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Αναμνήσεις διακοπών

Γίνετε Αρθρογράφοι του περιοδικού. Περιγράψτε έναν ενδιαφέροντα τόπο διακοπών σας με τεχνικό, γεωτεχνικό και γεωλογικό ενδιαφέρον, πλαισιώνοντας την περιγραφή σας με φωτογραφίες.

Raouche sea rock off the coast of the Lebanese capital of Beirut

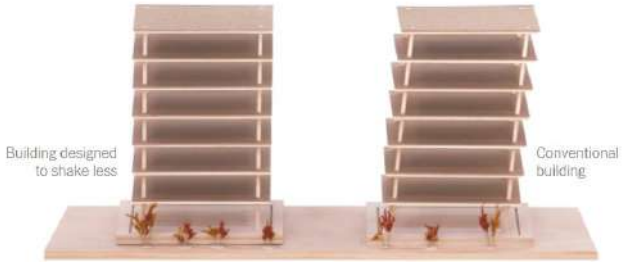
Dún Briste, a sea stack found off the western coast of Ireland

Παλαοκαστρίτσα, Κέρκυρα

Geology Library

ΑΡΘΡΑ

Buildings Can Be Designed to Withstand Earthquakes



Why Doesn't the U.S. Build More of Them?

When the shaking started at 5:46 a.m., Yasuhisa Itakura, an architect at a big Japanese construction company in Kobe, was sitting at his desk finishing a report he had toiled over all night. His office swayed, but the books stayed on their shelves and nothing fell off his desk.

"I thought to myself, this earthquake is not that big," Mr. Itakura said.

It was, in fact, catastrophic. The Great Hanshin earthquake of January 17, 1995, killed more than 6,000 people in and around the industrial port city.

Mr. Itakura had been cushioned from the violence of the earthquake because his three-story office building was sitting on an experimental foundation made from rubber — an early version of an engineering technique called base isolation.

The technique that protected Mr. Itakura's building is used in roughly 9,000 structures in Japan today, up from just two dozen at the time of the Kobe earthquake. Thousands of other buildings in the country have been fitted with shock-absorbing devices that can greatly reduce damage and prevent collapse.

Chile, China, Italy, Mexico, Peru, Turkey and other countries vulnerable to earthquakes have adopted the technologies to varying degrees.

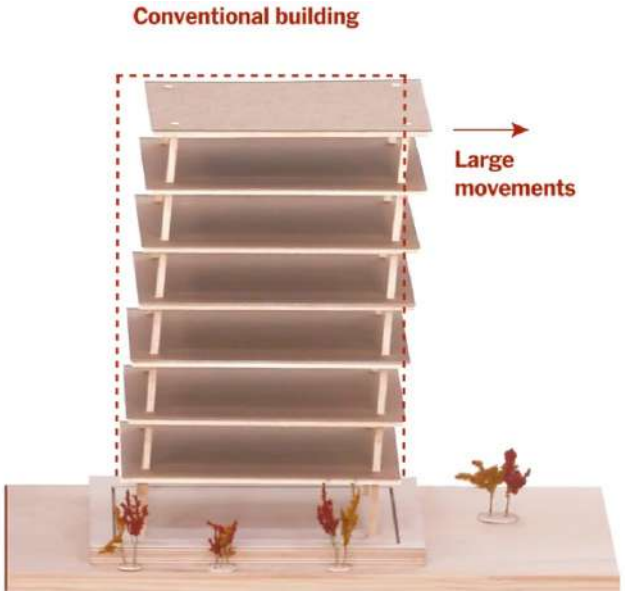
But with notable exceptions, including Apple's new headquarters in Silicon Valley, the innovations have been used only sparingly in the United States. Seismic safety advocates describe this as a missed opportunity to save billions of dollars in reconstruction costs after the inevitable Big One strikes.

How Base Isolation Works

Conventional buildings shake with the ground in an earthquake. They may sustain structural damage but are designed to remain standing.

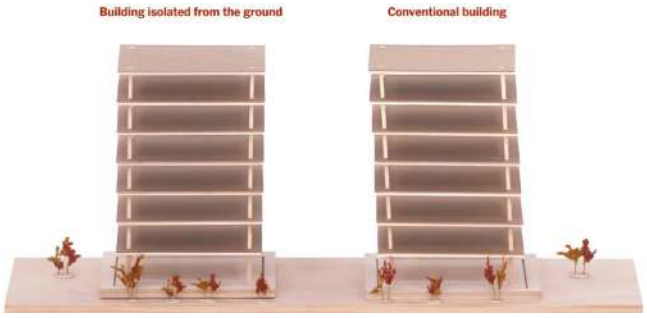
If the building shakes too much, **structural elements, including beams, columns, walls and braces,** can be damaged, rendering the building nonfunctional.

Base isolators are like shock absorbers between the building and the ground motion, letting a building slide back and forth while remaining upright during a quake.



The stronger the earthquake, the more the building moves in response.

The amount that the building moves is greatly reduced.



Buildings that use base isolation are more likely to survive a strong earthquake and be functional afterward.

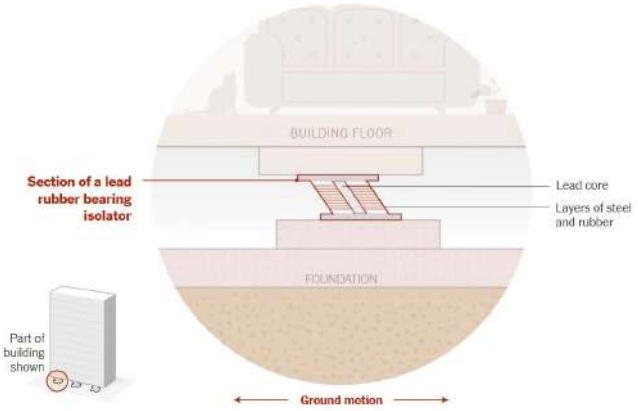
Earthquakes are of course natural phenomena. But the amount of damage they cause is a function of decisions made by politicians, engineers and business executives. Japan and the United States, two of the world's most technologically advanced countries, have the same problem — how to protect people and society from earthquakes — and yet they have responded in very different ways.

Japan, through both government mandates and its engineering culture, builds stronger structures capable of withstanding earthquakes and being used immediately afterward. The United States sets a minimum and less protective standard with the understanding that many buildings will be badly damaged.

The two approaches reflect different attitudes toward risk, the role of government and collective social responsibility. Analogous to America's debate over health insurance, the American philosophy has been to make more resilient buildings an individual choice, not a government mandate.

"Do we want to be more like Japan and are we willing to pay the price?" said Joyce Fuss, president of the Structural Engineers Association of California. "A lot of people would say 'no' and maybe some people would say 'yes.'"

Isolating the Building From Ground Motion



Inherent in the American approach to seismic engineering is a risk calculation: Many American engineers operate on the assumption that a building, which might be used for 50 years before it is torn down and replaced with a new one, has a relatively small chance of being hit by a huge earthquake.

"If you spend the money today and the earthquake happens tomorrow, then congratulations, you've done a good job," said Ron Hamburger, an American structural engineer who is perhaps the leading authority on the building code. "But the fact is, truly significant damaging earthquakes will affect a place like San Francisco or Los Angeles maybe once every 100 to 200 years."

"How lucky do you feel?" he added.

Apple's new headquarters in Silicon Valley was constructed with an acute awareness that the building sits in earthquake country. Jim Wilson/The New York Times

Los Angeles City Hall was retrofitted with base isolators.

The building housing Sony's office in Tokyo uses base isolation, as well as another seismic technology known as shock absorbing dampers.

In cities like San Francisco, where the median price of a home is well above a million dollars, the notion of making construction costs even more expensive is likely to be unpopular, even if the goal is to preserve the city in the long run.

Large earthquakes are around 10 times more common in Japan than in the continental United States, according to Hiroo Kanamori, an emeritus professor of seismology at the California Institute of Technology.

But seismic history suggests that California may be due for large earthquakes, which often come in clusters.

In Northern California, the last five major earthquakes along the Hayward fault, the jagged crack in the earth that runs through the heavily populated cities of Berkeley and Oakland across the bay from San Francisco, have occurred on average every 140 years.

The last one was 151 years ago. (Seismic history has also shown that predicting earthquakes is a fool's errand.)

The last major earthquake in the contiguous United States, which caused $20 billion of damage to the Los Angeles area, was a quarter of a century ago.

"The land has been peaceful in America," said Masayoshi Nakashima, president of the International Association for Earthquake Engineering. "Young generations in particular are not necessarily familiar with the reality of earthquakes."

The debate over whether to build more resilient buildings in the United States has been held largely out of public view, among engineers and other specialists.

But at stake is whether places like Silicon Valley, Seattle, Salt Lake City, San Francisco or Los Angeles might be forced to shut down after a direct hit — and for how long.

A federal study last year found that a quarter of the buildings in the San Francisco Bay Area would be significantly damaged after a magnitude-7 earthquake, a disaster that would be compounded by the fact that nine out of every 10 commercial buildings and eight out of 10 homes in California are not insured for earthquakes.

"Cities won't be usable for many months, if not years," said H. Kit Miyamoto, a member of the California Seismic Safety Commission, a government body that advises the State Legislature and the governor on earthquake issues. "Throwaway buildings equal a throwaway city."

In a severe earthquake, most American buildings are designed to crumple like a car in a head-on collision, dissipating the energy of the earthquake through damage. The goal is to preserve lives, but the building — like a car after an accident — may be useless.

Mr. Hamburger, the structural engineer, estimates that half of all buildings in San Francisco could be deemed unoccupiable immediately after a major earthquake.

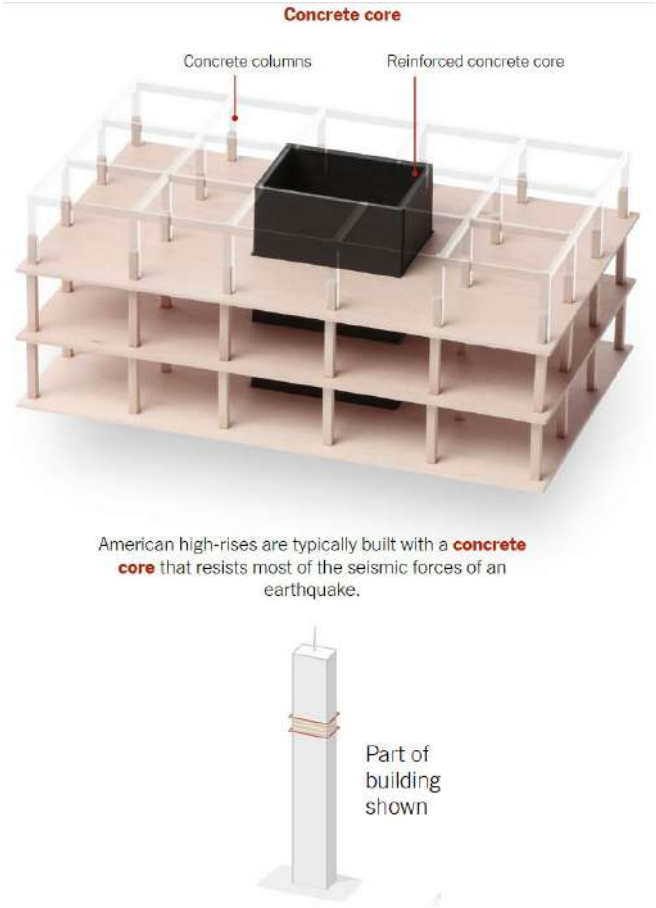
Some cities like San Francisco are considering rules that would require buildings to be more rigid, similar to those in Japan. There is no such thing as earthquake-proof construction, but experts say American buildings could be much more resilient for little additional cost.

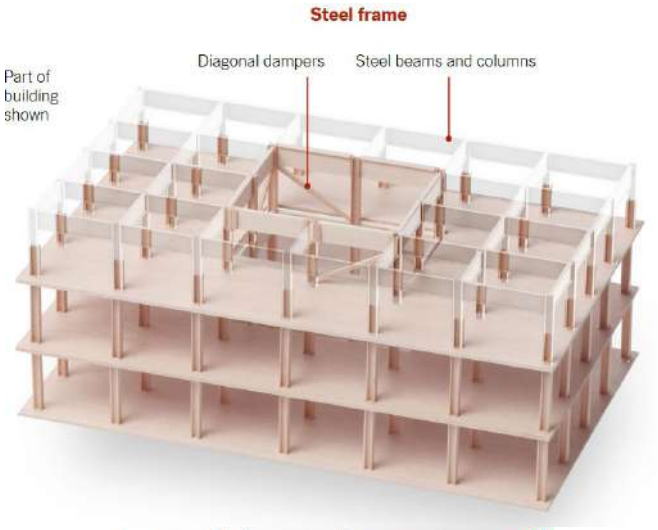
A multiyear federal study concluded that fixing buildings after an earthquake costs four times more than building them more strongly in the first place. The United States is losing an estimated $4 billion for every year that it delays a stronger building code for earthquakes, the study calculated.

Mr. Miyamoto, who was raised in Japan but now lives in California, said there was increasingly sharp disagreement between Japan and the United States over seismic engineering.

"The Japanese are completely flabbergasted about how we design out here," he said.

American vs. Japanese High-Rise Construction





Japanese high-rise construction commonly uses a **grid of steel beams and columns** that evenly distributes seismic forces across the structure and diagonal dampers that serve as shock absorbers.

American high-rises are typically built with a concrete core that resists most of the seismic forces of an earthquake.

Japanese high-rise construction commonly uses a grid of steel beams and columns that evenly distributes seismic forces across the structure and diagonal dampers that serve as shock absorbers.

Protecting tall buildings from earthquakes is among the highest-stakes endeavors for engineers. The collapse of even one skyscraper could have catastrophic effects. Tall buildings are also perhaps the biggest bone of contention between American and Japanese engineers.

Most new high-rises in the United States are built around a reinforced concrete core, a technique that Japanese engineers shun because they say it performs unpredictably in an earthquake. Tall buildings in Japan are almost always built with steel.

Japan, of course, still has many vulnerabilities, some of which were made clear when the 2011 Tohoku earthquake created a tsunami that breached sea walls, killing an estimated 16,000 people and spreading radiation from a damaged nuclear reactor.

The country has many older buildings constructed before major changes to a 1981 building code, and even the country's seismic innovations are of varying quality and effectiveness, as highlighted by revelations last year that a manufacturer of seismic shock absorbers falsified its performance data.

But over all, Japanese engineers say, earthquakes over the past two decades have proved the effectiveness of the country's stricter regulations and innovations.

Kobe and the Tohoku earthquake of 2011 led to a surge in demand for more robust buildings, with consumers willing to pay a premium for the latest technologies. One company has developed inflatable airbags that deploy underneath a wooden home when a large earthquake is detected.

Of Japan's 9,000 base-isolated structures, 4,300 are multistory buildings, many of them offices, condominiums and government buildings, and 4,700 are houses, according to the Japan Society of Seismic Isolation.

Base isolation is advertised on Japanese television and on the Tokyo subway, touting the seismic systems of newly constructed condominiums. Nice Corporation, a Japanese construction company, says a seven-story base-isolated building costs 13 to 15 percent more than a conventional one. Ian Aiken, an engineer who specializes in seismic technologies, says the systems can cost as little as 5 percent more.

https://static01.nyt.com/newsgraphics/2019/04/08/america-japan-quake/40ab240fa1988cf7201a41c1d072acb469762a60/videos/shakevideo-900.mp4

Staffers at the Japanese Red Cross Hospital in Ishinomaki City, which was equipped with a base isolation system, were able to stay at their desks during the magnitude-8.9 Tohoku earthquake in 2011. Ishinomaki Red Cross

Many new buildings in Japan are not base isolated, but even conventional ones are generally stronger and stiffer than American ones, according to Mr. Hamburger, the code expert, and other engineers who have worked in both countries.

The so-called resilience movement — designing buildings to better withstand natural disasters such as earthquakes — has gained adherents in the United States in recent years. Canada is also studying higher strength requirements for its buildings. But American advocates say they face a number of obstacles.

Evan Reis, a co-founder of the U.S. Resiliency Council, a nonprofit organization, says the biggest impediment is that unlike in Japan, buildings change hands frequently in America and the developers who build them do not see the incentive in making them more robust.

"Short-term thinking is absolutely the biggest villain," Mr. Reis said. "People are willing to roll the dice."

Efforts in the California Legislature to strengthen seismic laws faltered last year. A bill that would have mandated that buildings be functional after an earthquake was watered down in committees and then vetoed by the governor at the time, Jerry Brown.

Experts say there is little political upside to advocate stronger buildings because the public is largely unaware that buildings are designed to be damaged in a large earthquake.

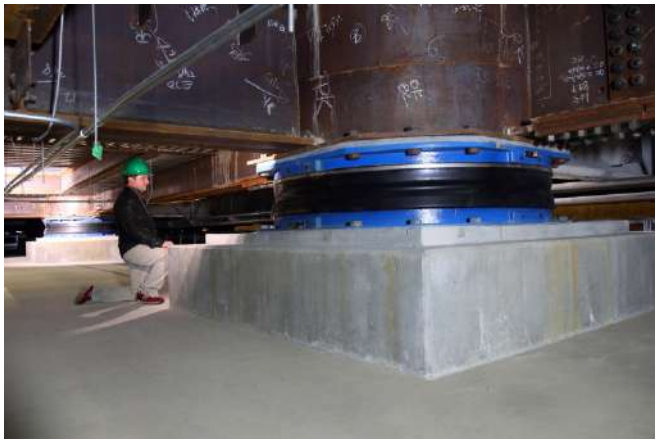
"The building is going to take punishment and hopefully allow us to get out alive," said Richard J. McCarthy, the executive director of the California Seismic Safety Commission.

The commission began a campaign this year to warn the public that the building code protects them less than they may think.

Amarnath Kasalanati, the associate director of the Pacific Earthquake Engineering Research Center at the University of California, Berkeley, says it is paradoxical that more buildings in the United States do not use innovative seismic technologies, since American scientists and engineers were early leaders in the field.

Mr. Kasalanati estimates that there are 175 base-isolated buildings in the United States, mostly museums, hospitals and older buildings like the city halls of San Francisco and Los Angeles that were retrofitted with isolators.

One American company that helped develop seismic isolation devices has shipped 70 percent of the 20,000 devices it has produced overseas.



The base isolators installed in Apple's headquarters are two stories underground. Made by Earthquake Protection Systems, a company based in California, the devices isolate the steel frame of the building from the shaking of the ground and foundation during an earthquake. Jim Wilson/The New York Times

One notable building in the United States that uses the devices is Apple's giant new headquarters in Silicon Valley.

Steve Jobs, the Apple co-founder, died before construction began on the building. But when he introduced plans for the circular, glass-sheathed structure, he described it as a "little like a spaceship."

As seen on a rare tour, the four-story orb, which holds 12,000 people and is about as wide as the Pentagon, is the Rolls-Royce of base-isolated buildings.

The building, which has a concrete foundation that resembles a bathtub, is not attached to the ground — if cranes or helicopters existed that were powerful enough, they could lift it up.

At the base of the building's nearly 700 support columns are stainless steel pucks that sit on top of massive steel saucers. When an earthquake causes the ground to shake, the pucks slide across the saucers as much as four feet, slowed by friction.

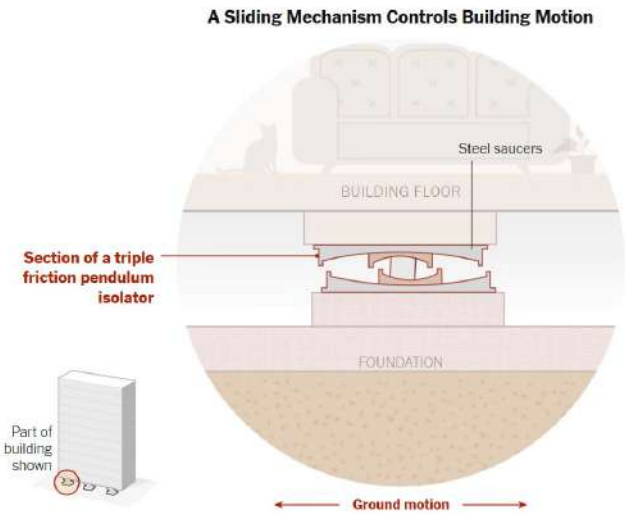
The net effect for occupants is that when the ground jolts back and forth, the building moves significantly less.

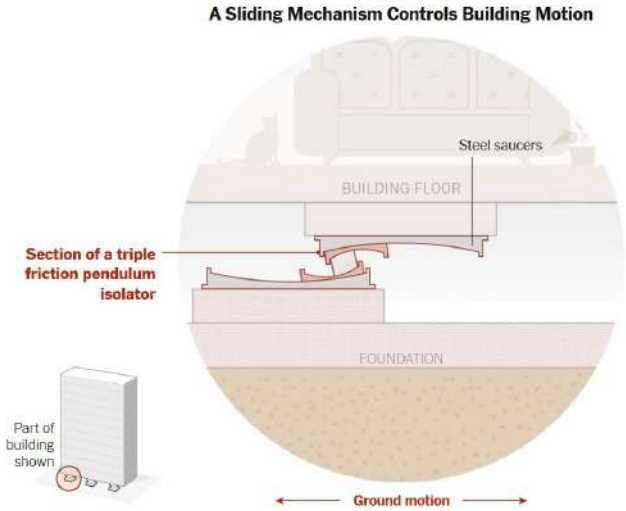
One of the designers of the building was Jony Ive, the man who was responsible for the look and feel of Apple products such as the iPhone and iPad.

A native of Britain, Mr. Ive said he found the threat of earthquakes "utterly alarming" when he moved to California in the 1990s and was surprised by the Californian nonchalance toward them.

Mr. Ive said he and Mr. Jobs never considered using a conventional foundation for the building.

"We would have seen it as utterly bizarre not to protect our investment," he said.





(Thomas Fuller, Anjali Singhvi, Mika Gröndahl and Derek Watkins / The New York Times, June 7, 2019, https://www.nytimes.com/interactive/2019/06/03/us/earthquake-preparedness-usa-japan.html?smid=nytcore-ios-share)

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

cmn 2019 -Congress on Numerical Methods in Engineering, July 1 - 3, 2019, Guimarães, Portugal, www.cmn2019.pt

International conference on clay science and technology, Meeting of the European Clay Groups Association (ECGA) jointly with the 56th annual meeting of The Clay Minerals Society (CMS) and the 6th Mediterranean Clay Meeting (MCM), 1 – 5 July 2019, Paris, France, https://euroclay2019.sciencesconf.org

http://deepmining.neu.edu.cn/IWUOGS2019

The International Workshop on Underground Oil/Gas Storage (IWUOGS) will be held on August 18-20, 2019 at Northeastern University in Shenyang, China. It has been approved as an ISRM Specialized Conference. The purpose of this workshop is to promote the state-of-the-art theories and technologies on the design, construction and operation of underground oil/gas storage facilities.

The themes of the workshop include:

- Rock mass characterization and geological mapping;
- Fluid flow and coupling effects in rock mass;
- Deformation and strength of rock mass;
- Design methodology for underground storage facilities;
- Stability and containment of underground storage facul-ties;
- Construction and operation technologies;
- Laboratory testing and field monitoring technologies and
- Case studies and numerical methods.

This workshop is sponsored by ISRM and CSRME, is organized by ISRM Commission on Design Methodology, Northeastern University and CSRME Rock Engineering Design Methodology Sub-society, and is co-organized by SSEC, SEI, CPPE and CNOOCPEC.

Prof. Xia-ting Feng, Prof. Seokwon Jeon and Prof. Bjorn Nilsen will co-chair the workshop. The workshop will show the diversity of experiences by inviting experts from China, Japan, Korea, Norway, Singapore, Sweden and other countries. The outcome of the workshop will contribute the development of theories and technologies related to underground storage in the field of rock mechanics and rock engineering.

Contact

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Address: #11, 3rdAve, Wenhua Road, Heping District, Shenyang, China 110004

7th Asia-Pacific Conference on Unsaturated Soils, August 23~25, 2019, Nagoya, Japan, www.jiban.or.jp/e/activities/events/20190823-25-seventh-asia-pacific-conference-on-unsaturated-soils

The 17th European Conference on Soil Mechanics and Geotechnical Engineering, 1st - 6th September 2019, Reykjavik Iceland, www.ecsmge-2019.com

NORDIC GROUTING SYMPOSIUM 2019, September 2-3, 2019, Helsinki, Finland, https://www.ril.fi/en/events/nordic-grouting-symposium-2019.html

4ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής & Τεχνικής Σεισμολογίας, Αθήνα, 5 – 7 Σεπτεμβρίου 2019, https://conv.eltam.org

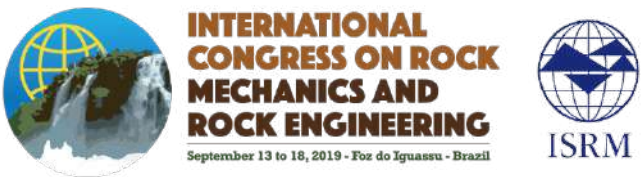
SECED 2019 Conference Earthquake risk and engineering towards a resilient world, 9-10 September 2019, Greenwich, London, U.K., www.seced.org.uk/2019

15th International Benchmark Workshop on Numerical Analysis of Dams, 9th - 11th September 2019, Milano, Italy, www.eko.polimi.it/index.php/icold-bw2019

3rd International Conference "Challenges in Geotechnical Engineering" CGE-2019, 10-09-2019 - 13-09-2019, Zielona Gora, Poland, www.cgeconf.com

XVIII Technical Dam Control - International Conference Hydraulic Structures Monitoring and Safety, 10-13 September 2019, Warsaw, Poland, www.tkz.ibs.pw.edu.pl

International Symposium on SPH and other particle-based continuum methods and their applications in geomechanics, 11-13 September 2019, Vienna, Austria, https://sph-vienna.com



Short courses / Workshops

Geology for Rock Engineering Projects (Short Course), Dr. Christophe Vibert and Dr. Philippe Vaskou, 13 September 2019.

Rock Engineering Design Approaches and Challenges in Deep Hard Rock Mining Engineering (Workshop), Dr Mostafa Sharifzadeh, Dr. Antonio Samaniego and Prof. Xia-Ting Feng, 13 September 2019.

Rocscience Tools for Mining Applications (Short Course), Thamer Yacoub, 13 September 2019.

2d and 3d Modelling for Underground and Slope Rock Engineering (Short Course), Dr. Giuseppe Cammarata and Marina Trevizolli, 14 September 2019.

Geotechnical Monitoring in Conventional Tunnelling (Short Course), Professor Wulf Schubert, 14 September 2019

Grouting Works Based on Spread of Grout in Rock Fracture (Workshop), A. Fransson, M. El Tani, J. Lopez Molina, T. Carter, Z. Zhao, H. Krenn, H. Stille, 14 September 2019.

Rock Mechanics in Nuclear Waste Disposal Programs (Workshop), Ju Wang, Eda Freitas de Quadros, Chunliang Zhang, Gilles Armand, Xiangling Li, Rolf Christiansson, Jianfu Shao, Kaiwen Xia, Hide Yasuhara, Chun'an Tang, Ming Cai, Liang Chen, Sandra Fahland, Xingguang Zhao, Hongsu Ma, Zhihong Zhao, Qizhi Zhu, Pengzhi Pan, Guibin Wang, 14 September 2019.

The Integration of Structural Geology and Applied Rock Mechanics (Short Course), Dr. Nick Barton and Prof. John Cosgrove, 14 September 2019.

http://isrm2019.com/short-courses.php

ISGHS 2019 International Symposium on Geotechnical aspects of Heritage Structures, September 16-18, 2019, IIT Madras, Chennai, India, www.igschennai.in/ISGHS2019

12th Asian Regional Conference of IAEG, 23 ~ 27 September 2019, Jeju Island, Republic of Korea (South Korea), www.iaegarc12.org

1st MYGEC 1st Mediterranean Young Geotechnical Engineers Conference, Double Events – MYGEC & EYGEC, 23-24th September, 2019, Bodrum, Muğla, Turkey, http://mygec2019.org

27th EYGEC 27th European Young Geotechnical Engineers Conference, Double Events – MYGEC & EYGEC, 26-27th September, 2019, Bodrum, Muğla, Turkey, http://eygec2019.org

3rd ICTITG International Conference on Information Technology in Geo-Engineering, Sep. 29-02 Oct., 2019, Guimarães, Portugal, www.3rd-icitg2019.civil.uminho.pt

11th ICOLD European Club Symposium, 2 - 4 October 2019, Chania Crete – Greece, www.eurcold2019.com

4ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής και Τεχνικής Σεισμολογίας *20 Χρόνια Μετά...*, Αθήνα, 4-6 Οκτωβρίου, 2019, www.eltam.org

XVII African Regional Conference on Soil Mechanics and Geotechnical Engineering 07-10 October 2019, Cape Town, South Africa, www.arc2019.org

2019 AYGE 7th African Young Geotechnical Engineers Conference, 6 October 2019, Cape Town, South Africa, www.arc2019.org/ayge-landing

HYDRO 2019 Concept to closure: practical steps, 14-16 October 2019, Porto, Portugal, www.hydropower-dams.com/hydro-2019

XVI Asian Regional Conference on Soil Mechanics and Geotechnical Engineering, 14 - 18 October 2019, Taipei, China, www.16arc.org

Developing Resilient Cities of the Future through the Integration of Tunneling and Underground Space Use
15-17 October 2019, Nigeria
events@tunnellingnigeria.org

11ème Édition des Journées Africaines de la Géotechnique

21-24 Octobre 2019, Niamey, Niger
http://ctgaafrique.org/niamey-niger-ville-hote-de-11eme-edition-journees-africaines-de-geotechnique

Conformément aux résolutions prises lors de l'Assemblée Générale du 24 octobre 2018 à Abidjan en Côte d'Ivoire, le Niger abritera cette année la 11ème édition des Journées Africaines de la Géotechnique (JAG 2019), co-organisée par la Comité Transnational de Géotechniciens d'Afrique (CTGA) et l'Association des Laboratoires du Bâtiment et des Travaux Publics (ALBTP) sous le thème : ***"Géotechnique et efficience économique des stratégies de développement en Afrique inter-tropicale".***

Email: emk2cm@Yahoo.fr

4th Regional Symposium on Landslides in the Adriatic-Balkan Region – ReSyLAB 2019 - 9th Scientific and Expert Conference GEO-EXPO 2019 23rd to 25th of October 2019, Sarajevo, Bosnia and Herzegovina, www.geotehnika.ba/ReSyLAB_&_GEO-EXPO_2019.html

8ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής, 6 – 8 Νοεμβρίου 2019, Αθήνα, Ελλάς, www.8hcge2019.gr

2019 GEOMEAST International Congress & Exhibition, 10 -14 November 2019, Cairo, Egypt, www.geomeast2019.org

The 8th International Symposium on Roller Compacted Concrete (RCC) Dams, Nov. 11th – 12th, 2019, Kunming, China, chincold-en@vip.126.com, http://www.chincold.org.cn

8th International Geotechnical Symposium, 13-15 November 2019, Istanbul, Turkey, www.geoteknik2019.org/en/

XVI Panamerican Conference on Soil Mechanics and Geotechnical Engineering, 18-22 November 2019, Cancun, Quintana Roo, Mexico, http://panamerican2019mexico.com/panamerican

International Symposium on Rock Mechanics and Engineering for Sustainable Energy
24-24 November 2019, Hanoi, Vietnam
http://vietrocknet.org

On behalf of the Vietnam NG of ISRM, VSRM, I inform you that the deadline of abstract submission of VCRES2019 will be extended to 3 July 2019.

The International Symposium on Rock Mechanics and Engineering for Sustainable Energy - the 35th VSRM Anniversary is an ISRM Specialized Conference and the 1st Vietnam - China Researchers and Engineer Symposium. It is jointly organized by the Vietnam National Group of the ISRM - Vietnamese Society for Rock Mechanics (VSRM), the Vietnam Institute of Geological Sciences and the Chinese Society for Rock Mechanics and Engineering, and co-supported by the Korean Society for Rock Mechanics

The goal of Symposium is to promote the exchange, transfer of knowledge and experience on Rock Mechanics and Rock Engineering for sustainable development of this field in Vietnam.

Symposium Topics

- Rock properties and testing methods
- Tunnel and underground construction
- Slope Stability
- Rock foundation
- Apply new methods of Rock Mechanics in mining
- Apply new methods of Rock Mechanics for hydropower project, Rock slope, land slide, tunneling and shafts.

GEOTEC HANOI 2019 The 4th International Conference on Geotechnics for Sustainable Infrastructure Development, November 28 – 29, 2019, Hanoi, Vietnam, https://geotechn.vn

YSRM2019 - The 5th ISRM Young Scholars' Symposium on Rock Mechanics and REIF2019 - International Symposium on Rock Engineering for Innovative Future - Future Initiative for Rock Mechanics and Rock Engineering - Collaboration between Young and Skilled Researchers/Engineers – 1-4 December 2019, Okinawa, Japan, www.ec-pro.co.jp/ysrm2019/index.html

ICGU 4th 2019 4th International Conference on Ground Improvement and Ground Control (ICGI2019): Infrastructure Development and Natural Hazards Mitigation, 1-3 December 2019, Luxor, Egypt, https://icgi2019-ets.org/page/p/Welcome-ICGI

ETS Conference and Exhibition 2019, 4-5 December 2019, Luxor – Egypt, https://icgi2019-ets.org/page/p/Welcome-ETS

ISOG 2019 First Indian Symposium on Offshore Geotechnics, December 5-6, 2019, IIT Bhubaneswar, Odisha, India, https://sites.google.com/iitbbs.ac.in/isog2019/home

15th International Conference on Geotechnical Engineering, and 9th Asian Young Geotechnical Engineers Conference, 05 ÷ 07-12-2019, Lahore, Pakistan, http://www.pges-pak.org

GeoSS International Conference on Case Histories & Soil Properties, 5-6 December 2019, Singapore, www.iccs2019.org

ISSPDS-Edinburgh 2020 2nd International Symposium on Seismic Performance and Design of Slopes, January 18–22, 2020, Edinburgh, UK, www.isspds.eng.ed.ac.uk

GeoAmericas2020 4th Pan American Conference on Geosynthetics, 26-29 April 2020, Rio de Janeiro, Brazil, www.geo-americas2020.com

WTC 2020 ITA-AITES World Tunnel Conference, 15-21 May 2020, Kuala Lumpur, Malaysia, www.wtc2020.my

14th Baltic Sea Geotechnical Conference 2020
Future Challenges for Geotechnical Engineering
25 ÷ 27 May 2020, Helsinki, Finland
www.ril.fi/en/events/bsgc-2020.html

The Finnish Geotechnical Society has a pleasure to invite you to attend the 14th Baltic Sea Region Geotechnical Conference in Helsinki, Finland 25th – 27th of May 2020. The conference will be held in Hotel Clarion.

The conference is organized parallel with the 18th Nordic Geotechnical Meeting (www.NGM2020.com) at the same venue. By registering to the BSGC participant has access also to the interesting sessions of NGM without extra fees.

The Conference will gather distinguished researchers, engineers and practitioners acting in the field of geotechnics, foundation and environmental engineering on the Baltic Sea Region and around the globe.

The leading theme of the conference is Future Challenges for Geotechnical Engineering. The theme emphasizes global trends together with regional and local problems in geotechnical engineering. The climate change, digitalization and urbanization affect profoundly all construction activities including also geotechnical engineering challenging our mindset and ways of working.

The conference will be structured along several topics:

- Novel energy solutions in foundation engineering
- Digital applications in geotechnics
- Geotechnical art and historical experiences
- Soil and rock investigation
- Design experiences and theoretical solutions
- Environmental geotechnics and recycling
- Case studies
- Modelling
- Design guidelines
- Foundation engineering and deep foundations
- Ports
- Transport infrastructure

We welcome scientific papers that describe original works. Papers may also be submitted on advanced new systems or techniques as well as general research papers indicating future directions. Full papers will be accepted based on their quality, relevance to the theme of the conference and originality. Accepted Scientific papers will be INDEXED via IOP Conference Series: Earth and Environmental Science. The program of the conference will cover both oral and poster presentations.

For industry we offer separate low-threshold submission where full paper is not required. We warmly welcome engineers and practitioners to share the knowledge which otherwise so easily stays hidden. Presentations can cover for example interesting geotechnical projects or practical findings found during earth and foundation construction projects.

Organiser: Finnish Geotechnical Society
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Nordic Geotechnical Meeting
Urban Geotechnics
25-27 May 2020, Helsinki, Finland
www.ril.fi/en/events/ngm-2020.html

The Finnish Geotechnical Society has a pleasure to invite you to attend the 18th Nordic Geotechnical Meeting in Helsinki, Finland 25th – 27th of May 2020. The conference will be held in Hotel Clarion. The conference is organized parallel with the 14th Baltic Sea Geotechnical Conceference (www.bsgc2020.com) at the same venue. By registering to NGM, participant has also access to the sessions of BSGC without extra fees.

The aim of the meeting is to strengthen the relationships between practicing engineers, researchers and scientists within the fields of geotechnics, foundation and environmental engineering including ground improvements with special emphasis on the Nordic region.

The leading theme of the conference is Urban Geotechnics. The theme twines the global trends together with regional and local problems in geotechnical engineering. The urbanizetion, digitalization, standardization and climate change affect profoundly all construction activities including also geotechnical engineering challenging our mindset and ways of working. The specific topics cover the range of geotechnical engineering from soil mechanics, reliability based design, foundation and geoenvironmental engineering, ground improvement methods to circular economy.

The detailed list of topics is:

- Climate change and arctic issues
- Statistical methods and reliability based design
- Ground Improvement methods
- Eurocode and standardization
- Slope stability and other geohazards
- Soil and rock investigations (incl. Geophysical methods)
- Monitoring and digital solutions (big data and data mining)
- Modelling
- Case histories
- Foundations and deep excavations
- Transport infrastructure
- Circular economy and environmental impacts

We welcome scientific papers that describe original works. Papers may also be submitted on advanced new systems or techniques as well as general research papers indicating future directions. Full papers will be accepted based on their quality, relevance to the theme of the conference and originality. Accepted Scientific papers will be INDEXED via IOP Conference Series: Earth and Environmental Science. The program of the conference will cover both oral and poster presentations.

For industry we offer separate low-threshold submission where full paper is not required. We warmly welcome engineers and practitioners to share the knowledge which otherwise so easily stays hidden. Presentations can cover for example interesting geotechnical projects or practical findings found during earth and foundation construction projects.

Contact person: Prof. Leena Korkiala-Tanttu
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Phone: +358-(0)50 312 4775
Email: leena.korkiala-tanttu@aalto.fi

EUROCK 2020 Hard Rock Excavation and Support, 13-19 June 2020, Trondheim, Norway, www.eurock2020.com

DFI Deep Mixing 2020
15 to 17 June 2020, TBD, Gdansk, Poland
www.dfi.org/DM2020

Leaders in the international deep mixing community are pleased to present this seventh conference in a series on deep mixing. For almost 25 years, this consortium of global practitioners has organized and presented these events to advance the understanding, use and performance of deep mixing internationally. The archives from conferences and symposia held in Japan (1996, 2002 and 2009), Sweden (1999 and 2005) and the United States (2015) contain a wealth of knowledge that charts the evolution of the understanding and application of soil mixing on-land and off-shore, the understanding of material properties, new technologies, research, mix designs, and quality control and assurance for wet and dry deep mixing methods.

Deep mixing construction activity has increased markedly in many parts of the world, and the mixing technology has attained a permanent place in modern geotechnics, offering flexibility and competitive solutions of ground improvement and foundation engineering. Important advances in materials, equipment, process control, design, research and project delivery mechanisms have occurred since 2015. Deep Mixing 2020 will provide a forum for international exchange of this new information. In keeping with the focus of this series, the conference scope consists of deep mixing and mass mixing by mechanical means that may be assisted by fluid energy (hybrid mixing). The technical program will include presentations on all aspects of current soil mixing technology, including contemporary research and lessons learned, and will provide a forum for discussion with all stakeholders (authorities, clients, contractors, consultants, researchers, equipment manufacturers and binder suppliers). Deep Mixing 2020 will also focus on defining the future of deep mixing and transferring the charge of advancing the industry to the next generation of practitioners... passing the torch.

The technical program will include presentations on all aspects of current deep mixing technology and research and provide a forum for discussion with all stakeholders (contractors, engineers, researchers, and equipment and material suppliers and owners).

Topics

- Laboratory mixing and material testing
- Properties of treated soil materials (binders, durability, material models)
- Analyses and design procedures (methodology, modeling, recommendations, codes)
- Contracting strategy/specifications/practice
- Field testing and performance monitoring (measurements, long-term data)
- Mixing equipment and construction technologies
- Quality control and quality assurance
- Environmental mixing and related research
- Liquefaction mitigation with mixing (analyses, experience)
- Case histories with lessons learned

Organizer: Deep Foundations Institute
Contact person: Theresa Engler
Address: 326 Lafayette Avenue, Hawthorne, NJ 07506, USA
Phone: 19734234030
Fax: 19734234031
Email: tengler@dfi.org
Website: http://www.dfi.org
Email: staff@dfi.org

XIII International Symposium on Landslides - Landslides and Sustainable Development, June 15th – 19th 2020, Cartagena, Colombia, www.scg.org.co/xiii-isl

GEE2020 International Conference on Geotechnical Engineering Education 2020, June 24-25, 2020, Athens, Greece, www.erasmus.gr/microsites/1168

E-UNSAT 2020 4th European Conference on Unsaturated Soils - Unsaturated Horizons, 24-06-2020 ÷ 26-06-2020, Lisbon, Portugal, https://eunsat2020.tecnico.ulisboa.pt

Geotechnical Aspects of Underground Construction in Soft Ground
29 June to 01 July 2020, Cambridge, United Kingdom

Organiser: University of Cambridge
Contact person: Dr Mohammed Elshafie
Address: Laing O'Rourke Centre, Department of Engineering, Cambridge University
Phone: +44(0) 1223 332780
Email: me254@cam.ac.uk

16th International Conference of the International Association for Computer Methods and Advances in Geomechanics – IACMAG
29-06-2020 ÷ 03-07-2020, Torino, Italy

The 16th International Conference of the International Association for Computer Methods and Advances in Geomechanics (15IACMAG) will be held in Turin, Italy, 29 June - 4 July 2020. The aim of the conference is to give an up-to-date picture of the broad research field of computational geomechanics. Contributions from experts around the world will cover a wide range of research topics in geomechanics.

Pre-conference courses will also be held in Milan and Grenoble.

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ISFOH 2020 4th International Symposium on Frontiers in Offshore Geotechnics, 16 – 19 August 2020, Austin, United States, www.isfog2020.org

2020 CHICAGO International Conference on Transportation Geotechnics, August 30 - September 2, 2020, Chicago, Illinois, USA, http://conferences.illinois.edu/ICTG2020

EUROGEO WARSAW 2020 7th European Geosynthetics Congress, 6-9 September 2020, Warsaw, Poland, www.eurogeo7.org

37th General Assembly
of the European Seismological Commission
6 to 11 September 2020, Corfu, Greece
www.esc-web.org

6th International Conference on Geotechnical and Geophysical Site Characterization "Toward synergy at site characterisation", 7 ÷ 11 September, Budapest, Hungary, www.isc6-budapest.com

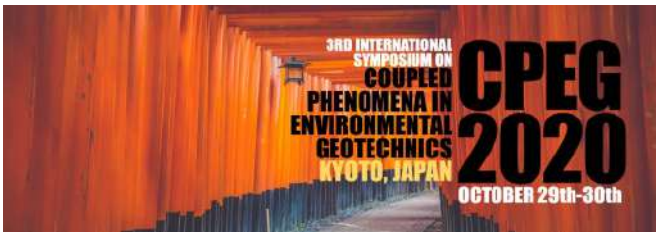
ICEGT-2020 2nd International Conference on Energy Geotechnics, September 20-23, 2020, La Jolla, California, USA, https://icegt-2020.eng.ucsd.edu/home

21-25th September 2020, Lisbon, Portugal

The Organising Committee of the **Fourth International DAM WORLD Conference** has the pleasure of inviting you to take part of the fourth edition of the **DAM WORLD** conference.

By now, we would like to ask you to SAVE THE DATE in your calendar: **LISBON, Portugal, 21-25th September 2020**.

Eliane Portela
COMITÉ ORGANIZADOR
4ª CONFERÊNCIA INTERNACIONAL DAM WORLD
LNEC - LISBOA - PORTUGAL - 21 a 25 de setembro de 2020
damworld@lnec.pt dw2020.lnec.pt



3rd International Symposium on Coupled Phenomena in Environmental Geotechnics
October 29th – 30th, 2020, Kyoto, Japan
https://cpeg2020.org

CPEG2020 is organized under the auspices of the Technical Committee TC215 (Environmental Geotechnics) of ISSMGE, and follows the very successful first two CPEG symposiums held in Torino (Italy) in 2013, and in Leeds (UK) in 2017.

CPEG2020 will be hosted in conjunction with the Japanese Geotechnical Society (JGS) and Kyoto University, and it will be followed by the 'Fifth World Landslide Forum' from November 2nd, making this a great opportunity to join both ISSMGE events in the Ancient Capital of Japan.

As we polish the details of the symposium, we will update the CPEG2020 website with further information, including keynote speakers, detailed symposium themes, and key dates. Please, keep the address of this site (www.cpeg2020.org) among your bookmarks for updated information.

5TH World Landslide Forum Implementation and Monitoring the USDR-ICL Sendai Partnerships 2015-2015, 2-6 November 2020, Kyoto, Japan, http://wlf5.iplhq.org

GeoAsia 2021

7th Asian Regional Conference on Geosynthetics
March 1-4, 2021, Taipei, Taiwan

EUROCK 2021
the ISRM European Rock Mechanics Symposium
1-6 June 2021, Torino, Italy

LATAM 2021
IX Latin American Rock Mechanics Symposium
20-22 September 2021, Asuncion, Paraguay

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3rd European Conference on Earthquake Engineering & Seismology, 19 – 24 June 2022, Bucharest, Romania, https://3ecees.ro

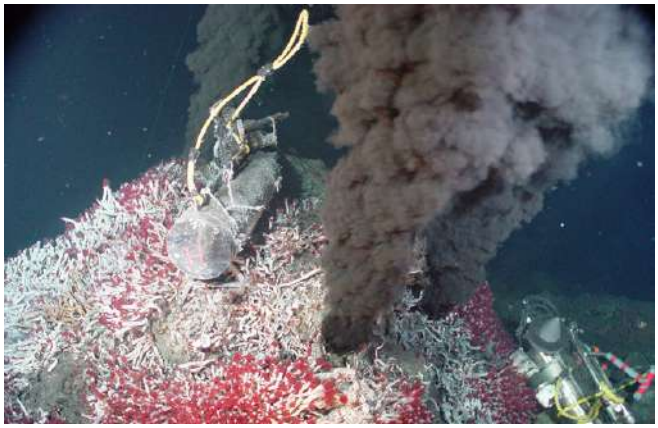
UNSAT2022
8th International Conference on Unsaturated Soils
June or September 2022, Milos island, Greece

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

The Ocean is Sinking into Earth's Mantle, and a Dead Supercontinent is Partly to Blame

The ocean is a big bathtub full of 326 million cubic miles (1.3 billion cubic kilometers) of water, and somebody has unplugged the drain.

Every day, hundreds of millions of gallons of water stream from the bottom of the ocean into Earth's mantle as part of a very wet recycling program that scientists call the deep water cycle. It works like this: First, water soaked up in the crust and minerals at the bottom of the sea both get shoved into Earth's interior at the undersea boundaries where tectonic plates collide. Some of that water stays trapped (some studies estimate that two to four oceans' worth of water are sloshing through the mantle), but large amounts of that water get spewed back to the surface via underwater volcanoes and hydrothermal vents.



Every year, billions of gallons of ocean water fall into the Earth at tectonic plate boundaries, then gush back out at hydrothermal vents like the one seen here. A new study shows that this deep water cycle may contribute to hundreds of feet of sea level loss over time.

It's not a perfect system; scientists think there's currently a lot more water plunging into the mantle than spewing out of it — but that's OK. Overall, this cycle is just one cog in the machine that determines whether the world's oceans rise or fall.

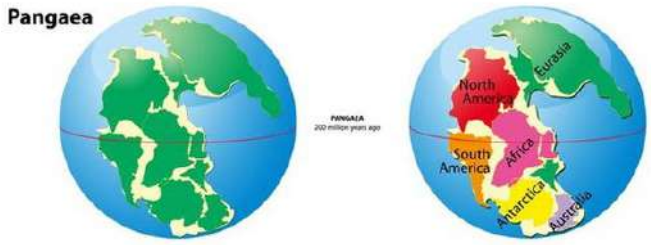
Now, in a study published May 17 in the journal Geochemistry, Geophysics and Geosystems, researchers report that this cog may be more important than previously thought. By modeling the fluxes in the deep water cycle over the last 230 million years, the study authors found that there were times in Earth's history when the gargantuan amount of water sinking into the mantle played an outsize role in sea level; during those times, the deep water cycle alone may have contributed to 430 feet (130 meters) of sea-level loss, thanks to one world-changing event: the breakup of the supercontinent Pangaea.

"The breakup of Pangaea was associated with a time of very rapid tectonic plate subduction," lead study author Krister Karlsen, a researcher at the Centre for Earth Evolution and Dynamics at the University of Oslo, told Live Science. "This led to a period of large water transport into the Earth, causing associated sea-level drop."

Death of a supercontinent

About 200 million years ago, the supercontinent Pangaea (a landmass consisting of all seven continents we know today) started to split, sending massive slabs of land careening in all directions.

As these continental plates spread apart, new oceans appeared (beginning with the Atlantic, roughly 175 million years ago), huge rifts in the seabed cracked open and ancient slabs of underwater crust plunged into the fresh voids. Gargantuan amounts of water that were trapped inside those sinking chunks of crust moved from the planet's surface into its deep interior.



The supercontinent Pangaea

Building on previous studies of Earth's tectonic plates over the last 230 million years, the researchers modeled the approximate rates that water entered — and left — Earth's mantle. The faster a water-rich plate fell into Earth, the farther it could subduct before its water content was evaporated by the high heat of the mantle. According to the team's calculations, this imbalanced the deep water cycle enough to result in millions of years of extreme water loss.

Of course, there is more to sea level than just the movement of very deep water, Karlsen said, and this study doesn't account for other sea level changing processes like climate change or ice sheet coverage. Even as massive amounts of water sink into the mantle, actual sea levels can spike and plummet by hundreds of feet on much shorter timescales.

Right now, the ocean is in the midst of another sea level spike, thanks largely to manmade climate change (estimates vary, but sea levels will probably rise anywhere from 6 to 16 feet over the next century). Sadly, all those billions of gallons of sea water pouring into the mantle right now can't save us from this dangerous trend.

"While the deep water cycle can effectively change sea level over hundreds of millions to billions of years, climate change can change the sea level in zero to 100 years," Karlsen said. "For comparison, the present-day sea level rise associated with climate change is about 0.1 inches (3.2 millimeters) a year. The sea level drop associated with the deep water cycle is about 1/10,000 of that."

(Brandon Specktor, Senior Writer / LIVESCIENCE, June 10, 2019, https://www.livescience.com/65678-deep-water-cycle-sinking-ocean.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20190610-ls)

Deep Water Cycling and Sea Level Change since the Breakup of Pangea

Krister S. Karlsen, Clinton P. Conrad, Valentina Magni

Abstract

First-order variations in sea level exhibit amplitudes of ~200 m over periods that coincide with those of superconti-

nental cycles (~300–500 Myr). Proposed mechanisms for this sea level change include processes that change the container volume of the ocean basins and the relative elevation of continents. Here we investigate how unbalanced rates of water exchange between Earth's surface and mantle interior, resulting from fluctuations in tectonic rates, can cause sea level changes. Previous modeling studies of subduction water fluxes suggest that the amount of water that reaches sub-arc depths is well correlated with the velocity and age of the subducting plate. We use these models to calibrate a parameterization of the deep subduction water flux, which we together with a parameterization of mid-ocean ridge outgassing, then apply to reconstructions of Earth's tectonic history. This allows us to estimate the global water fluxes between the oceans and mantle for the past 230 Myr and compute the associated sea level change. Our model suggests that a sea level drop of up to 130 m is possible over this period and that it was partly caused by the ~150Ma rift pulse that opened the Atlantic and forced rapid subduction of old oceanic lithosphere. This indicates that deep water cycling may be one of the more important sea level changing mechanisms on supercontinental time scales and provides a more complete picture of the dynamic interplay between tectonics and sea level change.

(Geochemistry, Geophysics, Geosystems, 17 May 2019 https://doi.org/10.1029/2019GC008232, https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019GC008232)

Big earthquakes might make sea level rise worse. Here's how.

The Samoan islands are sinking faster than expected due to warming alone, and a pair of huge quakes is likely to blame.

Rising sea levels due to climate change already threaten many coastal communities. But people in Samoa and American Samoa, seen here, face yet another challenge: The islands themselves are sinking.

A geologic one-two punch rocked the South Pacific in September 2009, as a magnitude 8.1 earthquake struck off the coast of the island nation of Samoa, followed mere moments later by a similarly intense temblor. A towering tsunami soon crashed onto the shores of islands nearby, leaving more than 180 dead and communities in ruins in Samoa, the neighboring U.S. territory of American Samoa, and surrounding islands.

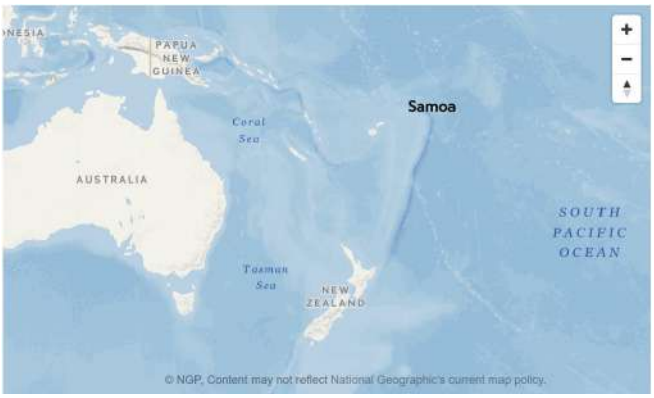
But a new study, published in the *Journal of Geophysical Research: Solid Earth*, reveals that the quakes also sparked a slow-burning danger for the more than 55,000 residents of American Samoa: sea level rise that is five times as fast as the global average.

Like other island and coastal regions around the world, Samoa and American Samoa are facing encroaching waters as our warming world sends sea levels soaring at accelerating rates. In the wake of the mega-quakes, though, the researchers discovered that these Pacific islands are also sinking. The situation is particularly concerning for American Samoa, where the team estimates that, over the next 50 to a hundred years, local sea levels could rise by roughly a foot in addition to the anticipated effects of climate change.

While the contributions of big earthquakes won't be the same everywhere, the discovery emphasizes the sometimes overlooked effects that geology can have on the increasing number of people around the world who call coastlines home.

"Everybody is talking about climate change issues ... but they overlooked the impact of the earthquake and associated land subsidence," says study leader Shin-Chan Han of the University of Newcastle, Australia, referring to documents from regional governments on sea level rise.

"This is a really important thing to point out," says geophysicist Laura Wallace of the geoscience consultancy firm GNS Science, Te Pū Ao, in New Zealand, who was not involved in the study. "It obviously has a big impact on the relative sea level changes people are going to see in places like [the Samoan islands]."



Geologic geometry

Plate tectonics is constantly reshaping the surface of our planet—a role particularly evident during an earthquake. Generally speaking, these events occur where tectonic plates are colliding or sliding against each other, building up geologic stress. When that pent-up energy is released suddenly, it can send blocks of the planet's crust careening out of place.

But not all the change from a big earthquake is immediate. Unlike the rigid crust, the rocks of the mantle below flow like cold molasses and gradually adjust to the sudden surface jolt, Wallace says. This can cause either sinking or uplift of the land that can continue for decades after a temblor strikes.

This prolonged landscape deformation is what intrigues Han. For years, he's scoured data from the Gravity Recovery and Climate Experiment, or GRACE, satellites to hunt for the rise and fall of land after a quake. This satellite duo orbited Earth in a line from 2002 to 2017 and precisely tracked the gap between the spacecraft. As they passed over zones with slightly more mass, and thus stronger gravity, the leading craft would feel the tug just before the trailing one. This tweaked the space in between and registered as a wobble in the planet's gravitational field that can reveal changes in the

landmass below.

In the case of the 2009 earthquake, such changes were minute on a day-to-day basis. But eventually, the effects were large enough that Han saw something strange happening in the Samoan islands while poring over the GRACE data.

A rare coincidence

The 2009 event was a particularly unusual earthquake that initially baffled scientists, since the pair of powerful temblors ripped through the Earth nearly at the same time. One broke along a so-called normal fault, created due to the flex of the oceanic crust as it plunges under another tectonic plate in what's known as a subduction zone. Another quake broke within the subduction zone due to the compressive forces of the colliding plates.

The researchers investigated the lingering impacts of these quakes using a combination of GRACE data and local GPS and tide gauge records. They then built a computer model to tease apart the complex interplay between the temblors and what is happening at the surface.

This data showed slow sinking of the landscape, driven primarily by the normal-fault quake. This particular earthquake causes one side of the landscape to fall in relation to the other, which sent the nearby islands sinking downward.

The team found that nearly a decade after the event, the island of Samoa has sunk by roughly 0.4 inches a year. The situation is particularly acute for American Samoa, which has seen more than 0.6 inches of subsidence each year, and it doesn't look like it's stopping anytime soon.

The pace outstrips the estimated rate of global sea level rise, which is creeping upward at some 0.13 inches a year. Flooding and seawater intrusion in freshwater aquifers are already grave concerns for residents of American Samoa, Han says, and the latest find only adds to the worry.

Bathtub oceans

It's possible similar effects could happen on other islands near where plates collide, but a lot of factors influence what ensues post-quake. The overall importance of the new work is highlighting that the causes of sea level change in any given locale are a lot more complicated than melting ice and warming seas.

"People think of global mean sea level rise as the bathtub just filling and emptying," says University of South Florida's Don Chambers, who is an expert in the use of satellite gravity data to study sea level. But a host of other factors perturb our vast oceanic tubs. Some of these are human caused, like groundwater extraction or sediments being compacted by expanding cities, which makes the land sink. This effect is a culprit along the Louisiana coast, where waters are rising by an inch every two years in some sections.

Tectonic mischief, like that seen in the Samoan islands, is also a common factor, but the effects depend on the geometry of the faults, says Jeffrey Freymueller, a geophysicist at Michigan State University who was not involved in the new work. In many places, tectonic jostling causes uplift rather than subsidence. For example, Han has tracked post-earthquake changes in Japan and New Zealand, both of which have instead been moving upward for years.

But around Samoa and elsewhere, subsidence due to earthquakes is a real worry for sea level rise. Freymueller points to a recent study in *Marine Geology* that documented considerable sea level rise for Thailand's Phuket Island following the magnitude 9.2 Sumatra-Andaman earthquake in 2004. Local waters have risen nearly five inches as of 2019—a combined effect of climate change and post-earthquake sinking.

This latest study emphasizes the need for greater awareness and continued monitoring to mitigate the potential effects of mega-quakes, Wallace says. However, predicting such sea level effects before an earthquake strikes is not feasible, since earthquake prediction itself remains elusive.

"This might be a problem that suddenly causes you heartburn next week," Freymueller says, "or it might not cause any problem for the next century."

(Maya Wei-Haas / Science Writer at National Geographic, June 17, 2019, https://www.nationalgeographic.com/science/2019/06/big-earthquakes-might-make-sea-level-rise-worse)

Sea Level Rise in the Samoan Islands Escalated by Viscoelastic Relaxation after the 2009 Samoa-Tonga Earthquake

Shin-Chan Han, Jeanne Sauber, Fred Pollitz, Richard Ray

Abstract

The Samoan islands are an archipelago hosting a quarter million people mostly residing in three major islands, Savai'i and Upolu (Samoa), and Tutuila (American Samoa). The islands have experienced sea level rise by 2–3 mm/year during the last half century. The rate, however, has dramatically increased following the M_w 8.1 Samoa-Tonga earthquake doublet (megathrust + normal faulting) in September 2009. Since the earthquake, we found large-scale gravity increase (0.5 μGal/year) around the islands and ongoing subsidence (8–16 mm/year) of the islands from our analysis of Gravity Recovery and Climate Experiment gravity and GPS displacement data. The postseismic horizontal displacement is faster in Samoa, while the postseismic subsidence rate is considerably larger in American Samoa. The analysis of local tide gauge records and satellite altimeter data also identified that the relative sea level rise becomes faster by 7–9 mm/year in American Samoa than Samoa. A simple viscoelastic model with a Maxwell viscosity of $2–3\times10^{18}$ Pa s for the asthenosphere explained postseismic deformation at nearby GPS sites as well as Gravity Recovery And Climate Experiment gravity change. It is found that the constructive interference of viscoelastic relaxation from both megathrust and normal faulting has intensified the postseismic subsidence at American Samoa, causing ~5 times faster sea level rise than the global average. Our model indicates that this trend is likely to continue for decades and result in sea level rise of 30–40 cm, which is independent of and in addition to anticipated climate-related sea level rise. It will worsen coastal flooding on the islands leading to regular nuisance flooding.

(Journal of Geophysical Research: Solid Earth, 28 March 2019, https://doi.org/10.1029/2018JB017110, https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018JB017110)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Κατεδαφίστηκε η μοιραία γέφυρα της Γένοβας ένα χρόνο μετά την τραγωδία

Εκατοντάδες Γενοβέζοι συγκεντρώθηκαν σήμερα για να παρακολουθήσουν από μακριά την κατεδάφιση της γέφυρας Μοράντι, μέρος της οποίας είχε καταρρεύσει τον Αύγουστο του 2018 με αποτέλεσμα να σκοτωθούν 43 άνθρωποι.

Σχεδόν 4.000 κάτοικοι της περιοχής χρειάσθηκε να απομακρυνθούν από τις εστίες τους εξαιτίας της κατεδάφισης, παρόλο που οι κάτοικοι πολυκατοικιών που βρίσκονται ακριβώς κάτω από τη γέφυρα είχαν ήδη αναγκασθεί να εγκαταλείψουν τις κατοικίες τους την ημέρα της τραγωδίας.

Οι δύο κύριοι πυλώνες που είχαν απομένει από τη γέφυρα της Γένοβας κατεδαφίστηκαν με ελεγχόμενη έκρηξη, ώστε να επιτραπεί η ανέγερση μιας νέας δομής.

Nine News Australia https://twitter.com/i/status/1144524210250735617

Τα εκρηκτικά πυροδοτήθηκαν στις 09:37 (τοπική ώρα, 10:37 ώρα Ελλάδας) και οι περίπου 4.500 τόνοι μπετόν και χάλυβα των δύο τεράστιων πυλώνων κατέρρευσαν μέσα σε επτά δευτερόλεπτα μέσα σ' ένα σύννεφο σκόνης.

Η κυβέρνηση έχει υποσχεθεί πως η νέα οδογέφυρα από χάλυβα και τσιμέντο, σχεδιασμένη από τον διάσημο ιταλό αρχιτέκτονα Ρέντσο Πιάνο, θα ανοίξει για την κυκλοφορία τον Απρίλιο 2020.

https://www.kathimerini.gr/1031178/gallery/epikairothta/kosmos/katedafisthke-h-moiraia-gefyra-ths-genovas-ena-xrono-meta-thn-tragwdia-vinteo---fwtografies

Η άμμος είναι ο νέος χρυσός

Η άμμος για μπετόν είναι πλέον περιζήτητη παντού λόγω του κατασκευαστικού οργασμού σε παγκόσμιο επίπεδο. Ακόμα και παράνομα, επιτήδειοι αφαιρούν με εκσκαφείς άμμο από παραλίες σε θάλασσες και ποτάμια με στόχο το κέρδος.

Μετά το νερό η άμμος είναι το πιο περιζήτητη πρώτη ύλη στον κόσμο, διαπιστώνει σε έκθεσή του το Περιβαλλοντικό Πρόγραμμα UNEP του ΟΗΕ. Οι ειδικοί του Προγράμματος υπολογίζουν την ζήτηση από 40 μέχρι 50 δις τόνους το χρόνο. Άμμο βρίσκουμε σήμερα σε περισσότερα προϊόντα από ότι φανταζόμαστε: γυαλί, καλλυντικά, προβολείς οχημάτων, οθόνες κινητών και οδοντόκρεμες.

Επιπλέον η άμμος χρησιμοποιείται στο φιλτράρισμα του νερού, τον εξωτερικό καθαρισμό κτηρίων ακόμα και το σύστημα φρένων των τραίνων. Είναι ωστόσο απαραίτητη κυρίως στον κατασκευαστικό κλάδο. Μέσα στα τελευταία 20 χρόνια η ζήτηση για άμμο στις κατασκευές τριπλασιάστηκε.

Η πλούσια Σιγκαπούρη είναι ο μεγαλύτερος εισαγωγέας άμμου στον κόσμο. Με την άμμο επέκτεινε το έδαφός της μέσα σε 40 χρόνια κατά 130 τετραγωνικά χιλιόμετρα. Υπολογίζεται ότι για το εγχείρημα αυτό απαιτήθηκαν περίπου 500 εκατομμύρια τόνοι άμμου. Όμως τα αποθέματα μειώνονται σταθερά, προειδοποιεί το Περιβαλλοντικό Πρόγραμμα του ΟΗΕ.

«Οι σύγχρονες κοινωνίες είναι χτισμένες στην άμμο»

Δυστυχώς η άμμος που υπάρχει στις ερήμους ανά τον κόσμο είναι ακατάλληλη για τον κατασκευαστικό κλάδο, μιας και είναι υπερβολικά ψιλή. Για το λόγο αυτό ακόμα και κράτη που βρίσκονται κοντά ή διαθέτουν έρημο είναι υποχρεωμένες να εισάγουν την πολύτιμη άμμο.

Επειδή όμως η ζήτηση είναι τεράστια η γερμανική εταιρία MultiCon από το Μόναχο επινόησε μια τεχνική σύμπτυξης άμμου, η οποία μέσα από μια πολύπλοκη διαδικασία μπορεί να χρησιμοποιηθεί εν τέλει στις κατασκευές. Ίσως η διαδικασία αυτή να συμβάλλει να σταματήσουν κάποτε οι παράνομες ενέργειες συλλογής άμμου από παραλίες σε ποτάμια και θάλασσες που προκαλούν μεγάλες ζημιές στο περιβάλλον. Όπως δηλώνει ο τεχνικός διευθυντής Χέλμουτ Ροζενλέχερ «η μαφία της άμμου έχει λόγο ύπαρξης όσο η προσφορά άμμου δεν καλύπτει τη ζήτηση».

Το Περιβαλλοντικό Πρόγραμμα UNEP τάσσεται υπέρ μιας ρύθμισης στην εκμετάλλευση των αποθεμάτων άμμου. Σύμφωνα με τον ειδικό Πασκάλ Πεντούτσι του Παγκόσμιου Προγράμματος του ΟΗΕ η άμμος σε κτήρια θα μπορούσε εν μέρει να αντικατασταθεί από ροκανίδια ή από άλλα υλικά. «Η κοινωνία μας είναι χτισμένη στην κυριολεξία πάνω στην άμμο», τονίζει μισοαστεία μισοσοβαρά ο ειδικός του ΟΗΕ.

Αλεξάντερ Στουρμ (dpa)

(26 Ιουνίου 2019,
https://www.in.gr/2019/06/26/world/deutsche-welle/ammos-einai-o-neos-xrysos/)

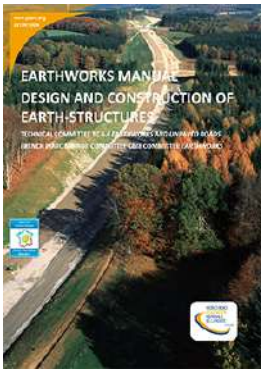
The World is Hungry for Sand

Sand: it's everywhere you look. At least, that's how it seems. The deserts are full of it and so are our beaches. We use sand to protect our coasts and build our cities. We include it in products such as glass, make-up, solar panels and electronic devices. So there are plenty of reasons to worry about the depletion of our sand supplies. This is what you need to know about sand.

1. Sand is the most mined material in the world. By far. According to UNEP, the UN's environmental organisation, sand and gravel account for 85 percent of the world's mined materials. Approximately 20 million m3 of sand is extracted annually in the Netherlands.
2. The world population is growing and it will be concentrated in cities. As a result, demand for sand is highest in the construction industry. In *Science*, American and European scientists reported that nearly 30 billion tons of sand and gravel were being processed annually for infrastructure and land reclamation in 2017. To give an example: *The Economist* calculated that, between 2011 and 2015, approximately 32 million houses and 4.5 million kilometres of road were built in China alone.
3. Climate change, which is leading to sea level rise and increased levels of coastal erosion, is another important cause of the rise in demand for sand worldwide.
4. Not all sand is suitable for use in construction or for raising coasts. Desert sand, for instance, is too uniform and doesn't provide enough grip. The amount of sand in a single location can be small. Alternatively, a project may be too far away. Under these conditions, sand extraction will not be economically feasible.
5. Worldwide, we currently need more sand than the amount formed by the pulverisation and wearing of rocks, river beds and mountains. That is leading to the depletion of our supplies. Moreover, in areas where regulation is inadequate, sand extraction is increasingly resulting in damage to the natural environment and the loss of biodiversity.
6. Sand extraction even results in crime. Research by Temple University in the United States, for example, showed that the demand for sand in India exceeds supplies from legal sources three times over. That has led to the establishment of a 'sand mafia' that extracts sand illegally and is happy to use violent methods.
7. Poorly regulated sand extraction at sea makes coastal areas particularly vulnerable to erosion and sea level rise. In deltas like the Mekong in Vietnam, salty sea water is penetrating further inland, causing the salinization and degradation of drinking water supplies and agricultural land.
8. Not all countries have their own sand reserves. However, all countries do need sand. This issue needs to be addressed internationally if sand extraction is to be sustainable. Geological services and research and coastal institutes can play an important role here.

Lot Folgering / DELTAlife, **DELTARES MAGAZINE NO. 11 MARCH 2019,** pp. 18-91, https://media.deltares.nl/deltalife/11/en/index.html

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Earthworks Manual
Design and Construction of Earth Structures

PIARC Technical Committee Earthworks and Unpaved Roads

The technical specificity of Earthworks corresponds to the management of many parameters and constraints that have an influence on the progress of the design and construction operations. In particular, the construction of earthworks is confronted with geotechnical and climatic hazards.

General considerations on the content of the Manual

The proposed Earthworks Manual is a collection of rules of the art, good practices,... to enlighten and sensitize readers on Earthworks management, at the design stage of earthworks, the project and the execution of earthworks.

The Manual takes into account the different PIARC technical reports produced in previous sessions by integrating them into the extended data of the current session.

The earthworks construction process produces earth-structures: cuts, fills or embankments, pavement support structures meeting specifications for stability, deformation, load-bearing capacity, hydraulic or other.

The quality of the works is required, in particular:

- To ensure the support of pavement structures in accordance with the planned design
- To ensure the durability of earthworks and thus reduce the importance and frequency of maintenance work

The economic and environmental aspects, which are crucial in the construction of road infrastructure, as well as concepts on adaptation to climate change are highlighted.

Design and studies

Geotechnical studies are of major importance to the success of the project, particularly for the following issues:

- material identification
- optimal reuse of site materials
- the stability of the structures
- the design of structures

The required quality of earthworks needs recommendations: technical guides, normative systems and standards, technical specifications, feedback from site experiences, test sites, etc. The Manual includes comparisons between the different approaches practiced in various countries around the world, particularly presenting all of the recent European standards dedicated to earthworks (currently under investigation by CEN).

Execution and controls

The Manual also presents the basic concepts on the project and the execution of earthworks:

- methods and techniques
- material adequacy
- various types of controls: material identification, implementation, binders, equipment.

An important part is devoted to the treatment of materials, a technique still under development.

Environmental aspects

A specific chapter is devoted to environmental aspects and proposals for actions to contribute to sustainable development in the field of earthworks.

Download for free https://www.piarc.org/en/order-library/30762-en-Earthworks%20Manual.htm

Υδροδυναμικά Έργα

Χρήστος Ε. Τσόγκας

Η κατασκευή φραγμάτων ήταν πάντα για τον άνθρωπο μια πρόκληση. Πριν πέντε χιλιάδες χρόνια, ήταν πρόκληση για τους αρχαίους Αιγυπτίους, όταν κατασκεύασαν το πρώτο φράγμα στον κόσμο για αρδευτικούς σκοπούς.

Ήταν πρόκληση όταν, πριν από δύο περίπου χιλιάδες χρόνια, οι Έλληνες βελτίωσαν την τεχνολογία και, λίγο αργότερα, οι Ρωμαίοι κατασκεύασαν το πρώτο τοξωτό φράγμα.

Ήταν πρόκληση και το 1912, όταν ο Καρδιτσιώτης καθηγητής και μετέπειτα πρύτανης του Εθνικού Μετσόβειου Πολυτεχνείου, αείμνηστος Απ. Κουτσοκώστας, εμπνευστής του μοναδικού τοξωτού φράγματος στον παραπόταμο του Αχελώου, τον Ταυρωπό, πρότεινε στον συμπατριώτη του και πρωθυπουργό το 1951, αείμνηστο Νικόλαο Πλαστήρα, την κατασκευή φράγματος, για να μη χάνεται το νερό στη θάλασσα, τη στιγμή που διψάει ο κάμπος της Καρδίτσας. Έτσι έγινε η αρχή για να υλοποιηθεί 15 χρόνια αργότερα η ιδέα του Α. Κουτσοκώστα και να ονομαστεί «Φράγμα Πλαστήρα».

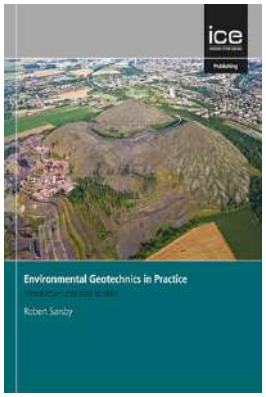
Ακολούθησαν οι κατασκευές χωμάτινων, κατά κύριο λόγο, φραγμάτων σε όλη την Ελλάδα. Η ραγδαία τεχνολογική εξέλιξη και η πρόοδος της επιστήμης, συνεπικουρούμενες από την ανάπτυξη σύγχρονων χωματουργικών μηχανημάτων, με την εκ παραλλήλου ίδρυση της ΔΕΗ, έδωσαν την ώθηση για να φτάσουμε σήμερα να μιλάμε για περισσότερα από 100 μεγάλα φράγματα σε όλους τους ποταμούς της Ελλάδας.

Η σύγχρονη τεχνολογία έδωσε υλικά και μέσα για την γρήγορη και εύκολη επίλυση της μελέτης ενός φράγματος. Παράλληλα, η εξέλιξη της τεχνολογίας των υλικών προώθησε μια νέα γενιά φραγμάτων με αδιαπέρατα υλικά, εποξειδωτικές ρητίνες, πλαστικές μεμβράνες, κυλινδρούμενο σκυρόδεμα και παραλλαγές αυτών.

Με βάση τη γνώση και εμπειρία 40 ετών και με οδηγό τις τελευταίες τεχνολογικές εξελίξεις, παρουσιάζουμε το πόνημα αυτό, ευελπιστώντας να καλύψουμε ένα μακροχρόνιο κενό στην ελληνική βιβλιογραφία.

Κατεβάστε το δείγμα του βιβλίου σε pdf
http://www.ziti.gr/docs/pdf/1668.pdf

(Εκδόσεις ΖΗΤΗ, Σεπτέμβριος 2018)



Environmental Geotechnics in Practice: Introduction and case studies

Robert W. Sarsby

Environmental Geotechnics in Practice is an informative and practical guide to the study of land-based waste disposal. The book identifies the key elements of a variety of waste disposal systems, and explains their role in protecting the environment. Using the most significant case histories from across the world where key lessons have been learned the book provides an engaging introduction to this important field.

The cases described all concern land-based waste disposal sites where there is significant interaction between ground engineering and the environment. Together they demonstrate that whatever the type of waste being disposed of it is possible to use geotechnical principles and practices to design a suitable facility. The author explains how the lessons from these historical cases can help current designers and constructers of waste disposal facilities to address the problems posed by climate change and land shortage. The book provides a broad coverage of environmental geotechnics relating to the performance of landfill sites, treatment of contaminated and damaged land, and stability of waste dumps (tips, tailings and lagoons).

Environmental Geotechnics in Practice will encourage readers to critically appraise the applicability of any design concept and data for the whole lifetime of a waste disposal project. The book will be of interest to a wide readership including professionals working in geotechnical engineering, environmental scientists, geology, and waste management, and also students of these subject areas.

(ICE Publishing, 28 August 2019)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

www.issmge.org/filemanager/article/624/ISSMGE_BULLETIN_2019_JUN_FINAL.pdf

Κυκλοφόρησε το Τεύχος No. 3 του Τόμου 13 (Ιουνίου 2019) του ISSMGE Bulletin της International Society for Soil Mechanics and Geotechnical Engineering με τα παρακάτω περιεχόμενα:

Research highlights
Research laboratory of Geotechnical Engineering and Georisk, University of Tunis EI Manar, Tunisia

Report from member society
New cabinet of the Hong Kong Geotechnical Society (HKGES)

Conference reports

- The 13th Australia New Zealand Conference on Geomechanics, Western Australia
- CAPG Plenary Session at the 13th Australia New Zealand Conference on Geomechanics, Western Australia
- The 9th Annual Conference of the Italian Young Geotechnical Engineers, Italy

Hot news – GeGe 2019

Event Diary

Corporate Associates

Foundation Donors

www.geoengineer.org/news

Στα **News** του **Geoengineer.org** θα βρείτε πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωμηχανικής. Υπενθυμίζεται ότι η διαχείριση του ιστοτόπου **Geoengineer.org** γίνεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο.

www.isrm.net/adm/newsletter/ver_html.php?id_newsletter=174

Κυκλοφόρησε το Τεύχος No. 46 (Ιουνίου 2019) του Newsletter της International Society for Rock Mechanics and Rock Engineering με τα παρακάτω περιεχόμενα:

- 4th International Congress on Rock Mechanics, 13-18 September 2019, Foz de Iguaçú, Brasil
- 26th ISRM online lecture by Dr José Lemos
- EUROCK2020 in Trondheim, Norway, the 2020 ISRM International Symposium
- Election of the Regional ISRM Vice Presidents 2019-2023
- Volume 21 - 2018 of the ISRM News Journal is online
- ISRM Board approves the new Science and Technology Awards
- 1st Bolivian Congress on Rock Mechanics, July 2019
- International Workshop on Underground Oil and Gas Storage (IWUOGS), Shenyang, China, August 2019
- 9th Nordic Grouting Symposium, Helsinki, September 2019 - an ISRM Specialized Conference
- International Symposium on Rock Mechanics and Engineering for Sustainable Energy, November 2019, Hanoi
- YSRM2019&REIF2019, Okinawa, Japan, December 2019
- 3rd ICITG, Guimarães, Portugal, September 2019
- ISRM Sponsored meetings

The 2018 issue of the ISRM News Journal is available on the website. This issue of the News Journal reports the ISRM activities in 2018 and presents two technical articles.

You will find information about the Board and Council meetings and activities, the ISRM President's Address, the Secretary-General's Report displaying the evolution of ISRM National Groups and ISRM's membership in recent years, the Reports from the ISRM Vice-Presidents, the report from the Technical Oversight Committee with the achievements of the Commissions over the period 2017-2018, the report with the activities of the Education Fund Committee and many other articles of interest for the rock mechanics community.

The technical articles are the ISRM Franklin Lecture 2018 delivered by Prof. Hideaki Yasuhara and the Rocha Medal presentation by Dr. Michael du Plessis, winner of the Rocha Medal 2018.

The ISRM News Journal is distributed to all members in electronic version. We also print a few copies of the News Journal, which are available at our sponsored symposia.

https://www.isrm.net/gca/?id=206

International Geosynthetics Society

Κυκλοφόρησε το IGS Newsletter της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

IGS NEWSLETTER – June 2019

Helping the world understand the appropriate value and use of geosynthetics

- GeoAmericas 2020 Abstracts Deadline Extended! Submit Your Abstracts Now! READ MORE
- Dr. Richard Brachman to Present Inaugural Zornberg Lecture READ MORE
- Join us at EuroGeo7! READ MORE
- Invitation For EuroGeo7 Sponsors & Exhibitors READ MORE
- Geosynthetics for Sustainable Development – Japanese Translation READ MORE
- Rencontres Géosynthétiques 2019 – Nancy, France 11-13 March 2019 READ MORE
- Case Studies: Extreme slope with AGRU HDPE geomembrane READ MORE
- ACIGS International Speakers Series Videos Now Available to View! READ MORE
- Calendar of Events

READ MORE AT GEOSYNTHETICSSOCIETY.ORG

Κυκλοφόρησε το IGS Newsletter της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

IGS NEWSLETTER – July 2019

Helping the world understand the appropriate value and use of geosynthetics

- GeoAmericas 2020 Keynote Lecturers Confirmed! READ MORE
- GeoAmericas 2020 Young Members Program Announced! READ MORE
- IGS Young Members: Down to Earth – An Interview with IGS Vice-President, Nathalie Touze, PhD READ MORE
- Slope Stability Analysis with Soil and Geosynthetic Interfaces READ MORE
- Announcing IGS-NA Educate the Educators – 2019 December 9-10 – La Jolla California READ MORE
- Geosynthetics 2019 – 13th International Conference on Geosynthetics READ MORE
- Nigerian Geosynthetics Event READ MORE
- Student Award Paper Spotlight: A Study On The Settlement Reduction Of Artificial Reef Using Geosynthetics READ MORE
- 9th IAGIG: Annual Conference of the Italian Young Geotechnical Engineers Naples (Italy), 10-11 May 2019 READ MORE

READ MORE AT GEOSYNTHETICSSOCIETY.ORG

https://www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/47/issue/3

Κυκλοφόρησε το Τεύχος 3 του Τόμου 47 (Ιουνίου 2109) του Geotextiles and Geomembranes της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

Editorial Board, Page ii

Geosynthetics for transportation and environmental applications, Jie Han, Shijin Feng, Page 281

Fully transient analytical solution for degradable organic contaminant transport through GMB/GCL/AL composite liners, Shi-Jin Feng, Ming-Qing Peng, Hong-Xin Chen, Zhang-Long Chen, Pages 282-294

Design and construction of lightweight EPS geofoam embedded geomaterial embankment system for control of settlements, Anand J. Puppala, Pinit Ruttanaporamakul, Surya Sarat Chandra Congress, Pages 295-305

Evaluation of moisture reduction in aggregate base by wicking geotextile using soil column tests, Jun Guo, Jie Han, Xiong Zhang, Zexia Li, Pages 306-314

Seismic analysis of geosynthetic-reinforced retaining wall in cohesive soils, H. Alhajj Chehade, D. Dias, M. Sadek, O. Jenck, F. Hage Chehade, Pages 315-326

The role of undrained clay soil subgrade properties in controlling deformations in geomembranes, B.A. Marcotte, I.R. Fleming, Pages 327-335

A novel 2D-3D conversion method for calculating maximum strain of geosynthetic reinforcement in pile-supported embankments, Zhen Zhang, Meng Wang, Guan-Bao Ye, Jie Han, Pages 336-351

Two and three-dimensional numerical analyses of geosynthetic-reinforced soil (GRS) piers, Panpan Shen, Jie Han, Jorge G. Zornberg, Amr M. Morsy, ... Chao Xu, Pages 352-368

Quantifying the effects of geogrid reinforcement in unbound granular base, Bingye Han, Jianming Ling, Xiang Shu, Weimin Song, ... Baoshan Huang, Pages 369-376

A simplified model for evaluating the hardening behaviour of sensor-enabled geobelts during pullout tests, Xin-zhuang Cui, Yi-lin Wang, Kai-wen Liu, Xue-zhi Wang, ... She-qiang Cui, Pages 377-388

A closed-form solution for column-supported embankments with geosynthetic reinforcement, Lin-Shuang Zhao, Wan-Huan Zhou, Xueyu Geng, Ka-Veng Yuen, Behzad Fatahi, Pages 389-401

Local stiffness characteristic of geogrid-stabilized aggregate in relation to accumulated permanent deformation behavior, Yong-Hoon Byun, Erol Tutumluer, Pages 402-407

Corner reinforced slopes: Required strength and length of reinforcement based on internal stability, Fei Zhang, Dov Leshchinsky, Yufeng Gao, Shangchuan Yang, Pages 408-416

Experimental and theoretical studies on the ultimate bearing capacity of geogrid-reinforced sand, Chao Xu, Cheng Liang, Panpan Shen, Pages 417-428

Microscale investigation into mechanical behaviors of heat-bonded nonwoven geotextile using DEM, Hong-Xin Chen, Xin Liu, Shi-Jin Feng, Jie-Ni Chen, ... Annan Zhou, Pages 429-438

Magnitude and significance of tensile strains in geomembrane landfill liners, R. Kerry Rowe, Yan Yu, Pages 439-458

https://www.icevirtuallibrary.com/toc/jgein/26/3

Κυκλοφόρησε το Τεύχος 3 του Τόμου 26 (Ιουνίου 2109) του Geosynthetics International της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

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Large-scale pullout testing and numerical evaluation of U-shape polymeric straps, S. Razzazan, A. Keshavarz, M. Mosallanezhad, pp. 237–250

Load behaviour of model strip footings on reinforced transparent soils, J.-F. Chen, X.-P. Guo, J.-F. Xue, P.-H. Guo, pp. 251–260

A new image-based technique for measuring pore size distribution of nonwoven geotextiles, R. A. e Silva, R. G. Negri, D. de Mattos Vidal, pp. 261–272

Mechanistic-empirical analysis of geogrid-stabilized layered systems: Part I. Solutions, X. Sun, J. Han, pp. 273–285

Mechanistic-empirical analysis of geogrid-stabilized layered systems: Part II. Analysis, X. Sun, J. Han, pp. 286–296

Prediction of footing settlements with geogrid reinforcement and eccentricity, K. Dal, O. F. Cansiz, M. Ornek, Y. Turedi, pp. 297–308

Performance of a geosynthetic cementitious composite mat for stabilising sandy slopes, T. P. Ngo, S. Likitlersuang, A. Takahashi, pp. 309–319

Natural frequencies of full-height panel reinforced soil walls of variable cross-section, P. Xu, K. Hatami, T. Li, pp. 320–33

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Behavior of expanded polystyrene (EPS) blocks under cyclic pavement foundation loading, S. M. A. Ghotbi Siabil, S. N. Moghaddas Tafreshi, A. R. Dawson, M. Parvizi Omran, pp. 332

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2015 – 2019)

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