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Professor Ralph B. Peck on Geotechnical Engineering

As I look back across nearly 50 years of participation in the development and growth of geotechnics, two things stan out in my mind. The first is the remarkable international camaraderie that has been a part of our profession since the earliest days. Although our numbers have grown enormously, we still know personally a surprising number of our colleague Perhaps it is because geotechnical problems exist throughout the world, knowing boundaries that are geological rather than political, that we have found common problems and common chal lenges, and we have exchanged our experiences in our personal contacts and through our literature.

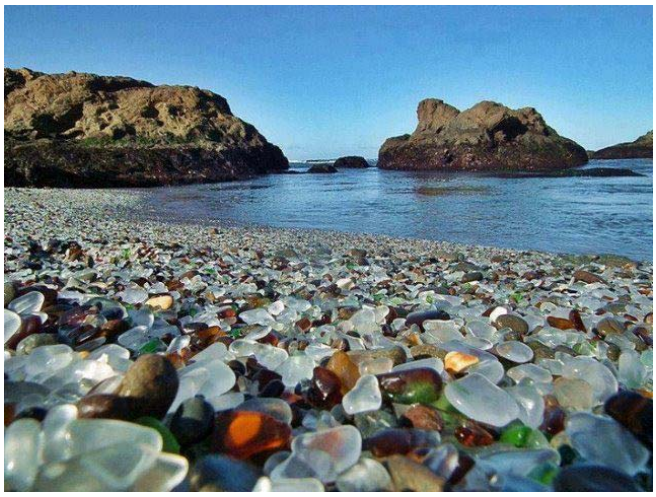
Secondly, perhaps more than any other group of profes- sional people, we have been willing to investigate and discus our failures. Rarely in the history of human activity have members of a profession been so prompt and straightforward in sharing with others their predictions, the events that actual ly occurred, and the possible explanations for shortcomings in the predictions. This willingness was responsible for muc of the rapid progress in the early days of soil mechanics, an it has carried over into the disciplines of rock mechanics an engineering geology as they have joined the geotechnical fam- ily.

It is my hope that observation in the field will remain the keystone of our profession, serving not only to encourage theoretical developments, but to keep such developments close to reality. There are many problems yet to be solved, and I have no doubt that the Members of the Southeast Asian Geotech- nical Society will remain in the forefront in solving them.

My very best wishes on your 20th Anniversary.

Ralph Peck

Η επιστολή εστάλη στα μέλη της Asian Geotechnical Society με την ευκαιρία του εορτασμού των 20 ετών από την ίδρυσή της.



Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

ΑΡΘΡΑ

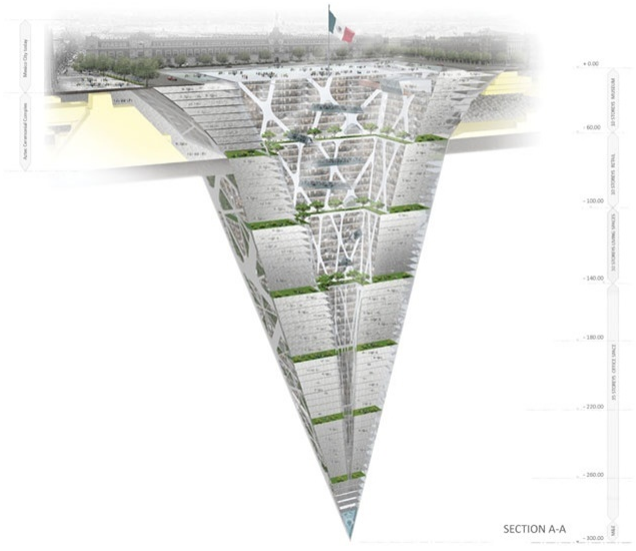
The only way is down

Could underground engineering help solve cities' overcrowding problems?

Culture is replete with the concept of civilisations living underground. It crops up in everything from HG Wells to Elizabeth Beresford. Of course, Wells' underground dwellers were mutated cannibals and Beresford's were pointy-nosed mammals with an excellent grasp of English and an ecological bent, but the exploration and exploitation of the realm below the surface has been a trope for decades.

Underground, overground

Now, the lure of subterranean space is growing, especially in cities where land is at a premium and building becomes ever-more difficult. And while travelling underground is part of everyday life for millions in cities around the world, other uses for underground space are becoming ever-more innovative; and more may well be to come. The challenge for engineers will be how to construct these underground spaces, make them suitable for the uses earmarked for them and maintain the conditions inside them to keep their contents and users safe and comfortable.



The Earthscraper concept plunges as far into the ground as London's Shard scrapes the sky

There are many reasons you might want to go underground. Space is an obvious example. In crowded established cityscapes such as London or New York, or the chaotic, fast-growing cities of India and East Asia, there just isn't much space on the surface. Taking a small ground footprint and building upwards into a skyscraper, the choice for maximising space since the 1920s, has its limitations. In many cities, the planning regimes are increasingly frowning on ever-higher skyscrapers, and even in the Middle East and East Asia, where it seems easier to get permission to build high, there's a practical limit to how high you can go. Hollowing out the space under the ground could be a way to get around these problems, as it gives more scope to expand laterally, rather than linearly. Go wide, not deep.

Another factor might be an inhospitable outdoor environment. In Canada, the northern states of the US, Scandinavia and Eastern Europe, the winters are so bitterly cold that building underground, where the environment is stable and insulated by the surrounding soil and rock, is an attractive prospect. Similarly, nearer the Equator, subterranean spaces could offer an escape from steamy humidity; and in heavily industrialised cities with air quality problems, it could be easier to guarantee a healthy, breathable environment underground.

But sometimes it's just a matter of space. In Tokyo, for example, bicycle parking has been taken underground using a system devised by engineering firm Giken Seisakusho, which can store 144 bikes in a space just 7m wide. Bikes are becoming more popular in urban Japan, where air quality from traffic is a serious issue. But parking them is a perennial problem. Giken's solution, an anti-seismic parking system, takes the bikes underground and out of the way, with only a deposit system at the surface.

Under the ground is a cylindrical silo some 11m deep and 8m across that holds a racking system, arranged radially around a central mechanism that incorporates a lift system and a robotic placing machine that whisks bikes from the street-level kiosk (it's this that is 7m wide; the kiosk doesn't cover the whole area of the shaft throat).

Tokyo's underground bike parks make only a small impression at the surface

Each user's bike is equipped with an ID tag attached to its front forks, with owners holding a matching smartcard. To use the system, the bike's front wheel is pushed into a slot on the surface kiosk; the placing mechanism grabs onto it, whisks it down into the silo and files it into one of the radial slots. To retrieve the bike, the owner holds the card up to a panel on the kiosk; the mechanism then works in reverse, locating the filed bike and bringing it back to street level; this takes an average of 13 seconds. The store can hold mountain bikes, electric bikes and bikes with front baskets or rear child seats.

"Imagine how much area would be needed on the surface for a bike park to hold 144 bicycles

Haan Admiraal, ITACUS, ITA-AITES

"It's a formidable space-saving technique – imagine how much area would be needed on the surface for a bike park to hold 144 bicycles," said Haan Admiraal, chair of the underground space committee (ITACUS) of international tunnelling and underground space association ITA-AITES at a recent seminar on underground engineering at the Institution of Civil Engineers in London. It is built with a proprietary system developed by Giken that uses interlinking piles, pressed into the ground hydraulically to form the walls of the silo; the void is then excavated up to this wall. This is a low-noise, vibration-free, seismically safe system that causes minimal disruption to neighbours when installed, developed for the crowded, earthquake-prone region, and is also used for other types of construction.

For some applications, underground may just be the best environment. ITACUS vice-chair Antonia Comaro gave the examples of museums and art galleries. "Architects and engineers spend an inordinate amount of effort, time and money to design iconic, beautiful buildings, and quite rightly," she said. "But then they have to spend even more effort and money to devise ways to protect the priceless artworks they are to hold from sunlight and changes in the environment. The Paris Louvre had the idea to put its lobby underground, with the famous glass pyramid as its entrance; but it might well be that below ground would be the best place for the entire institution, and other galleries where light- and moisture-sensitive objects are going to be on display. You are starting from a default position of no light – the effort is spent on bringing it in and controlling it, not keeping it out – and the insulating effects of soil and rock help keep the environment very stable."

"It might well be that below ground would be the best place museums, and other galleries where light- and moisture-sensitive objects are going to be on display

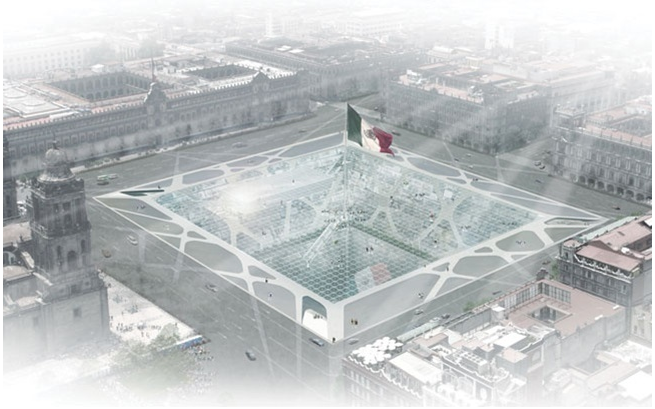
Antonia Comaro, ITACUS

This is one of the rationales behind one of the world's most intriguing plans for a large building: the Earthscraper, which has been designed for a specific location in Mexico City by architecture practice BNKER Arquitectura (pleasingly, the company name in English is said as 'Bunker Architecture'). Best described as an underground skyscraper, the Earthscraper has museum space as an integral part of its concept. This is partly owing to its location.

The museum levels on the Earthscraper would disply Aztec artifacts from the site's past

Originally devised as an entry for an architecture competition, Earthscaper is designed for the city's largest public square – and, indeed, one of the world's largest – the Plaza de la Constitucion, known as Zocalo. Bordered by the city's cathedral, the National Palace and the city government buildings, Zocalo is a square 240m on each side, giving it a total area of 57,600m^2. It is a ceremonial space with a flagpole at its centre that is raised every morning and lowered every night, and is a significant area in Mexico City's public life.

Which makes it slightly incongruous that the plan for the Earthscraper involves digging it up; especially as Mexico City has a long history, being the site of Tenochtitlan, the capital of the Mexica and Aztec civilisations, and a correspondingly rich archaeological record, parts of which would be showed off in the structure's museum space. However, the land pressure on the city is extreme. "New infrastructure, office, retail and living space is required but no empty plots are available," said BNKR founder and chief executive officer Esteban Suarez. "Federal and local laws prohibit demolishing historic buildings and, even if this was so, height regulations limit new structures to eight stories. So we have a massive programme of hundreds of thousands of square meters and nowhere to put it. This means the only way to go is down."



On the surface, Zocalo would still have its usual functions despite the presence of the Earthscaper

Earthscraper is designed to be "the antagonist of the skyscraper". It is an inverted pyramid 300m deep – as deep as the Shard in London is high – whose base would occupy almost the entire area of Zolcalo apart from the roads around the edge. The base would be covered with a thick glass sheet to allow Zocalo to still be utilised for its current uses, while still allowing light to penetrate into the void at the centre of the structure, which will act like an enormous lightwell for the structures arranged around the walls of the pyramid.

The pyramidal form is not coincidental. If it were housed in a simple vertical shaft, the walls would tend to cave in and would need enormous supporting structures to prevent a catastrophic collapse. Sloping the walls inwards on all sides means they are more self-supporting, Suarez explained. It's also a matter of concern that Mexico City is in an active earthquake zone, but again the pyramid is a logical choice. "Because its structure must already resist the lateral forces of the surrounding earth, it would be especially strong against the lateral forces of an earthquake," Suarez said.

With the 'buildings' sections of the Earthscraper lining the walls of the pit, natural light can penetrate down into its depths, although the plans include a fibre-optic system to illuminate the deepest levels; vents in the top sheet would also allow natural ventilation. "We hope that in creating a pleasant environment underground we would convince sceptics of the viability of our scheme," Suarez said.

The interior of the Earthscraper would be flooded with natural light

The floors nearest the surface would be museum space, with retail developments below that, then residential, and office space at the bottom. The top glass plate – which we hope will be frosted in some way or only the boldest would walk across it – would be able to host anything from Christmas skating rinks to major artistic performances, religious gatherings and political protests. "It preserves the iconic presence of the city square and the existing hierarchy of the buildings that surround it," said Suarez.

In engineering terms, one of the biggest challenges would be water. The lowest 165m of the pit would be below Mexico City's water table, and therefore effectively floating on mud. This would necessitate a "greater investment in structure" than a skyscraper, making it about 30 per cent more expensive. The cost would require government intervention, with tax breaks for developers similar to those that helped finance the new buildings on London's Isle of Dogs.

For the moment, however, the Earthscraper remains an intriguing and ingenious concept, a potential space to be watched. For real underground activity, a city much further north shows a way forward.

One of the biggest stumbling blocks with building underground is what's already there. Whether it's the basements of buildings, sewerage systems, electrical infrastructure or existing tunnels for roads, subways and underground railways, cities without an underground hinterland of some sort are rare. "You need to have accurate and reliable surveys of the existing situation," said Martin Knights, senior vice-president for earth engineering at contractor CH2MHill, "and some sort of overarching plan of what else you want to fit in and how it's supposed to be used."

Leading the way in this respect is the Finnish capital of Helsinki, where the local population love outdoor life but, for most of the year, can't indulge in it without risking frostbite. The city has an underground masterplan that governs all of its subterranean activities, which are extensive: underneath its central park can be found a 100-yard-long lake that can hold nine million gallons (41 million litres) of icy Baltic water, which is used to cool the city in the summer (when temperatures can reach 30°C). Conversely, the city also has a huge underground heat pump system, which recovers thermal energy from wastewater and diverts it into domestic district heating.

Elsewhere under the city is a running circuit, an ice-hockey hall, the Itäkeskus swimming pool, the Temppeliaukio Church and a shopping centre. A series of light wells dotted around the surface light up the subterranean spaces, whose volume adds up to some nine million cubic metres, with 400 separate facilities linked by tunnels, and the master plan has another 100 locations earmarked for future resources. There are also plans for an 80km undersea tunnel linking Oulo in northern Finland with Helsinki, to create an economic 'twin town'.

Helsinki residents can swim underground in the Itäkeskus swimming pool, and worship in the Temppeliaukio Church (below)

But in many cities, the main reason to go underground is the same as it has been for more than a century: to get roads off the surface, relieve congestion and open up surface ground for new uses. One example is Boston, Massachusetts, where a project known as Central Artery Tunnel or the 'Big Dig' took an elevated highway that was considered a blight to the city below ground and constructed a new tunnel under the harbour. Further west, Seattle, Washington, is attempting to bury an the Alaskan Way overpass, which is old and decaying. This is not going well, with the tunnel boring machine stuck 10 per cent of the way through a 1.7-mile dig for more than a year.

In the UK, meanwhile, two major tunnelling projects could transform west and south London beyond recognition. CH2MHill is involved with feasibility studies to turn the Hammersmith Flyover into a tunnel. Another study is looking at the possibility of burying the South Circular Road. In a £30bn project that includes a tunnel on the North Circular at Brent Cross aimed at improving facilities for cyclists and pedestrians at ground level while also improving air quality as London's population and therefore its traffic continue to increase.

(Stuart Nathan / **theengineer**, 11 May 2015, http://www.theengineer.co.uk/civil/in-depth/the-only-way-is-down/1020331.article)

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

Geosynthetic Institute

GSI White Paper 32 on HDPE Geomembranes

The Geosynthetic Insitute (GSI) has accomplished a lot internationally with its generic specifications, often filling a void in or setting the stage for ASTM or ISO standardization developments in geosynthetics. One of the most significant specifications released by GSI's Geosynthetic Research Institute is the GRI-GM13 Specification for HDPE Geomembranes.

GSI White Paper 32, released early this year, focuses directly on GRI-GM13 and looks at the rationale and background for it.

Download a copy of GRI White Paper 32 here http://www.geosynthetica.net/wp-content/uploads/GSI_WhitePaper32_HDPEGeomembranes.pdf

The authors of the paper, Drs. Grace Hsuan, Robert Koerner, and George Koerner, open with the historical development of the specification, citing important work by the National Sanitation Foundation (NSF), the EPA, and the movement in the 1990s to assemble a task group to form a truly useful, technically adept, generic specification for high-density polyethylene geomembranes. At the time, the the market for geomembranes was growing quickly, well outpacing full engineering awareness or regulatory readiness.

The growth in applications and the need for specific site situations to be considered in design and acceptance led to a focus on Manufacturing Quality Control (MQC).

White Paper 32 (Rationale and Background for the GRI-GM13 Specification for HDPE Geomembranes) discusses test selection, relationships to previous and current standards and specifications, field data to support GRI-GM13, and much more. It even includes discussion on warranties (5 years, 20 years, and notes on the performance of covered/backfilled geomembranes vs. the financial obligations and risks in insuring installations).

In addition to data tables and notes on tests that have been included or excluded from the document, discussion highlights include:

- Endurance, physical, and mechanical properties
- Carbon black content
- Asperity height
- Puncture resistance
- OIT
- UV resistance

The author's write:

With HDPE geomembranes (as with all geosynthetics) material modifications and upgrading by the manufacturing/resin/additive community is an ongoing process. As such, any specification must be reviewed and modified (as required) on a regular basis. GRI-GM13 requires such a review every 24-months, or sooner. The information presented in this paper represents the development of the original document dated June 17, 1997. Over the intervening years, the specification has seen twelve revisions and this white paper reflects the major quantitative changes….

May 11, 2015

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

ICGE 2015 International Conference in Geotechnical Engineering – Colombo-2015, 10 - 11 August 2015, Colombo, Colombo, Sri Lanka, http://www.icgecolombo2015.org

Numerical Analysis in Geotechnics, 20 August 2015, Hanoi, Vietnam, nag2015secretariat@gmail.com

Subsea Tunnels, 2-3 September 2015, Seoul, Korea www.tu-seoul2015.org

SICAT 2015 - Symposium on Innovation and Challenges in Asian Tunnelling 2015, 2 to 3 September 2015, Singapore, tucss@cma.sg, www.tucss.org.sg.

China Shale Gas 2015 - an ISRM Specialized Conference, 6-8 September 2015, Wuhan, China, http://english.whrsm.cas.cn/ic/ic/201405/t20140509_120692.html

"Underground Construction" Conference, 8-9 September 2015, Krakow, Poland, www.inzynieria.com

13th International Benchmark on the Numerical Analysis of Dams, 9 - 11 September 2015, Lausanne | Switzerland http://icold2015bmw.epfl.ch

International Symposium on Geohazards and Geomechanics 10-11 September, 2015, Coventry, U.K., www.warwick.ac.uk/isgg2015

24th European Young Geotechnical Engineers Conference in Durham, UK, 11-12 September, 2015, https://www.dur.ac.uk/conference.booking/details/?id=419

16th European Conference on Soil Mechanics and Geotechnical Engineering "Geotechnical Engineering for Infrastructure and Development", 13 - 17 September 2015, Edinburgh, UK, www.xvi-ecsmge-2015.org.uk

2015 Cutting Edge "Urban Tunneling", September 21-23, 2015, Denver, USA, www.ucaofsmecuttingedge.comwww.ucaofsmecuttingedge.com

Workshop on Volcanic Rocks & Soils, 24 - 25 September 2015, Isle of Ischia, Italy, www.associazionegeotecnica.it

The 7th International Symposium on Roller Compacted Concrete (RCC) Dams, Chengdu, China, Sept. 24th-25th, 2015, www.chincold.org.cn

Athens 2015 International Landfill Mining Conference, September 24-25, 2015, Athens, http://www.erasmus.gr/microsites/1050/welcome-address

TranSoilCold 2015 - The 2nd International Symposium on Transportation Soil Engineering in Cold Regions, September 24-26, 2015, Novosibirsk, Russia, http://transoilcold2015.stu.ru/index.htm

International Conference on Landslides and Slope Stability (SLOPE 2015), September 27-30, 2015, Bali, Indonesia, www.slope2015.com

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

4ο 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

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, ajaycbri@gmail.com

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

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

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

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

Recent Advances in Rock Engineering - RARE 2016 - an ISRM Specialised Conference
16-18 November 2016, Bangalore, India

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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

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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

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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

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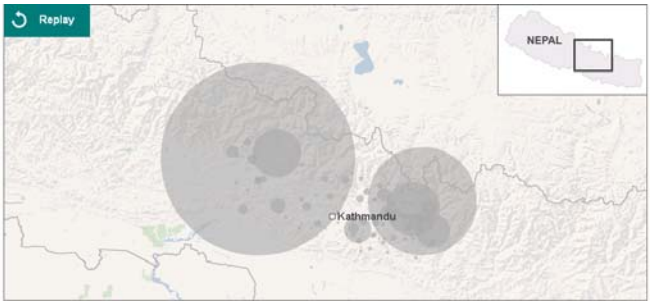
ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Animated map: The earthquake and its 120 after-shocks

14 May



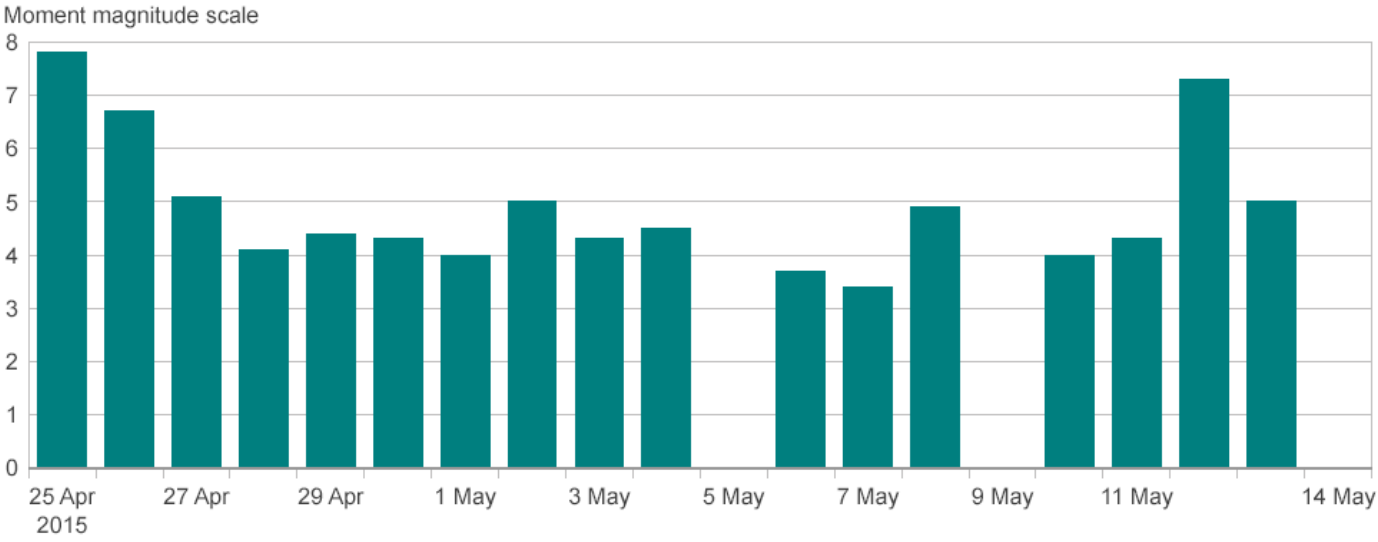
http://www.bbc.com/news/world-asia-32479909

Nepal earthquakes: Devastation in maps and images

Thousands of people lost their lives and thousands more were injured in a 7.8-magnitude earthquake that hit Nepal's capital Kathmandu and its surrounding areas on 25 April.

The earthquake was followed by a large number of aftershocks, including one that measured 7.3 on 12 May.

Largest recorded earthquakes in Nepal each day



Note: Logarithmic scale, so earthquakes with higher magnitude appear much larger on the map than those with smaller magnitude.
Data excludes earthquakes with magnitude lower than 2.5.

Source: USGS

Among the worst-hit districts was Sindhupalchok - where more than 2,000 died. In the capital, Kathmandu, more than 1,000 perished. Thousands more were badly injured by falling debris caused by the quake or powerful aftershocks that rocked the region. Mount Everest was also struck by deadly avalanches after the quake on 25 April.

Worst-affected areas

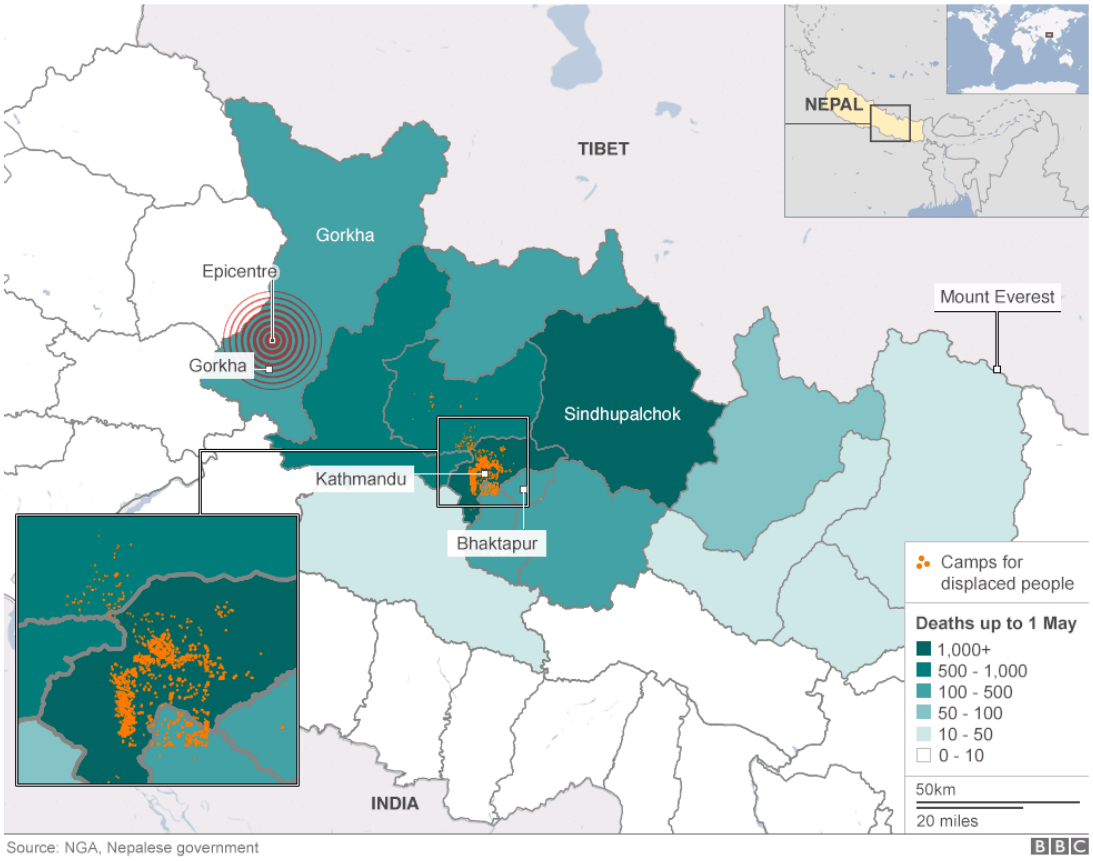
Since then, people are living in makeshift camps around Kathmandu, having been made homeless by the quake or because they are too afraid to stay inside. Some have tried to leave the capital amid fears of further aftershocks.

Many of the country's historic sites have been severely damaged, including temples and monuments.

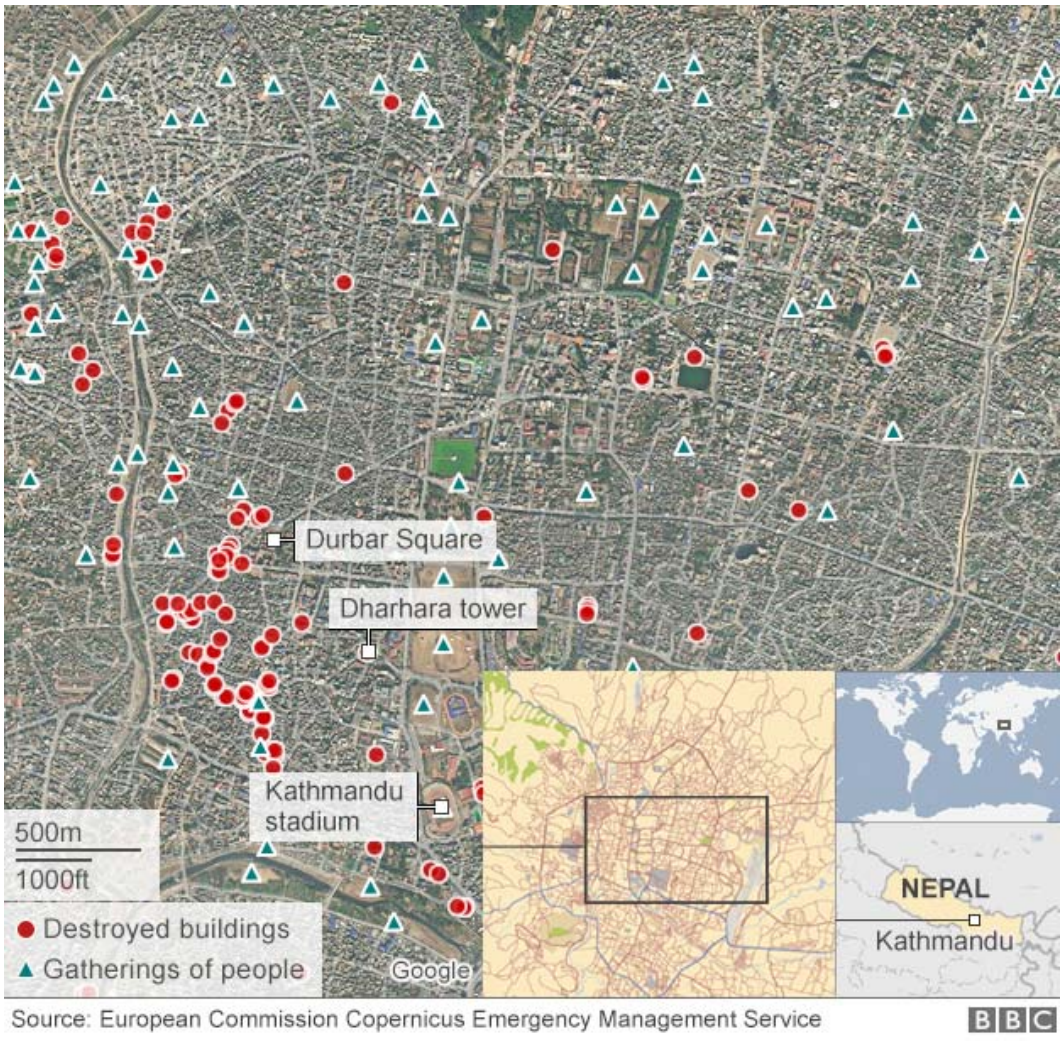
Kathmandu

Analysis of satellite imagery captured before and after the devastating quake reveals that more than 180 buildings in the densely populated city centre were destroyed.

At least four out of seven Unesco World Heritage sites in the Kathmandu valley - three of them ancient city squares - were badly affected (http://www.bbc.com/news/world-asia-32472307).



Building damage in Kathmandu: 27 April 2015



Dharahara tower, Kathmandu: 27 October 1998 and 26 April 2015

Dharahara tower, Kathmandu: 27 October 1998 and 26 April 2015

The capital's Durbar Square - the royal Nepalese residence until the 19th century - has also suffered, with many buildings reduced to rubble.

Durbar Square, Kathmandu: via satellite before and after the quake

Durbar Square, Kathmandu: February 2015

Durbar Square, Kathmandu: 27 April 2015

Temporary shelters have been set up on open spaces in the city - such as fields and stadiums. They offer some protection to families who have lost their homes or those too scared to stay inside after the quake and powerful aftershocks.

Tent city': field in Kathmandu via satellite before and after the quake

Narayanhiti Palace, Kathmandu: via satellite before and after the quake

Bhaktapur

In Bhaktapur, which had been the country's best preserved old city, initial reports claim half of all buildings have been destroyed and 80% of temples damaged.

The ancient city, one of the worst-affected areas, lies to the east of the capital.

Durbar Square, Bhaktapur: February 2015

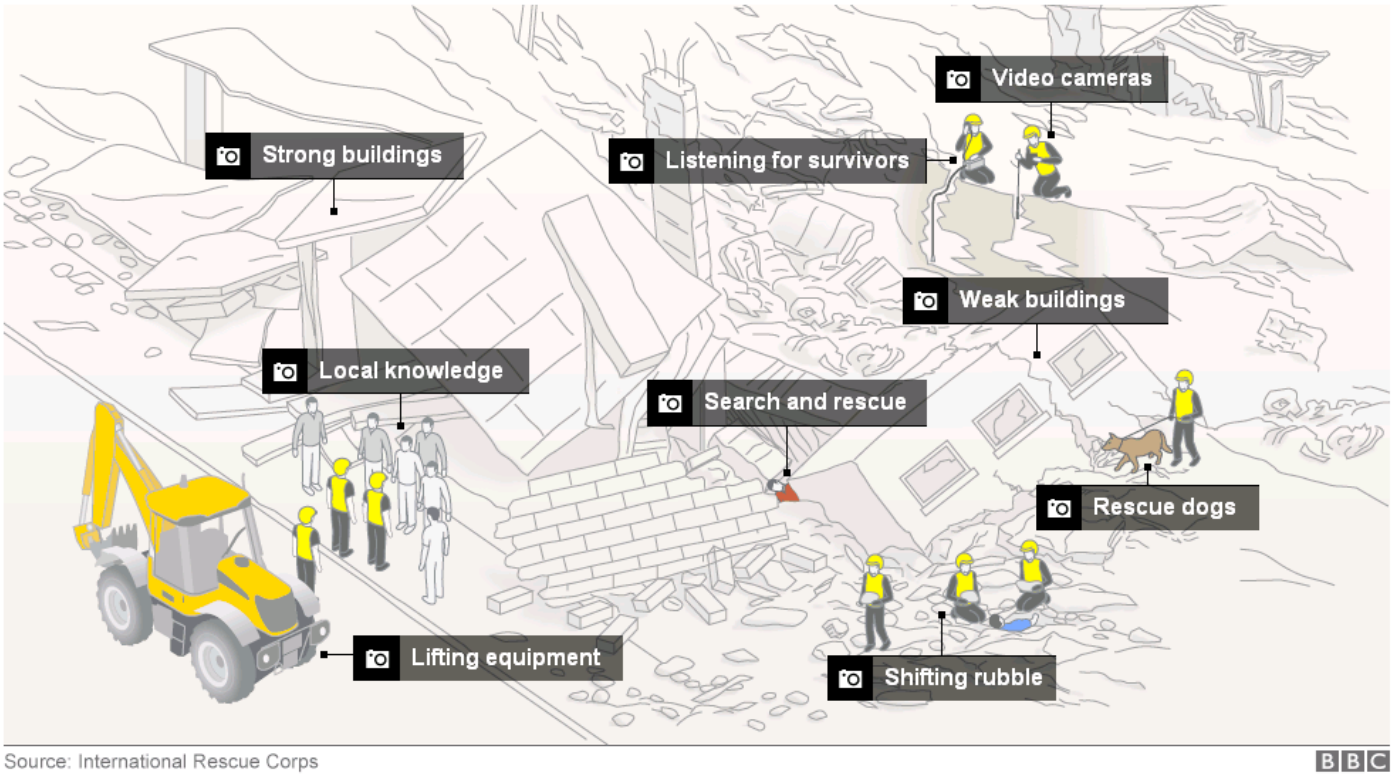
Durbar Square, Bhaktapur: April 2015

Search and rescue operation

International teams of rescuers and medical experts are arriving in Nepal to help hunt and care for earthquake survivors.

INTERACTIVE

http://www.bbc.com/news/world-asia-32479909



How a search and rescue operation is carried out

Strong buildings

Rescue workers need to be swift to assess where they are most likely to find survivors inside collapsed buildings.
Video cameras

Video cameras placed on the end of flexible poles can be squeezed through gaps in the rubble to help locate survivors. Using this technique means time is saved as less rubble is shifted unnecessarily. Thermal imaging equipment can also be used to locate survivors as their body heat can warm the rubble around them.

Listening for survivors

Stairwells or the spaces under large concrete beams can provide what rescue workers call 'voids', in which people may have survived.

Specialist sound equipment can detect the faintest of noises to within a few metres. Silence on the site is needed while a member of the rescue team bangs three times and hopes to hear a response. Carbon dioxide detectors can be used to find survivors rendered unconscious. They work best in confined spaces where they detect the greater CO2 concentration in the air exhaled by those still breathing.

Weak buildings

Many of the buildings in Nepal collapsed in the initial earthquake or the aftershock. Many older neighbourhoods in the capital, Kathmandu, were made up of poorly-constructed brick buildings and these were largely destroyed in the disaster. Fewer, modern structures collapsed.

Local knowledge

Local people often know the best locations to begin the search for survivors. After speaking to them rescue workers can quickly select the most promising place to begin their work. Many local people have also joined in the search for survivors.

Search and rescue

The co-ordinating agency, usually the UN, and the host country, have to take the difficult decision of when to stop looking for a few remaining trapped people and concentrate resources on looking after the thousands of other survivors. The average time for this switch is between five and seven days, but individuals have been known to survive as long as 13 days, if they have access to water.

Rescue dogs

Dogs are extremely effective at using their sense of smell to pick up on signs of life that human rescuers cannot. They are also able to cover large areas quickly, speeding up the search and rescue process.

Lifting equipment

Diggers and hydraulic jacks are among the heavy machinery that rescue workers employ to shift rubble. Large concrete slabs on the outside of buildings can be pulled aside by diggers, enabling rescuers to get a view of any people still trapped inside. Rescue workers are also taking chainsaws and other power tools to cut through wreckage.

Shifting rubble

Before the heavy-lifting equipment arrives, rescuers use pick axes and shovels to dig through the rubble. Other tools used by rescuers include chainsaws, disc-cutters and rebar cutters - which can be used to tackle the metal bars in reinforced concrete.

The United Nations, which estimates 6.6 million people live in the districts affected by the earthquake, is helping to co-ordinate rescue efforts.

Many have been left homeless by the disaster and the country is already reported to be running out of water and food. There are also frequent power cuts.

The British organisation, **Search and Rescue Assistance in Disasters** (SARAID) has sent a team of experts with 1.5 tonnes of specialist equipment. This includes an electrical power generator and power tools for cutting through concrete and steel.

They also have their own tents and food supplies, so they will not be a drain on local resources.

India and China are among the other countries to send teams of rescuers.

(BBC From the section Asia, 15 May 2015, http://www.bbc.com/news/world-asia-32479909)

Nepal's 456-MW Upper Tamakoshi hydroelectric project suffers "settlement"

Nepal's Electricity Authority has released a list of earthquake damaged state- and independently-owned hydroelectric projects that includes the US$664 million 456-MW Upper Tamakoshi hydroelectric facility being constructed on Nepal's Tamakoshi River.

According to NEA, the Upper Tamakoshi concrete dam settled as a result of the April 25, Nepal earthquake that killed more than 7,000 people.

Published local news reports indicate Bigyan Prasad Shrestha, Upper Tamakoshi project chief, said an initial inspection of the project site following the earthquake showed the dam sustained "settlement." But, there was no other damage.

"This [settlement] is repairable and it is not a new phenomenon for projects under construction," Shrestha said.

The project is one of several revealed by Nepal's Finance Minister Baburam Bhattarai in September 2008 as part of a government initiative to increase the country's hydroelectric capacity by 10,000 MW by 2018.

NEA's list of damaged facilities include(see table next column):

Upper Tamakoshi is a peaking run-of-river project with an 822 m gross head and a design discharge of 66 m3/s.

The major components of this project are the intake, a 22 m high concrete dam, twin de-sanding basins, a 7.86 km long headrace tunnel, a 360 m high surge shaft, a 495 m long penstock pipe, an underground powerhouse with six Pelton turbines, a 2.9 km long tailrace tunnel, and a 47 km long 220 kV transmission line to Khimti substation.

The facility is the largest hydroelectric project in Nepal, located in the district of Dolakha, one of the districts that bore the brunt of the massive 7.8 magnitude earthquake that had its epicenter 197 km east in Kathmandu.

The plant is on the Tamakoshi River, one of the major tributaries to the Sunkoshi River in the Koshi River Basin near Nepal's northwestern border with Tibet.

The project is slated to be complete by 2016, but the earthquake may push back its completion date.

Projects of independent power producers affected by the earthquake

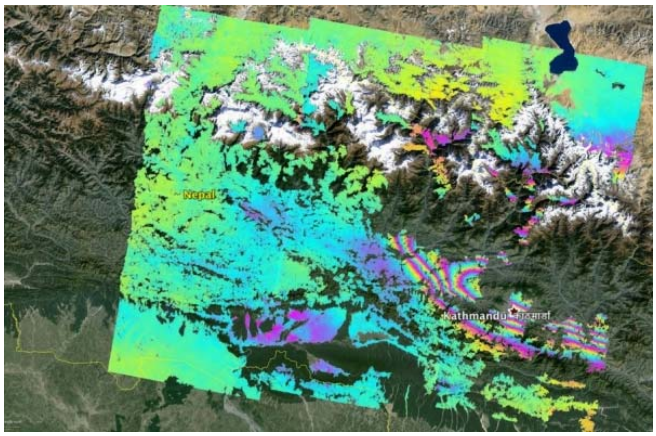
PROJECT	CAPACITY	STATUS
Upper Bhotekoshi	45 MW	Penstock burst due to the rock slide; power house submerged due to penstock burst; rock slide continues after earthquake; no excess to power plant
Sunkoshi Khola	2.5 MW	Power-house wall has fallen inside power-house room, landslide at penstock alignment and landslide at headwork areas, no access to plant
Indrawati-III	7.5 MW	Significant damage, but in operation
Chaku Khola	3 MW	Not in operation, details yet to come
Baramchi Khola	4.2 MW	Penstock pipe burst; no access to power plant but in operation
Middle Chaku	1.8 MW	Not in operation, details yet to come, no access to power plant
Sipring Khola	9.65 MW	Extension joints burst, landslide at penstock alignment, not in operation
Ankhu Khola-1	8.4 MW	Sub-station, power-house fully damage by landslide 11 poles are damages, plant is not in operation
Mailung Khola	5 MW	Significant damage in headworks, penstock pipe and power-house; not in operation, no access
Bhairab Kunda	3 MW	Tunnel leakage, penstock burst, switchyard damaged, transmission line damaged but power house is safe; not in operation

Projects of Nepal Electricity Authority affected by the earthquake

PROJECT	CAPACITY	STATUS
Trishuli	24 MW	Cracks in the crest in the balancing pond, staff quarter damaged; not in operation, but can be restored within a few weeks
Devighat	14 MW	A cascade project of Trishuli; cannot operate until Trishuli resumes
Sunkoshi	10.05 MW	Severe leakage in a stretch of 200 meter canal, maintenance in the headworks damaged by Jure landslide remains incomplete; not in operation
Kulekhani	60 MW	Cracks in the crest of the dams, but in operation
Chilime	22 MW	Damage in transmission line
Upper Trishuli 3A (under construction)	60 MW	Severe damage in the construction works after landslide from both sides not only killed four employees but also buried heavy equipment; damage in the audit tunnels and a suspension bridge

(Gregory B. Poindexter, Associate Editor / HydroWorld, 11 May 2015, http://www.hydroworld.com/articles/2015/05/nepal-s-456-mw-upper-tamakoshi-hydroelectric-project-suffers-settlement.html)

ARIA Provides New Look of Earth's Surface from Nepal Quake



It was only a minute the duration of the earthquake of Nepal, but this minute was enough to deform the Earth's surface as we used to know!

The Advanced Rapid Imaging and Analysis project (ARIA) enables Nasa and its partners to calculate a map of the deformation of Earth's surface caused by the magnitude 7.8

quake. As viewed by the satellite in a 70-day interval between two ALOS-2 images, acquired February 21 and May 2, 2015, the false-color map shows the amount of surface which moved permanently.

The color contours show the surface displacements, where each color cycle represents 4.7 inches (11.9 centimeters) of surface motion. As it can be seen from the contours in the map, the land around Kathmandu has moved upward by more than 40 inches (1 meter) toward the satellite, assuming purely vertical motion. Areas, having heavy vegetetion or snow, do not have color contours, since they affect the radar measurements. Through these maps, scientists can note the land movements caused by earthquakes and be able to estimate the impact on future earthquake activity.

For more information about ARIA, visit: ARIA

(Geoengineer.org, Wednesday, 06 May 2015)

Καλωσήλθατε στη Νισινοσίμα
Νεογέννητο νησί στην Ιαπωνία γίνεται φυσικό εργαστήριο Εξέλιξης

Το νησί της Νισινοσίμα στις 23 Φεβρουαρίου 2015. Η ηφαιστειακή δραστηριότητα δεν έχει ακόμα καταλαγιάσει

Ένα μικρό νησί που γεννήθηκε από ηφαιστειακές εκρήξεις νότια του Τόκιο δίνει μια μοναδική ευκαιρία στους οικολόγους να παρακολουθήσουν από κοντά τον αποικισμό αυτής της άγονης νέας γης. Είναι μια διαδικασία στην οποία θα παίξουν βασικό ρόλο οι κουτσουλιές που αφήνουν τα θαλασσοπούλια.

Το νησί ξεπήδησε μέσα από πίδακες τέφρας και λάβας το Νοέμβριο του 2013, και κατάπιε το γειτονικό νησί Νισινοσίμα στο αρχιπέλαγος του Ογκασαβάρα, γνωστό και ως Μπενίν, περίπου 1.000 χιλιόμετρα από το Τόκιο (http://news.in.gr/science-technology/article/?aid=1231274997).

Η νέα Νισινοσίμα, με την αξιοσέβαστη έκταση των 2,46 τετραγωνικών χιλιομέτρων, είναι σήμερα μια γυμνή, σαθρή μάζα βράχων που σχηματίστηκαν από τη στερεοποίηση της λάβας.

Το νησάκι, ένα νεότευκτο ακίνητο στην απέραντη έκταση του Ειρηνικού, σταδιακά θα αποικιστεί από φυτά και ζώα, μια διαδικασία που οι επιστήμονες θα παρακολουθούν προσεκτικά. «Θα μπορέσουμε να δούμε το σημείο έναρξης των εξελικτικών διαδικασιών» δήλωσε στο Γαλλικό Πρακτορείο Ειδήσεων ο Ναόκι Κάτσι, καθηγητής του Μητροπολιτικού Πανεπιστημίου του Τόκιο και επικεφαλής της Ερευνητικής Επιτροπής Αρχιπελάγους Ογκασαβάρα.

Όταν η ηφαιστειακή δραστηριότητα καταλαγιάσει, «το πρώτο που θα συμβεί θα είναι πιθανότατα η άφιξη φυτών που μεταφέρονται από τα ωκεάνια ρεύματα ή ταξιδεύουν προσκολλημένα στα πόδια πτηνών» εξήγησε ο ερευνητής.

Τα θαλασσοπούλια αυτά θα μπορούσαν σταδιακά να εγκατασταθούν στο νησί. Κουτσουλιές, πεσμένα φτερά, νεκρά πτηνά και κομματάκια εμετού θα δημιουργήσουν τελικά γόνιμο έδαφος για τη φύτρωση σπόρων που φτάνουν με τον άνεμο ή επιζούν μέσα στο πεπτικό σύστημα των πουλιών.

Το νησί της Νισινοσίμα θα ακολουθήσει έτσι το δρόμο του Σάρτσεϊ, ενός ηφαιστειογενούς νησιού που εμφανίστηκε το 1963 περίπου 30 χιλιόμετρα από τις ακτές της Ισλανδίας.

Το Σάρτσεϊ αναγνωρίζεται σήμερα ως παρθένο εργαστήριο της φύσης και έχει ανακηρυχθεί από την UNESCO Μνημείο Παγκόσμιας Κληρονομιάς.

«Από τότε που άρχισαν να μελετούν το νησί το 1964, οι επιστήμονες κατέγραψαν την άφιξη σπόρων που μεταφέρονταν από τα ωκεάνια ρεύματα, την εμφάνιση μυκήτων και βακτηρίων, αλλά και την άφιξη του πρώτου αγγειόσπερμου φυτού που ακολούθησε το 1965» αναφέρει η UNESCO στο δικτυακό τόπο της.

«Μέχρι το 2004 [τα αγγειόσπερμα φυτά] είχαν φτάσει τα 60, μαζί με 75 βρυόφυτα, 71 λειχήνες και 24 μύκητες. Ογδόντα εννέα είδη πτηνών έχουν καταγραφεί στο Σάρτσεϊ, από τα οποία τα 57 αναπαράγονται σε άλλες περιοχές της Ισλανδίας. Το νησί των 1.410 στρεμμάτων φιλοξενεί επίσης 335 είδη ασπόνδυλων».

Η Νισινοσίμα πιθανότατα δεν θα εξελιχθεί σε οικοσύστημα με τόσο μεγάλη ταχύτητα, αφού βρίσκεται μακριά από την ηπειρωτική Ιαπωνία και από τα υπόλοιπα νησιά του συμπλέγματος.

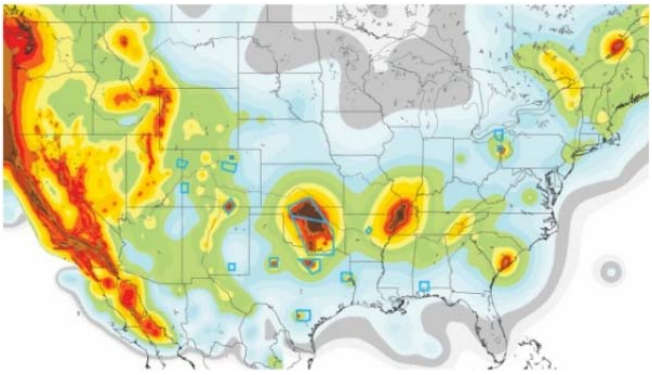
Είναι όμως ένας λευκός καμβάς στον οποίο θα ζωγραφίσει η εξέλιξη, και οι ερευνητές σχεδιάζουν τα επόμενα χρόνια να αρχίσουν μελέτες πεδίου.

Βασικό τους μέλημα σε αυτές τις μελλοντικές αποστολές είναι η αποφυγή μεταφοράς ξένων ειδών. Για το λόγο αυτό, ο επιστημονικός εξοπλισμός και τα ρούχα των ερευνητών θα πρέπει να είναι είτε ολοκαίνουργια είτε προσεκτικά αποστειρωμένα.

Το νησί του Σάρτσεϊ έξω από την Ισλανδία 16 ημέρες μετά την έναρξη της ηφαιστειακής έκρηξης που το δημιούργησε

(Βαγγέλης Πρατικάκης / Newsroom ΔΟΛ, 19 Μαΐου 2015, http://news.in.gr/science-technology/article/?aid=1231409046&ref=newsletter)

USGS report correlates earthquake triggering to human activity



Earthquake risk is now higher in Oklahoma than California. Boxes represent fracking zones

A newly released report from the U.S. Geological Survey (USGS) has for the first time attempted to establish a connection between human activities such as fracking with earthquake occurrence. Even though small in magnitude, human-induced earthquakes are becoming gradually important and warnings that greater magnitude events may be generated are expressed.

The report issued by the U.S. Geological Survey (USGS) supports that human activities and especially wastewater injection and hydraulic fracturing may essentially trigger a great number of earthquakes. According to the scientists, many low-magnitude earthquakes - recorded using very sensitive equipment - "*are located near deep fluid injection wells or other industrial activities capable of inducing earthquakes*". Even though their frequency and magnitude were not a concern so far, "*dramatic increases in seismicity rates have been observed in the Central United States in the past 5 to 7 years. This increase is reported to be stimulated by injection of wastewater or other fluids in deep disposal wells*".

For instance, Oklahoma, which has evolved to be a fracking center, has witnessed a significant increase from 1.5 a year to 2.5 a day in the frequency of magnitude 3 and stronger seismic events. The state was also shaken by the magnitude 5.6 Prague earthquake in 2011 and even though scientists attribute its occurrence to fracking, the debate on the event's causes is still under dispute.

Authors of the report admit this is an initial effort to quantify the problem, whose dimensions appear to be growing and acknowledge that further research is required to come up with reliable seismic hazard models. They also express their concerns that stronger earthquakes may be triggered as a result of industrial human activity, which may even reach a magnitude 7, causing millions of dollars of damage.

To access the full report in pdf format, please click here!

(Geoengineer.org, Thursday, 07 May 2015)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

County Durham artist Steve Messam creates paper bridge in Lake District

Steve Messam, who is based in County Durham, used 22,000 sheets of red paper to construct the span in Patterdale.

It's a project which has been on the cards for North East artist Steve Messam for the last four years or so.

At the weekend, he finally realised his ambition to build a traditional-style pack horse bridge in the Lake District.

Only this particular bridge has been constructed from 22,000 sheets of red paper.

The bridge spans a waterway two miles from Patterdale, at the foot of the Helvellyn range.

It can take the weight of walkers and will stay as a prominent part of the landscape until May 18.

Then the bridge will be dismantled and taken back to James Cropper Paper's Burneside Mill in Cumbria for recycling.

"It uses no glue, bolts or other fixings. Instead it relies on architectural principles as used in drystone walls and the original pack horse bridges that dot the Lake District," said Steve.

"In this respect PaperBridge is unique - something that has never been attempted anywhere before.

"The intensity of colour in the bridge will contrast with the verdant landscape, making a bold statement."

The bridge was commissioned by Lakes Culture, which brings together the tourism and cultural sectors to promote the Lake District as a cultural destination and back the area's bid for world heritage site status.

PaperBridge - Steve Messam A new site-specific artwork in the Lake District

The bridge, which spans five metres and is two metres high, is the latest of Steve's landscape artwork projects over the last ten years.

In 2007 he worked with a farmer at Beal in Northumberland to create ploughing patterns in fields next to the East Coast rail line.

In 2013 he used 25,000 jars of different coloured ink for a ten-metre square design at Lindisfarne Priory based on the Gospels.

Last year, he provided the lighting element to a concert held in the Victoria Tunnel in the Ouseburn in Newcastle.

"You can't miss the bridge," said Steve, of County Durham.

"You can see it from a long distance.

"But the paper is made from wood and water so it resonates with the natural environment and the bridge is founded on age-old traditional techniques.

"PaperBridge is not just about engineering. It is also about a sense of place and the two-mile walk from the nearest road is part of the experience in understanding this most celebrated landscape.

"The Lake District has a long and important history in shaping the way we look at and appreciate landscapes."

(Tony Henderson / *Chrocicle*Live, 11 May 2015, http://www.chroniclelive.co.uk/news/north-east-news/county-durham-artist-steve-messam-9234678)

This Bridge Is Made From Nothing But 22,000 Sheets of Paper

No glue. No cables. No steel reinforcements. The only thing keeping this bridge intact is, well, physics.

If you happened to be strolling across the Grisedale Valley—a ridiculously picturesque piece of land in Cumbria—over the past two weeks, you probably saw what looks like something out of a Monument Valley fever dream. A blindingly bright red bridge spanning a thin creek, made of nothing except thousands of sheets of paper. About 22,000 sheets, according to The Chronicle.

It's called PaperBridge, and it's the work of a UK artist named Steve Messam, who was commissioned by the area's culture council to install it this spring.

The bridge, surreal though it seems, is actually using the same basic principles of engineering that have been used to build short footbridges for thousands of years.

They key to the whole structure are the wire cages full of stones. The arch is precisely aligned to make sure the weight of the paper—and any dog, human, or livestock standing on it—is moved down into the stone cages. "It relies on vernacular architectural principles as used in drystone walls and the original pack-horse bridges that dot the Lake District," says Messam on his blog.

After Dezeen posted about Messam's piece detailing how the bridge actually gets stronger in the rain—since paper absorbs water, expands, and makes the arch ever tighter—I reached out to Messam. He was kind enough to send along photos of the construction process, which is just as interesting as the finished piece.

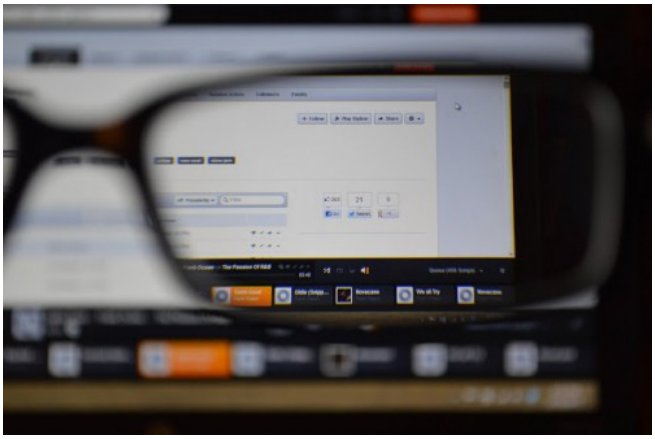
According to Messam, it took over three years to finalize the design and construction of the bridge. Here's the plywood frame that was used to align the sheets of paper during the build-out:

The paper was stacked from each stone support upwards, meeting in the middle.

As you can see, the finished product—which will be removed and recycled after today—is more than strong enough to support its own weight. And the weight of at least a couple rubber booted-humans, dogs, and children, too.

(Kelsey Campbell-Dollaghan / GIZMODO, 18 May 2015, http://gizmodo.com/this-bridge-is-made-from-nothing-but-22-000-sheets-of-p-1705315614?utm_campaign=socialflow_gizmodo_twitter&utm_source=gizmodo_twitter&utm_medium=socialflow)

Πανέξυπνο τρικ: Πώς να βλέπετε καθαρά χωρίς γυαλιά μυωπίας



Χάσατε τους φακούς επαφής σας; Τα γυαλιά της μυωπία μήπως θρυμματίστηκαν; Η καλή όραση είναι θέμα απλής φυσικής, γράφει η Independent, που μπορεί να αξιοποιηθεί για να δώσει προσωρινή λύση και μάλιστα χρησιμοποιώντας μόνο το χέρι σας.

Το τρικ αυτό δημοσιεύτηκε σε μορφή βίντεο από το YouTube -από το κανάλι Minute Physics- και έχει καταπλήξει τους διοπτροφόρους χρήστες. Το «κόλπο» είναι πολύ απλό:

Κάντε μια μικρή τρύπα με το δάχτυλό σας και κοιτάξτε από μέσα. Ό, τι κι αν προβάλλεται, είτε πρόκειται για κείμενο ή αντικείμενο, πλέον, η εικόνα του είναι σαφέστερα πιο καθαρά ορατή.

https://www.youtube.com/watch?v=OydqR_7_DjI#t=165

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