, Gold Coast, Queensland, Australia http://www.isc5.com.au

SAHC 2016 - 10th international Conference on Structural Analysis of Historical Constructions 13-15 September 2016, Leuven, Belgium, www.sahc2016.be

13 Baltic States Geotechnical Conference Historical Experiences and Challenges of Geotechnical Problems in Baltic Sea Region, 15 - 17 September 2016, Vilnius, Lithuania, http://www.13bsgc.lt

EuroGeo 6 – European Regional Conference on Geosynthetics, 25 – 29 Sep 2016, Istanbul, Turkey, www.eurogeo6.org

ARMS 9, 9th Asian Rock Mechanics Symposium, ISRM Regional Symposium, 18-20 October 2016, Bali, Indonesia, http://arms9.com

GeoAsia 6 - 6th Asian Regional Conference on Geosynthetics 8-11 November 2016, New Delhi, India, http://seags.ait.asia/news-announcements/11704

RARE 2016 Recent Advances in Rock Engineering 16-18 November 2016, Bangalore, India, www.rare2016.in

AfriRock 2017, 1st African Regional Rock Mechanics Symposium, 12 – 17 February 2017, Cape Town, South Africa, www.saimm.co.za/saimm-events/upcoming-events

World Tunnel Congress 2017
Surface problems – Underground solutions
9 to 16 June 2017, Bergen, Norway
www.wtc2017.no

“Surface problems – Underground solutions” is more than a slogan; for ITA-AITES and its members it is a challenge and commitment to contribute to sustainable development. The challenges are numerous and the availability of space for necessary infrastructure ends up being the key to good solutions. The underground is at present only marginally utilized. The potential for extended and improved utilization is enormous.

EUROCK 2017
13-15 June 2017, Ostrava, Czech Republic

Contact Person: Prof. Petr Konicek

Address
Studentska 1768
708 00 Ostrava-Poruba
Czech Republic
Telephone: + 420 596 979 224
Fax: + 420 596 919 452
E-mail: petr.konicek@ugn.cas.cz

19th International Conference on Soil Mechanics and Geotechnical Engineering, 17 - 22 September 2017, Seoul, Korea, www.icsmge2017.org

GeoAfrica 2017
3rd African Regional Conference on Geosynthetics
9 – 13 October 2017, Morocco

11th International Conference on Geosynthetics (11ICG)

16 - 20 Sep 2018, Seoul South Korea
csyoo@skku.edu

10th Asian Rock mechanics Symposium - ARMS10
October 2018, Singapore

Prof. Yingxin Zhou
Address:
1 Liang Seah Street
#02-11 Liang Seah Place
SINGAPORE 189022
Telephone: (+65) 637 65363
Fax: (+65) 627 35754
E-mail: zyingxin@dsta.gov.sg

AFTES International Congress
"The value is Underground"
13-16 November 2017, Paris, France

World Tunnel Congress 2018
20-26 April 2018, Dubai, United Arab Emirates

14th ISRM International Congress
2019, Foz de Iguaçu, Brazil

Contact Person: Prof. Sergio A. B. da Fontoura
E-mail: fontoura@puc-rio.b

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

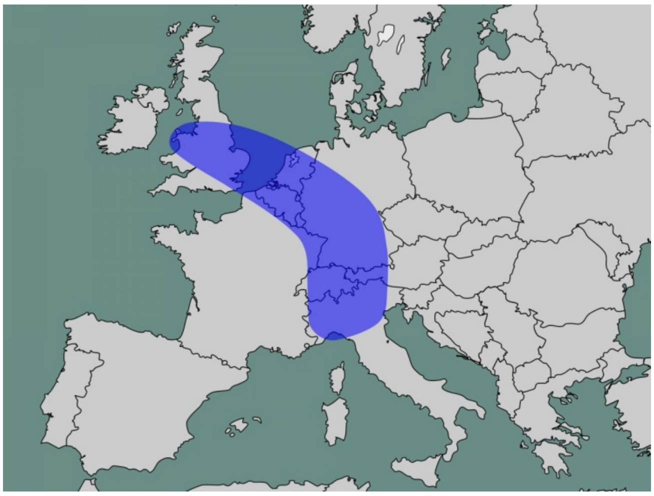
Switzerland has completed construction on the world's longest tunnel

The Swiss Alps are an unforgiving landscape of rugged, rocky peaks and lush, green valleys. Connecting communities that would be otherwise isolated by the vast mountain range — including cultural and economic hubs such as Zurich, Milan, and Turin — is no easy task.

Tunneling and track-laying for the 35-mile NEAT Gotthard Base Tunnel has been completed, making it officially the longest tunnel in the world, surpassing Japan's 14-1/2-mile Seikan Tunnel.

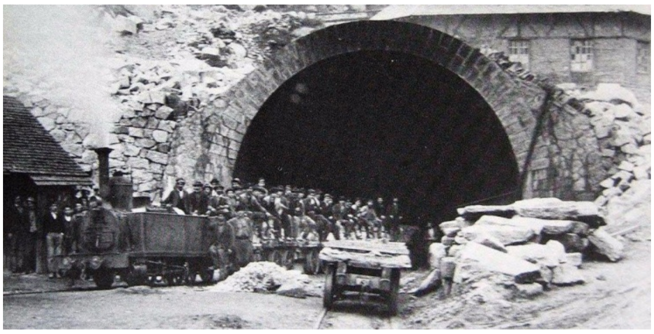
Swiss authorities held a media day inside the tunnel on Monday to announce that most of the technical work for the tunnel had been completed, the Swiss newspaper TDG reports. Testing will begin October 1 in anticipation of the first passenger and freight trains in June 2016.

Europe's most densely populated belt, historically known as the "blue banana," stretches from northern England south through the Netherlands, Switzerland, France, and Germany into northern Italy.



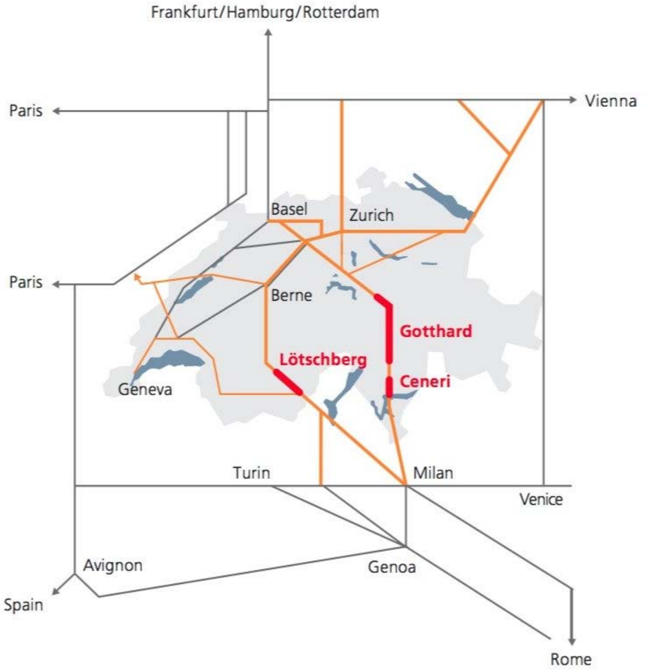
Most of this area — inhabited by approximately 111 million people — is relatively flat, except for Switzerland's notorious Alps. The Gotthard Pass has proven itself a vital link between Switzerland and northern Italy for hundreds of years.

The first tunnel on the Gotthard axis, connecting Zurich and Milan by train, was completed in 1882 as a joint venture by Switzerland, Germany, and Italy, all of which benefit from trade along the vital north-south route.

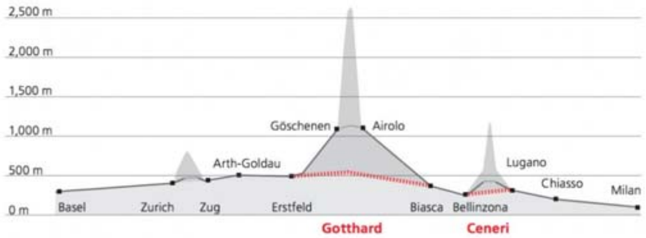


This new tunnel has been financed entirely by Switzerland, at a cost of approximately $10.3 billion.

Travel time between Zurich, Lugano, and Milan will be shortened by an hour once the tunnel opens to passenger service in June 2016.



Trains will speed through the tunnel at more than 150 mph. This is only possible because the tunnel grade is almost completely flat throughout its entire length — much more level than the Alpine peaks above.



Flat route through the Gotthard and Ceneri

Since 1999, almost 2,000 workers have labored day and night to excavate 31 million tons of earth from far beneath the mountains. That's more than 2 million truck loads!

Solid bedrock was excavated using four German-made tunnel boring machines that can cut through almost 100 feet of solid rock every day.

The massive machines must be cooled with water so they don't overheat while cutting through layers of super-hard gneiss and granite rock.

But TBMs can't do it all, and excavation is a dangerous job. Eight workers have died during construction and are remembered by co-workers in this small memorial.

After months of boring and excavating, the two massive machines reached the midpoint of the tunnel in October 2010, joining the two construction segments.

Two parallel, single-track tubes about 40 meters apart, like the one shown here, make up the tunnel. There are two emergency access points along the route.

Every 235 meters, cross passages, like the one shown here, connect the two tubes in case of emergency and to allow air circulation.

The tunnel must remain at a constant temperature so as not to affect trains as they enter from the frigid Franco-Swiss winter.

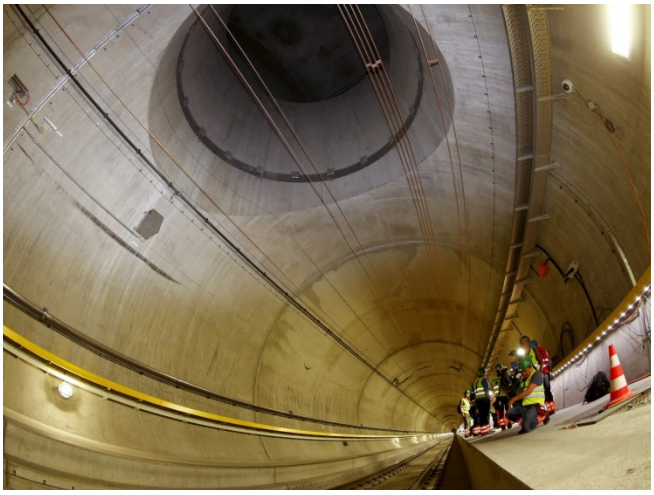
The tunnel is so long that workers use small folding bicycles to get from one spot to another.

Laying track in the tunnel has been quicker than the previous boring stages — pun intended. On October 31, 2014, workers celebrated laying the final track segment with what they call a "golden sleeper."

So far, the project has remained on time and without delays in construction. Testing the tunnel's tracks, ventilation and communications capabilities will begin in October.

Specially decorated locomotives were on hand to show off the newly completed tunnel for members of the press.

Journalists got to see — and photograph — a first-hand look at the inside of the cavernous tunnel.



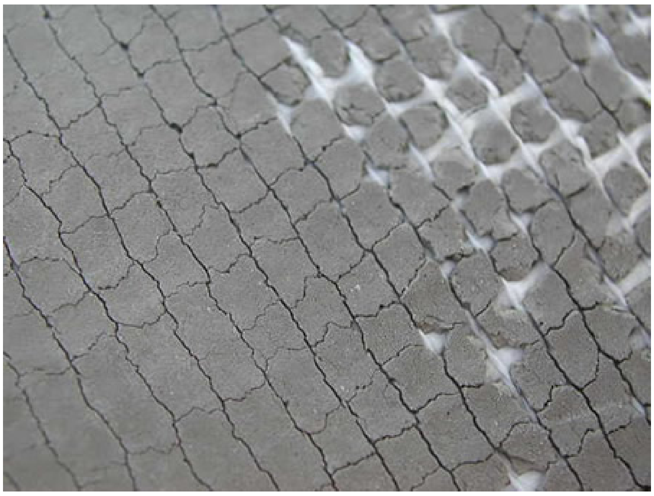
While travelers will appreciate the significant time decrease on their journey, they'll certainly miss out on some pristine Alpine scenery.

The Gotthard Base Tunnel will officially open with a festival in June 2016, but only a lucky 1,000 of the 500,000 festival-goers will have tickets for the first trip.

(Graham Rapier / Business Insider, Aug. 25, 2015, http://www.businessinsider.com/worlds-longest-tunnel-switzerland-2015-8#ixzz3k6sEM8kW)

Graphene and the Next Generation of Geosynthetics

Geosynthetic materials and products continue their steady development, as additive packages and manufacturing technologies evolve. Today, however, is different. Today, we are truly on the verge of a significant leap in geosynthetic performance. The enabler? Graphene. That single layer of carbon atoms has a specific strength higher than steel. It is self-repairing and has higher electrical conductivity than copper. It is even impermeable to helium atoms! Nanogeocomposites are the wave of the future.



Might graphene in a geosynthetic strengthen a cover system against (rare but costly) wind uplift risk?

Though it is not directly related to geosynthetics, it is worth noting that the 2010 Nobel Prize in Physics was awarded to Andre Geim and Konstantin Novoselov for their research into graphene's properties and utilization.

So, what would you like your geosynthetic to do that it presently cannot? What would raise performance to the next level (or further) for your projects? In example, graphene is already being incorporated into geotextile fibers to make them conductive for electrical leak location surveys.

Bond the conductive geotextile to a geomembrane or geonet.

Leak location might be improved by graphene-enhanced geosynthetics in a barrier system.

Advantages of Graphene

To help further your thoughts, please keep in mind that graphene can improve:

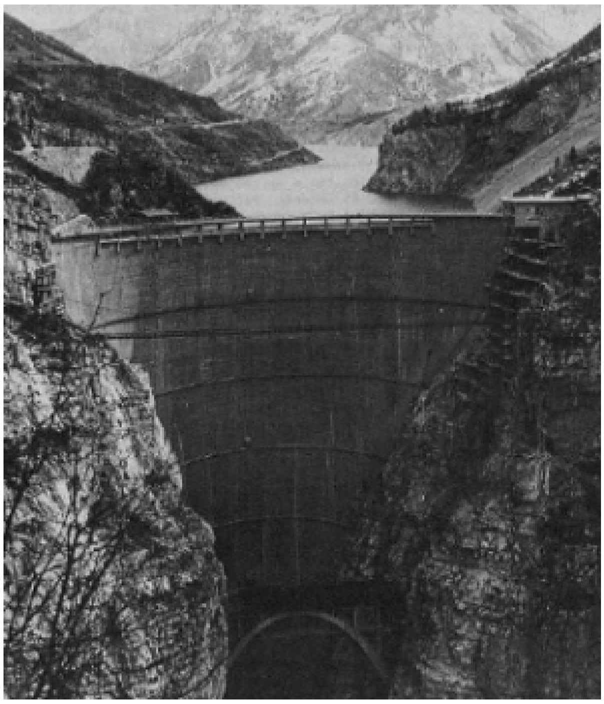
- Thermal conductivity: heat removal
- Electrical conductivity: geomembranes, geotextiles, geogrids
- Hydrophilic performance
- Hydrophobic performance
- Antimicrobial performance: geotextile filter clogging prevention
- Strength with weight reduction
- Strength with ductility
- Sense: stress, temperature, moisture
- Water purification
- Precipitation from solutions
- De-watering
- Water stabilization
- Big data collection/interpretation
- Self-sealing in the presence of carbon.

(Ian D. Peggs / geosynthetica.net, August 12, 2015, http://www.geosynthetica.net/graphene-nanogeocomposites-geosynthetics)

ꕥ ꕥ

Dam Vaiont Failure

The failure of the dam Vaiont is a catastrophic event not due to structural failure of the arched double curvature dam, but in a huge landslide slope of a flood basin. Despite the fact that in the area of Vaiont there was every indication of a "problem" area, though political-economic interests, combined with the absence of a common language among geologists and engineers, led to disastrous errors and omissions.



Before

After

Failure Date: October 9, 1963

Casualties: Approximately 2,600 deaths and destruction of cities, Longarone and Villanova Valley Piave.

History: The Vaiont dam was completed in 1960, at a high altitude valley in the Italian Alps and was 266 meters tall, making it the second highest dam in the world after the dam Cupola.

The geomorphology of the area indicated that there was risk for the southern slopes, mainly. Nevertheless it was decided by the engineers of the project that there was no reason for concern.

Not having sufficient geotechnical data, it was decided to draw up a typical geotechnical analysis. the existence of a prehistoric landslide which is still active was noted. But the company had already spent a huge amount of money, so they did not want to stop the project.

During the first filling of the reservoir (February to November 4, 1960), movement was seen in the southern slope. While at the beginning the landslide was ranged a few mm / day, in October the landslide was ranged at about 4cm / day. As the reservoir began to reach the planned level of filling, a large crack opened (tension crack), 300 m length and 1,5 m width. On 4 November, while the filling of the reservoir was continuing, a part of the landslide, measuring 500x500m, (700.000 m3), slid into the reservoir within 10 minutes.

The engineers tried to control the rate of movement of the slope through decreasing and increasing the reservoir level.

After 3 years it was found that the slip rate was increased dramatically. Engineers had no longer the control. Heavy rains made worse the situation. Immediate reduction in reservoir level was decided in an effort to check the landslide which was moving uncontrollably at up to 0,4m / day, without success but with terrible consequences.

The latest measurements on 9 October that were recorded were 80cm / day in a large area of the landslide. The same day at 22:15, the landslide accelerated. A large block with length 2km, width 1,5km, and a thickness of several hundred meters (2.7 × 10 8 m3) slid from the hillside to the reservoir at a speed of 110km / h. The induced wave outstripped the dam at 70m and the downstream valley was flooded destroying cities Villanova, Longarone and Casso.

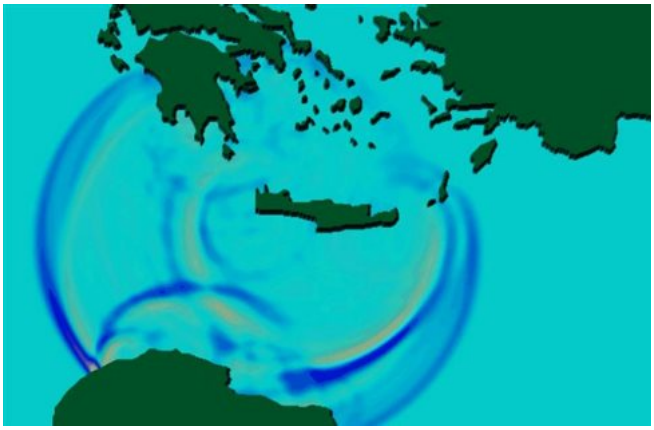
The most tragic failure in history with 2,600 dead people.

(Written by Geoengineer.org, Newsletter No 126, August 2015)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Μοντέλο του ολέθρου

Προσομοίωση: Τσουνάμι στην Κρήτη κατακλύζει τη Μεσόγειο

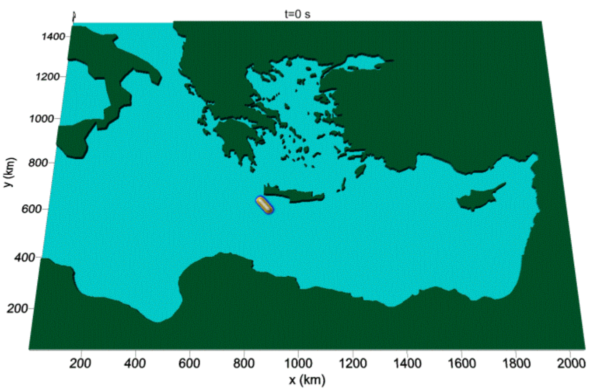


Οι ερευνητές προσομοίωσαν τσουνάμι από σεισμούς μεγέθους μέχρι 7,0 βαθμών (Πηγή: Samaras et al., Ocean Science)

Ενδεχόμενος ισχυρός σεισμός νότια της Κρήτης θα προκαλούσε καταστροφικό τσουνάμι που θα πλημμύριζε τις ακτές σε βάθος τουλάχιστον πέντε μέτρων, δείχνει μοντέλο που ανέπτυξε ευρωπαϊκή ομάδα με ελληνική συμμετοχή.

Η περιοχή νότια της Κρήτης είναι άκρως σεισμογόνος, καθώς το νησί βρίσκεται σχεδόν πάνω στο όριο ανάμεσα στην αφρικανική και την ευρασιατική τεκτονική πλάκα. Καθώς η πλάκα της Αφρικής κινείται προς τα βόρεια, βυθίζεται κάτω από την ευρασιατική πλάκα και παραμορφώνει τον φλοιό της γεννώντας ισχυρούς σεισμούς.

Περίπου το 10% των τσουνάμι που εκδηλώνονται σε όλο τον πλανήτη αφορούν τη Μεσόγειο, και αυτό συμβαίνει περίπου μία φορά ανά 100 χρόνια, επισημαίνει η ομάδα του Αχιλλέα Σαμαρά, ερευνητή του Πανεπιστημίου της Μπολόνια και επικεφαλής της νέας μελέτης.



Κλικ για μεγέθυνση: Animation που δείχνει την εξάπλωση ενός τσουνάμι νοτιοδυτικά της Κρήτης (Πηγή: Samaras et al., Ocean Science)

Ενδεχόμενο νέο συμβάν θα ήταν άκρως καταστροφικό, καταστοφικά, δεδομένου ότι οι μεσογειακές ακτές φιλοξενούν σήμερα γύρω στους 130 εκατομμύρια ανθρώπους. Επιπλέον, η μεσογειακή λεκάνη είναι σχετικά μικρή και τα κύματα θα χρειάζονταν λίγο χρόνο μέχρι να σαρώσουν τις ακτές, ορίζοντας έτσο το χρονικό περιθώριο που θα είχε ο πληθυσμός για να απομακρυνθεί.

Σε συνεργασία με τον Θεοφάνη Καραμπά του Αριστοτέλειου Πανεπιστημίου Θεσσαλονίκης και τη Ρενάτα Αρκέτι του Πανεπιστημίου της Μπολόνια, ο Σαμαράς ανέπτυξε ένα υπολογιστικό μοντέλο που προσομοιώνει τη γέννηση και την εξάπλωση τσουνάμι στη Μεσόγειο, βασισμένο σε δεδομένα για το βάθος της θάλασσας, τις ακτογραμμές και το ανάγλυφο της περιοχής.

Η μελέτη δημοσιεύεται στο Ocean Science, μια ανοιχτή επιθεώρηση της Ευρωπαϊκής Ένωσης Γεωεπιστημών (http://www.ocean-sci-discuss.net/12/673/2015/osd-12-673-2015.pdf).

«Προσομοιώνουμε το σχηματισμό τσουνάμι εισάγοντας μετατοπίσεις που προκαλούν σεισμοί είτε στον θαλάσσιο πυθμένα είτε στην επιφάνεια» εξηγεί ο Σαμαράς σε ανακοίνωση της Ένωσης. «Το μοντέλο προσομοιώνει στη συνέχεια πώς αυτές οι διαταραχές -τα κύματα του τσουνάμι- διαδίδονται και μεταμορφώνονται καθώς πλησιάζουν [...] και κατακλύζουν τις παράκτιες περιοχές».

Η μελέτη προσομοιώνει τσουνάμι από σεισμούς έντασης περίπου 7,0 βαθμών έξω από τις ακτές της ανατολικής Σικελίας και της νοτιοδυτικής Κρήτης. Και στις δύο περιπτώσεις τα κύματα θα πλημμύριζαν παράκτιες περιοχές περίπου μέχρι το υψόμετρο των πέντε μέτρων από την επιφάνεια της θάλασσας. Οι επιπτώσεις θα ήταν χειρότερες για το νησί της Κρήτης, με το νερό να καλύπτει χερσαία έκταση 3,5 τετραγωνικών χιλιομέτρων.

Ο Σαμαράς τονίζει πάντως ότι οι σεισμοί και τα τσουνάμι της μελέτης δεν είναι ακραία ισχυρά: «Παρόλο που τα τσουνάμι που προσομοιώσαμε δεν είναι μικρά, υπάρχει καταγεγραμμένη ιστορία σημαντικά ισχυρότερων γεγονότων» επισημαίνει.

Για παράδειγμα, ένα σμήνος σεισμών που χτύπησε έξω από την Κρήτη το 365 μ.Χ., με μέγεθος μέχρι 8,5 βαθμών, προκάλεσε τσουνάμι που κατέστρεψε ολόκληρες πόλεις στην Ελλάδα, την Ιταλία και την Αίγυπτο -μόνο στην πόλη της Αλεξάνδρειας, οι νεκροί εκτιμώνται γύρω στις 5.000.

Πιο πρόσφατα, το 1908, σεισμός μεγέθους περίπου 7,0 βαθμών εκδηλώθηκε στη Μεσίνα της Ιταλίας, προκαλώντας τσουνάμι που σκότωσε χιλιάδες. Οι μαρτυρίες μιλούν για κύματα με ύψος άνω των 10 μέτρων.

Πιο γνωστό όμως είναι το τσουνάμι από την έκρηξη του ηφαιστείου της Σαντορίνης γύρω τον 16ο αιώνα π.Χ, μια από τις ισχυρότερες εκρήξεις στην ιστορία της ανθρωπότητας, η οποία προκάλεσε τσουνάμι στο οποίο αποδίδεται η καταστροφή του Μινωικού πολιτισμού στην Κρήτη.

«Οι προσομοιώσεις μας θα μπορούσαν να βοηθήσουν τις αρχές και του διαμορφωτές πολιτικών να δημιουργήσουν μια λεπτομερή βάση δεδομένων για σενάρια εκδήλωσης τσουνάμι στην Μεσόγειο» καταλήγει η ανακοίνωση των ερευνητών.

(Βαγγέλης Πρατικάκης / Newsroom ΔΟΛ, 27 Αυγ. 2015, http://news.in.gr/science-technology/article/?aid=1500021246&ref=newsletter)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

The World's 25 Most Impressive Megaprojects
The biggest and boldest projects on the planet

Skyscrapers are reaching for new record heights, huge tunnels are establishing new transportation connections, and colossal bridges are spanning greater distances than ever before. Around the world, gigantic engineering and infrastructure projects are opening up or are closing in on their completion. So we surveyed those finished within the last three years and those under construction to find the most jaw-dropping dams, buildings, and big machines on Earth.

Panama Canal Expansion, Panama

Time to build: 11 years
Cost to build: $5.25 billion

The Panama Canal is so 1914. That's why the expansion project, set to complete in 2016, will carve out a new 3.8-mile-long channel for new locks—which require 4.4 million cubic meters of concrete—and widen and deepen what is already there. Ships have grown a lot over the past century, and so the world's most famous canal must do the same to keep pace, even if that does mean whittling away more of Panama.

Port Mann Bridge, Vancouver, B.C.

Time to build: 6 years
Cost to build: $1.93 billion

The widest bridge in the world (until the Bay Bridge's east span recently opened), the bridge east of Vancouver, B.C., which opened in 2012, remains the second-longest bridge in North America. The cable-stay bridge uses an impressive 288 cables to reach a total bridge length of 6,866 feet.

Three Gorges Dam, China

Time to build: 17 years
Cost to build: $22 billion

We can't even comprehend the amount of concrete needed to construct the world's largest dam. Standing on China's Yangtze River, this 17-year, $59 billion project measures 595 feet tall, 131 feet wide, and more than 7,600 feet long, with 32 main turbines producing electricity.

One World Trade Center, New York

Time to build: 7 years
Cost to build: $3.8 billion

The tallest building in the Western Hemisphere rises a symbolic 1,776 feet above New York City. The largely steel structure also includes a concrete core that provides additional security and strength. It's almost as if there's a second skyscraper within the first.

Aizhai Suspension Bridge, China

Time to build: 5 years
Cost to build: $600 million

The world's highest bridge, connecting two tunnels in China, is also one of the world's longest suspension bridges. Opened in 2012, the bridge sits 1,200 feet over the Dehang Canyon and spans a tower-to-tower distance of 3,858 feet. The mountains on either side anchor the suspension towers.

Marmaray Tunnel, Turkey

Time to build: 9 years
Cost to build: $4.5 billion

It took nine years and $4.5 billion to build, but the 47-mile underwater railway tunnel connects the European and Asian sides of town, giving Istanbul a new rail line into and out of the city when it opened in 2013.

FFR Grand Stade, Paris

Time to build: 4 years
Cost to build: $552 million

Retractable roofs are nice. Retractable fields, too. Put them together and add 82,000 seats and the rugby federation of France will have a nearly mobile stadium on a giant scale located south of Paris. The two million-square-foot venue will become one of the largest stadiums in all of Europe, including serving as the largest roofed entertainment venue. And one of the most moving.

Jubail Industrial City, Saudi Arabia

Time to build: 10 years
Cost to build: $11 billion

The ongoing expansion of a city built from the sand up starting in the 1970s required plenty of logistical planning. The project, located in the Eastern Province of Saudi Arabia, is undergoing an $11 billion expansion to update all things industrial. The four-phase project over nearly eight square miles includes eight blocks of industrial plants, four blocks of petrochemical industry, three blocks of support industries and four blocks of aluminum and other smelting plants. And that doesn't even include removing hills, building tunnels, expanding fiberoptics, building highways and using seawater for daily cooling.

Liuchonghe Bridge, China

Time to build: Unavailable
Cost to build: Unavailable

Opened in 2013 with a 1,437-foot span, the second-highest cable-stayed bridge in the world rises 1,100 feet above the Liuchonghe River. With one of the river canyon's walls acting as a virtual cliff and the two towers sitting above the canyon—one at 623 feet tall and the other 517 feet—you can expect some crazy views if you visit here.

London Crossrail, London

Time to build: 11 years
Cost to build: $23 billion

London continues to grow underground. Eight tunneling machines recently wrapped up 26 new miles of tunnel for new subway track that will connect 40 stations—including 10 completely new ones—to improve transportation in England's largest city.

Hyderabad Metro Rail, India

Time to build: 14 years
Cost to build: $2 billion

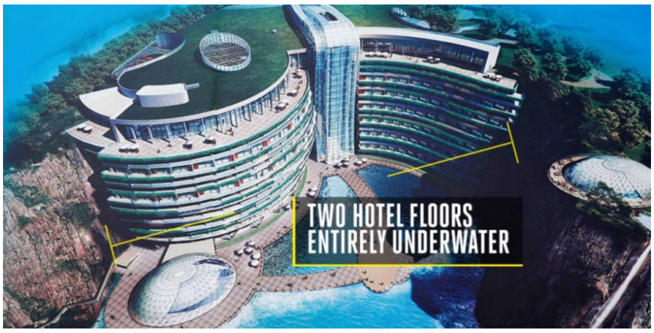
It will take all of the $2 billion-plus to create a new, elevated Hyderabad Metro Rail system in India. With initial phases nearing opening, the 46-mile light rail system will modernize an entire region. Elevated stations will appear every kilometer and are expected to handle 15 million riders, with trains arriving at stations every three to five minutes. With trains running at an average of over 20 miles per hour, all technology—track, stations and support—will run above ground.

Hong Kong-Zhuhai-Macao Bridge, China

Time to build: 7 years
Cost to build: $10.6 billion

The incredible scope of this mega-infrastructure project includes a 16-mile bridge-to-tunnel structure, with the tunnel portion spanning about four miles. Two artificial islands for the tunnel landings will help engineers create both the tunnel section and anchor the bridge portions, which will connect Hong Kong and the mainland via a mega-crossing.

Songjiang Hotel, China



Time to build: 2 years
Cost to build: $538 million

Don't mind the waterfall. It's a key feature of this hotel built into a 328-foot-tall quarry outside of Shanghai. The 19-story hotel will have the waterfall cascading down the middle and two hotel floors that are entirely underwater.

Russky Bridge, Russia

Time to build: 4 years
Cost to build: $1 billion

At a total length of over 10,000 feet, the $1 billion Russky Bridge in southwestern Russia became the world's longest cable-stayed bridge when it opened in 2012. The 168 cable stays from its towers support the load of the bridge, and pylons standing more than 1,000 feet high anchor the cables. Just the middle channel of this three-segment bridge is about the length of the Golden Gate Bridge. The longest cables stretch nearly 2,000 feet.

Etihad Rail, United Arab Emirates

Time to build: Unknown
Cost to build: $11 billion

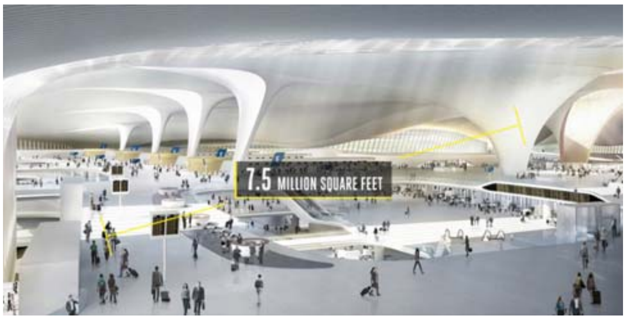
Rail may soon be the fastest and easiest way to get around the United Arab Emirates. The three-phased Etihad Rail project, which now has the first phase wrapped, plans to connect 745 miles of new rail across the country to link with Saudi Arabia, Qatar, Oman, Bahrain, and Kuwait.

Al Maktoum International Airport, Dubai

Time to build: Estimated: 20 years
Cost to build: $31 billion

The original opening in 2010 was never meant to be the final word on the new airport for Dubai. Al Maktoum will receive a $32 billion expansion set to last up to eight years that will allow for 220 million passengers per year to fly out of the desert. The shear scope of an airport spread over 21 square miles will accommodate 100 Airbus A380 aircrafts at any given time.

Beijing Daxing International Airport, China



Time to build: 5 years
Cost to build: $13 billion

This will be the home of the world's largest airport terminal, the gleaming Terminal 1, designed by Zaha Hadid. Built to accommodate 100 million passengers per year and with seven runways and 7.5 million square feet of the space, the airport's first phase should finish in 2018, with the rest slated to wrap up in 2025.

Bertha Tunnel-Boring Machine, Seattle

Time to build: 2 years
Cost to build: $80 million

While Bertha hasn't moved forward since it got stuck underground in December 2013, the world's largest tunnel-boring machine, at 57.5 feet in diameter, is undergoing repairs that should have it churning dirt again this fall. The 7,000-ton, 326-foot-long machine needed even more robust power to make it all the way under downtown Seattle as it digs a new transportation artery.

New Century Global Centre, China

Time to build: 3 years
Cost to build: Unavailable

At more than 18 million square feet, the New Century Global Centre is the world's largest freestanding building in terms of floor space. The structure includes multiple shopping malls, hotels, offices, theatres, theme-park-like attractions, and even a water park.

Atlanta Falcons Stadium, Atlanta

Time to build: 3 years
Cost to build: $1.2 billion

Any new football stadium is probably going to get a retractable roof. This $1.2 billion altar to opulence, however, has one that's rather unusual: It's made of eight roof "petals" that create a camera lens-like effect when the roof opens and closes. Made of ETFE fabric, the translucent panels allow light into the stadium even when they're closed. The roof will take eight minutes to open and expose the brand-new stadium planned for a 2017 opening.

Shanghai Tower, China

Time to build: 8 years
Cost to build: $2.4 billion

When the world's second-tallest building opens, probably later this year, stacked steel plates will create a "tuned-mass damper" at the top of Shanghai Tower to protect it against swaying. At 2,073 feet tall, there's plenty of room inside the tower for offices, hotel rooms and public space. The 21 sky lobbies should also offer plenty of mind-blowing views.

Bay Bridge Eastern Span, San Francisco-Oakland

Time to build: 12 years
Cost to build: $6.4 billion

The world's longest self-anchored suspension bridge, thanks to its 2,047-foot main span, is also the world's widest bridge. A single 2.6-foot-diameter main cable loops around the roadway, held aloft on a 525-foot tower that supports 90 percent of the bridge's weight.

State Route 520 Floating Bridge, Seattle

Time to build: 5 years
Cost to build: $2 billion

Concrete floats quite nicely in Seattle, where engineers have devised a 7,710-foot-long floating bridge, the longest in the world. The new State Route 520 bridge will replace the current world's longest on a stretch of highway that floats across Lake Washington, connecting Seattle to points east. The new structure, rising 20 feet above the water, will open to traffic in spring 2016.

Skytree, Tokyo

Time to build: 4 years
Cost to build: $806 million

The world's tallest "tower" in the world (Burj Khalifa remains the world's tallest building) opened in 2012 in Tokyo. Standing 2,080 feet, the $1.8 billion tower has six TV transmission antennas has two observation decks for panoramic views, allowing tourists to survey Japan's capital city from 1,148 feet and 1,476 feet up.

Silver Line, Washington, D.C.

Time to build: 8 years
Cost to build: $6.8 billion

The D.C. Metro is adding a color. The new silver line required 11.7 miles of new track and five new stations for the completion of phase one, which opened in 2014. Work has already started on phase two, which will add another 11.4 miles of track and six new stations, including a much-needed connection to notoriously difficult-to-reach Washington Dulles International Airport. The silver line has been noted as one of the most complex transportation projects in the country, as engineers had to plan and build amidst the already developed region.

(Tim Newcomb / Popular Mechanics, August 11, 2015, http://www.popularmechanics.com/technology/g2121/the-worlds-25-most-impressive-megaprojects/)

Τα 6 Μεγαλύτερα Έργα στον Κόσμο!!! Κατασκευές που κόβουν την ανάσα

Από την Κίνα μέχρι τη Μεγάλη Βρετανία και από τη Σαουδική Αραβία και το Ντουμπάι μέχρι τη Ρωσία, δεκάδες -τεράστια σε διαστάσεις και κόστος- έργα συνεχίζονται, παρά την οικονομική κρίση, ενώ αρκετά βρίσκονται είτε πολύ κοντά στην ολοκλήρωση είτε έχουν εγκαινιαστεί.

Το ακριβότερο όλων είναι η επέκταση του Διεθνούς Αεροδρομίου Αλ Μακτούμ του Ντουμπάι, η οποία αναμένεται να κοστίσει 32 δισεκατομμύρια δολάρια. Αν και προς το παρόν το αεροδρόμιο λειτουργεί για μεταφορές αγαθών και προϊόντων, η σχεδιαζόμενη επέκταση θα το κάνει το μεγαλύτερο αεροδρόμιο του κόσμου σε μέγεθος και σε αριθμό επιβατών.

ο αεροδρόμιο, σύμφωνα με τα σχέδια των κατασκευαστών, θα είναι μέρος του Dubai World Central, μιας οικονομικής ζώνης-πόλης που θα αναπτυχθεί με επίκεντρο το αεροδρόμιο και στην ουσία θα ζει από αυτό. Η οικονομική ζώνη θα καλύπτει έκταση 140 τετραγωνικών χιλιομέτρων και από το αεροδρόμιο θα μεταφέρονται συνολικά 12 εκατομμύρια τόνοι εμπορευμάτων τον χρόνο και 160 εκατομμύρια άνθρωποι τον χρόνο.

Εδώ αξίζει να σημειωθεί ότι το συνολικό project αρχικά είχε υπολογιστεί ότι θα είναι έτοιμο το 2017, όμως εξαιτίας της οικονομικής κρίσης η ολοκλήρωσή του αναμένεται να καθυστερήσει τουλάχιστον μέχρι το 2027!

Το ακριβότερο έργο είναι η επέκταση του Διεθνούς Αεροδρομίου Αλ Μακτούμ του Ντουμπάι, η οποία αναμένεται να κοστίσει 32 δισεκατομμύρια δολάρια

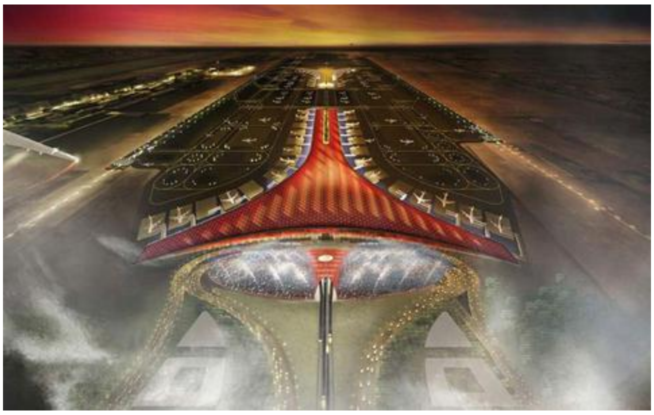
Αν εξαιρέσει κανείς το Διεθνές Αεροδρόμιο Αλ Μακτούμ, τα υπόλοιπα πιο ακριβά έργα του κόσμου συνεχίζουν και μάλιστα κάποια έχουν ολοκληρωθεί. Δεύτερο στη λίστα με τα ακριβότερα έργα είναι η επέκταση του μετρό του Λονδίνου (23 δισεκατομμύρια δολάρια), ενώ ακολουθούν το Φράγμα των Τριών Φαραγγιών (22 δισ. δολάρια), το Διεθνές Αεροδρόμιο Ντατσίνγκ του Πεκίνου (13 δισ. δολάρια), η Βιομηχανική Πόλη της Τζουμπαΐλ στη Σαουδική Αραβία (11 δισ. δολάρια) και η σιδηροδρομική γραμμή Etihad (11 δισ. δολάρια).

Από εκεί και πέρα, αν και αρκετά φθηνότερα, υπάρχουν αρκετά εντυπωσιακά έργα, όπως η υποθαλάσσια σήραγγα του Μαρμαρά στην Κωνσταντινούπολη (4,5 δισ. δολάρια) ή ο νέος ουρανοξύστης του World Trade Center, ο «Πύργος της Ελευθερίας» στη Νέα Υόρκη (3,8 δισ. δολάρια). Εξίσου εντυπωσιακός αναμένεται να είναι και ο Πύργος της Σανγκάης (2,4 δισ. δολάρια), ο οποίος μετά την ολοκλήρωσή του, που αναμενόταν μέσα σε αυτό το καλοκαίρι, θα είναι το δεύτερο πιο ψηλό κτίριο του κόσμου.

23 δισ. $ για το μετρό στο Λονδίνο

Η κατασκευή του αεροδρομίου ξεκίνησε τον Δεκέμβριο του 2014. Σε αυτό θα βρίσκεται το μεγαλύτερο τέρμιναλ του κόσμου. Θα ξεκινήσει να λειτουργεί το 2018.

Φράγμα των Τριών Φαραγγιών, Κίνα (22 δισ. δολάρια)
Το μεγαλύτερο υδροηλεκτρικό φράγμα του κόσμου στον ποταμό Γιανγκτσέ της Κίνας με ύψος 180 μέτρων και μήκος 2.335 μέτρων.



Διεθνές Αεροδρόμιο Ντατσίνγκ του Πεκίνου, Κίνα (13 δισ. δολάρια)

23 δισ. $ για το μετρό στο Λονδίνο

Καθώς το Λονδίνο συνεχώς επεκτείνεται και μεγαλώνει, μαζί του μεγαλώνει και το περίφημο μετρό του. Εδώ και περίπου 6 χρόνια κάτω από τη βρετανική πρωτεύουσα έχουν ξεκινήσει εργασίες για τη διάνοιξη της Crossrail, της νέας γραμμής του Tube (όπως είναι γνωστό το λονδρέζικο μετρό), η οποία θα έχει συνολικό μήκος 118 χιλιόμετρα (υπέργεια και υπόγεια) και θα συνδέει το Μπέρκσαϊρ και το Μπάκινγκχαμσαϊρ με το Εσεξ και το Νοτιοανατολικό Λονδίνο και θα περνά από περίπου 40 διαφορετικούς σταθμούς. Το έργο της επέκτασης του ιστορικού μετρό αναμένεται να κοστίσει συνολικά 23 δισεκατομμύρια δολάρια και τα πρώτα δρομολόγια, εάν όλα πάνε σύμφωνα με το πρόγραμμα, ξεκινήσουν το αργότερο το 2019.

(Χρήστος Στασινόπουλος / ΕΘΝΟΣ, 14 Αυγούστου 2015, http://www.analystsforchange.org/2015/08/6.html)

ꕥ ꕥ

Why the next global construction boom is sunk

You'd think a frequent ferry passenger (especially one who suffers from seasickness) would fancy a faster, smoother way to zip across the 50 miles between Helsinki and Tallinn, Estonia. Yet Estonian events promoter Louis Zezeran says the futuristic plans to build an underwater railway that connects these capital cities with a speedy train must surely be a joke. "It won't ever be done," he scoffs.

But like the little engine that could, engineers think they can — and not just those itching to burrow under the Gulf of Finland. Plenty of other places around the world have their own plans as well, including underwater rail links that would connect Gibraltar to the north of Africa, Vancouver Island to Vancouver, British Columbia, and even the southern tip of South Korea with its provincial island of Jeju (which, for the record, happens to be a dormant volcano). While similar plans exist to join Ireland with Wales, and Denmark with Germany, perhaps the most preposterous pipe dream would see a train snaking all the way from Beijing through eastern Siberia before crossing under the Bering Strait into Alaska — requiring a whopping 125 miles of tunnel, 91.5miles more than the world's longest tunnel today, in Japan.

Sure, some of these proposals will likely end up in the kind of scrapyard that would scare Thomas the Tank Engine straight. And they're not exactly cheap. That "Talinksi" fixed link, for example, could ring up to $14.5 billion — something that, along with construction noise and disrupted traffic or wildlife, might be cause for taxpayers to rail against. Yet feasibility studies to test the waters for many of these plans have already been conducted, and planners of at least one — the Femern project connecting the Danish island of Lolland with Germany's Fehmarn island — hope to break ground next year and be completed by 2024.

These ambitious projects are being driven by both environmental and economic reasons. After all, when electrically powered, a train "doesn't suffer from the same concerns as emissions from cars," says Andrew Potter, a logistics expert at Cardiff University who was involved with the feasibility report of an underwater rail between Wales and Ireland. And, for businesses that haul goods, a choo-choo is cheaper than a plane and faster than a ferry. Boating to Ireland from Wales takes two hours, for instance, while getting goods across by train would take around one.

Advocates behind these plans also argue that linking cities will help boost their countries' economies. Juho Siipo, managing director of Sweco Environment, the firm that conducted the pre-feasibility study for a link between Helsinki and Tallinn, says as many as 25,000 commuters will travel between the two cities each day, up from 30,000 who travel at least once a month right now. Meanwhile, the Femern project will reduce freight congestion running through the trade corridor between Scandinavia and Malta while also attracting business investments to both Denmark and Germany, says Jens Villemoes, press officer for Femern A/S, the state-owned firm coordinating the plans.

Big building ideas, of course, can quickly cave for a variety of reasons. Christian Ingerslev, vice president of the engineering consulting firm WSP Parsons Brinckerhoff, says today's tech can, theoretically, see tunnels go on forever. But there are still stark limitations, depending upon the ground material — rock? soft? — and the needs to transmit power, safely remove muck, meet ever-increasing safety regulations and defy water pressure that can mess with seals at depth. Gulp. No wonder experts like Potter think the 73-mile rail between Ireland and Wales would take a couple of decades to complete, while Ingerslev calls the tunnel beneath the Bering Strait "a pipe dream," owing to the fault lines.

Even so, many of today's existing tunnels — some of which connect England and France, Istanbul's Asian and European shores, and Japan's Hokkaido island with the Aomori Prefecture, which is the longest mainline rail tunnel to date, at 33.5 miles — overcame their own bumps in the road before completion. Which means certain challenges can be met. For the 8.5-mile-long Bosphorus tunnel linking the two coasts of Istanbul, for example, different types of ground materials forced engineers like Ingerslev to come up with linking solutions. He worked on the middle, immersed tunnel, which was joined at either end by rock tunnels dug with boring machines. Those were then linked to cut-and-cover tunnels used to approach the surface.

In other words, where there's a will, there's a way. And, today, migratory birds are tipping their beaks to the majestic wind turbines adorning the Danish coast as they fly between there and Fehmarn island and beyond. Luckily for them, the Femern rail link will ensure their views remain unmarred by a giant bridge linking Scandinavia to Europe, where an estimated $8.2 billion is likely to be poured into an underwater project that, Villemoes says, will "really bring the European community together."

(Tracy Moran / Ozy, Aug 20, 2015, http://www.ozy.com/fast-forward/why-the-next-global-construction-boom-is-sunk/62727)

The World's Longest (and Scariest) Glass Pedestrian Bridge

Haim Dotan didn't want to build a bridge. When two engineers approached the Israeli architect about designing a span across a 1,200-foot canyon in Zhangjiajie National Forest in China, his answer was a quick and resounding no.

The land is known for its dramatic jagged rock formations and rich vegetation. If it looks like a scene out of *Avatar*, that's because it is. The area, in the northwest part of Hunan province, was director James Cameron's inspiration for the movie's Halleluja Mountain. "[The developer] asked me, 'What do you think about a bridge from here to there?' And I said, 'No,'" Dotan says. "He looked at me and said 'Why, what are you talking about?' And I said, 'Why do you want a bridge? It's too beautiful.'"

The developer pressed him, and Dotan finally relented. "I told him, 'We can build a bridge but under one condition: I want the bridge to disappear.'"

When the Zhangjiajie Grand Canyon Glass Bridge opens in the fall, it will be the longest glass pedestrian bridge in the world. The structure stretches from one rocky summit to the next with little apparent effort. The bridge seems to float 1,300 feet above the ground, almost as though it were part of the clouds.

The engineering plans call for it to be 20 feet wide—large enough to host the fashion shows its developers plan to hold there—with a center platform that provides an unobstructed view and, for the adventurous types, a place for bungee jumping. The white supporting beams beneath the 5-centimeter-thick safety glass were originally 10 feet wide.

Dotan wasn't pleased. "I told them, 'No, there's no way,'" he says. "The bridge has to disappear."

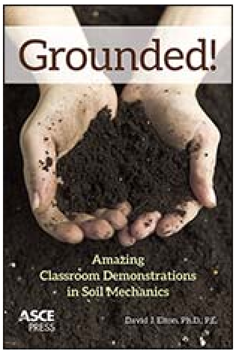
After more than three years of work, the structural engineers got the beams down to not quite 2 feet, thanks to suspension cables that stretch from the cliffs to the center of the span. Although the bridge has an ethereal look, Dotan says it can withstand wind gusts of more than 100 mph.

In recent years, China has shown a particular proclivity for building transparent bridges in epic locations. There's a diaphanous structure in Hunan Province that sways in the breeze 650 feet off the ground; another see-through walkway that wraps around a cliff.

Dotan's design is by far the most sophisticated of them. It's so elegant, in fact, its engineers have adopted a poetic way of thinking about the bridge. "The engineers described it as thin as a wing and as light as a swallow," Dotan says with a laugh. "My god, can you imagine a structural engineer describing a bridge like this?"

(Liz Stinson, WIRED, 06.05.2015, http://www.wired.com/2015/06/worlds-longest-scariest-glass-pedestrian-bridge, http://ow.ly/2ZE9JC)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Grounded!

Smazing Classroom Demonstrations in Soil Mechanics

David J. Elton

Dave Elton has done it again!

Exploding soils… Retaining walls made of paper… Gravity defying sand!

Grounded! Amazing Classroom Demonstrations in Soil Mechanics presents 35 serious but entertaining experiments that teach the fundamentals of soil mechanics to budding scientists and engineering students in an exciting and novel way. In this sequel to the popular *Soils Magic*, Elton has assembled a wealth of fascinating new experiments to illustrate the dynamics of how soils behave and how they can be manipulated.

Topics include: slaking, pile capacity, swelling clays, shear and compression, effective stress, capillary tension and flow, soil arching, tensile and compressive strength, soil identification, piping, liquefaction, relative density, soil filters, settlement rates, and many more.

Each demonstration includes easy-to-follow directions, illustrations, and an explanation of the engineering signifi-cance or application of the principle demonstrated. Videos of many experiments are also available.

An exciting tool for high-school and college instructors, the inexpensive and simple experiments in this book make soil mechanics fun to learn and are fascinating to even the casual science enthusiast.

David J. Elton, Ph.D., P.E, has taught civil engineering, specializing in geotechnical engineering, at Auburn University for more than 25 years. In addition, he practices as a professional engineer, has won the TRB Fred Burggraf award, and is a past-president of the North American Geosynthetics Society.

(ASCE Press, 2015)

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2012 – 2015)

ΕΕΕΕΓΜ
Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
Πολυτεχνειούπολη Ζωγράφου
15780 ΖΩΓΡΑΦΟΥ

Τηλ. 210.7723434
Τοτ. 210.7723428
Ηλ-Δι. secretariat@hssmge.gr ,
geotech@central.ntua.gr
Ιστοσελίδα www.hssmge.org (υπό κατασκευή)

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» Εκδότης: Χρήστος Τσατσανίφος, τηλ. 210.6929484, τοτ. 210.6928137, ηλ-δι. ctsatsanifos@pangaea.gr, editor@hssmge.gr, info@pangaea.gr

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» «αναρτώνται» και στην ιστοσελίδα www.hssmge.gr