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Αρ. 68 – ΑΥΓΟΥΣΤΟΣ 2014

Ημερίδα Σταδιοδρομίας για
Επαγγελματίες Υπογείων και Γεωτεχνικών Έργων
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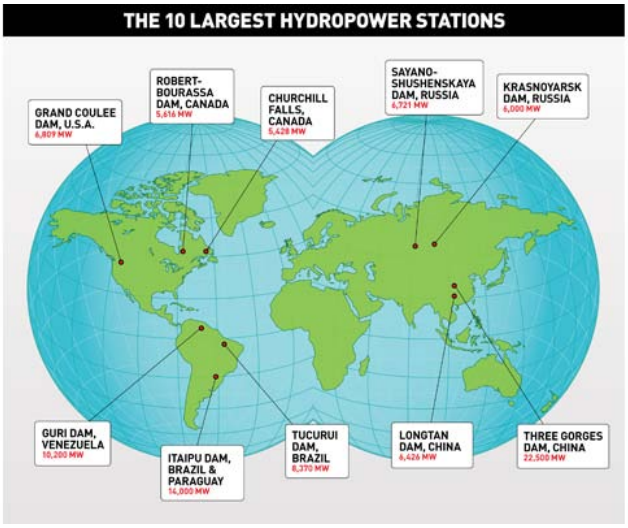
ΑΡΘΡΑ

10 Largest-Capacity Hydropower Plants



Hydropower produces 16% of the world's electricity and plays a strong role in satisfying the national energy needs of certain countries. Paraguay produces all of its electricity from hydropower, while exporting most of its excess supply to neighboring Brazil and Argentina. Albania, Bhutan and Lesotho also depend exclusively on hydroelectricity. Norway produces more than 98% of its electricity from hydropower, Brazil draws upon it for 85%, Iceland for 80%, Venezuela for 69%, Colombia for 65% and Canada for 61%. Austria (60%), Switzerland (56%) and New Zealand (53%) are other countries that generate the majority of their electricity from hydro sources. (The U.S. draws only 6% of its electricity from hydropower.)

In overall terms, China is the largest hydroelectricity producer, generating 721 terrawatt-hours (TWh) in 2010, which represented 17% of its electricity consumed. Canada ranks second, at 369 TWh in 2009, and Brazil is third, at 363 TWh, with the U.S. fourth at 250 TWh and Russia fifth at 167 TWh.

But hydropower is a resource governed by geographic restraints. "You need water and a change in elevation. That cuts out a lot of the world right away," says Chris Bergesen, Editorial Director, UDI Products, Platts, a unit of McGraw Hill Financial, of which ENR is a part.

"Hydropower development is taking place disproportionately in developing countries, because the U.S., Western Europe and Japan are built out, essentially," says Bergesen. The six nations that are advancing hydropower projects most ambitiously are China (82,492 MW worth of projects currently in the pipeline), Brazil (20,562 MW), India (15,328), Turkey (7,904 MW), Ethiopia (6,874 MW) and Pakistan (6,143 MW), according to Platts UDI World Electric Power Plants Data Base.

The largest-capacity hydropower plant being built in the world is the Xiluodu Dam, on the Jinsha River (the upper Yangtze River) in southwest China's Yunnan Province. The 285-m-tall, 700-m-long concrete arch dam will contain eighteen 770-MW turbines, for a total capacity of 13,860 MW. The first turbine was commissioned in July 2013, with the remainder expected to go online later in 2014.

Brazil has one of the most robust dam-building programs of any country. The largest dam currently under construction there, Belo Monte, on the Xingu River in northeastern Brazil, is a complex of three dams, numerous dikes and a set of canals that will supply water to two power stations. The planned capacity of 11,233 MW will rank it as the third or fourth largest-capacity hydropower plant in the world when it is completed. It is being built by the Belo Monte Construction Consortium, at an estimated cost of $14.4 billion. CCBM is led by contractor Andrade Gutierrez, along with Odebrecht and Camargo Corea, and seven other smaller contractors. Construction began in 2011, but has been halted several times by courts reacting to environmental lawsuits and legal actions by indigenous peoples. The current workforce is 28,000. Most of its turbines are expected to begin producing power in 2015.

The Jirau Dam is taking shape on the Madeira River, in western Brazil near the border of Bolivia. It is a 1,500-m-long, 63-m-high rock-fill dam with an asphalt-concrete core, which will produce 3,750 MW. It will supply electricity to São Paulo, 1,400 miles away. Camargo Correa is the primary contractor, with 20,000 workers currently engaged. It is expected to be completed in 2015, at a cost of $8 billion.

Ethiopia's current dam-building effort will lift its generating capacity from approximately 2,000 MW at present to 10,000 MW within the next three to five years.

The Gilgel Gibe III Dam, under construction on the Omo River by Salini Costruttori of Italy, will be the largest hydroelectric plant in Africa when completed, with a capacity of 1,870 MW. It is 75% finished, with no completion date announced.

The Grand Ethiopian Renaissance Dam, currently being built on the Blue Nile near the Sudan border, also by Salini Costruttori, will be the largest hydropower plant in Africa upon its completion in 2017, leapfrogging over Gilgel Gibe III. A roller-compacted concrete dam measuring 170 m tall and 1,800 m long, it will have powerhouses on each side of the spillway and will produce 6,000 MW. Much of the power generated by Ethiopia's new dams is likely to be sold to its neighbors, including Kenya, Sudan, Djibouti and possibly Egypt. Its construction cost is $4.8 billion.

The Grand Ethiopian Renaissance Dam has engendered political tensions with downstream neighbors Sudan and Egypt. Egypt in particular fears that a temporary reduction of water flow in the Nile during the filling of the dam may hurt its farmers. Water loss via evaporation from the dam's reservoir is another concern. It may also permanently lower the water level in Lake Nasser, thereby reducing the generating capacity of Egypt's Aswan Dam. Egypt, Ethiopia and Sudan have established the International Panel of Experts to study the impact of the dam and make recommendations for cooperative approaches.

The benefits of large dams are well known: irrigation, flood control, navigation improvements and power production. But they also engender a wide range of environmental consequences. They degrade water quality and block sediment flowing downstream, harming ecosystems and agriculture. They block fish migration. They flood fertile river-valley farmland and sometimes displace large numbers of residents. In tropical regions shallow reservoirs submerge large quantities of plant life, which generates large volumes of methane, a potent greenhouse gas. "Tucurui Dam [in the Amazon basin], by flooding a rainforest, triggered a new scientific discipline," says Bergesen.

1. Three Gorges Dam, China, 22,500 MW

A huge plug in China's mightiest river, the Yangtze, the Three Gorges Dam is the largest volume concrete dam in the world. It is 2,309 m long, 181 m high, and contains 14.86 million cu m of concrete. Construction began in 1994 and was completed in 2006, with a workforce that peaked

at 25,000 in 1999. It contains 34 turbines: 14 in the north bank powerhouse and 12 in the south bank powerhouse; six installed underground, each of them 700 MW; and two smaller 50-MW turbines. The north and south bank powerhouses became operational in 2008, generating a total of

18,300 MW. The underground turbines began operating in 2012.

2. Itaipu Dam, Brazil/Paraguay, 14,000 MW

Itaipu is a complex of four dam structures straddling the Parana River on the Brazil/Paraguay border. The main structure is a 3,114-ft-long hollow concrete gravity dam with a 357-ft-high powerhouse at its base. It tapers into a concrete buttress structure carrying the spillway. On the Brazilian side, rock and earthfill embankments stretch nearly three miles. It was built by a consortium comprised of five large Brazilian and six smaller Paraguayan firms. Work on the dam began in 1975 and was completed in 1984, with the workforce peaking at 30,000 in 1978. The powerplant contains 20 turbines, each 700 MW. The first generator started producing power in 1984, with 18 operating by 1991. The final two began operating in 2007. About 90% of the electricity is supplied to Brazil, by Furnas Centrais Eletricas, with the remainder going to Paraguay. It supplies 17.3% of Brazil's overall electricity needs, and 72.5% of Paraguay's.

3. Guri Dam, Venezuela, 10,200 MW

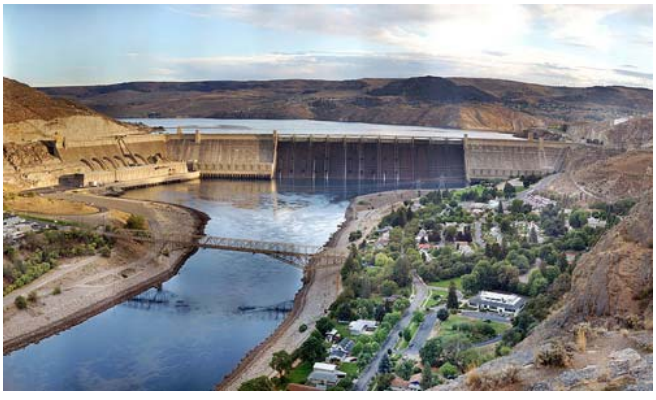
Guri is situated in Necuima Canyon on the Caroni River, a major tributary of the Orinoco. Construction of the original dam structure by Kaiser Engineers was nearing completion in 1968 when several sluice gates broke. To repair them, Kaiser's team had to build a rockfill dam to block the gates, using steel grillages and boulder "necklaces." The repair work consumed more than four months. Construction of the powerplant followed, with the final turbine in operation by 1976, bringing its capacity to 3,000 MW. A dramatic $5.2-billion expansion got under way in 1978. The concrete dam doubled in length to 4,606 ft and added 52 m in height to reach 162 m. Five and a half miles of earthen wing dams and dikes were added also, along with a new 7,000-MW

powerhouse. Upon final completion in 1986, Guri's output accounted for 60% of the total installed capacity in Venezuela. Today it accounts for over one-third. It was the world's largest capacity hydropower plant for several years, before being surpassed by Itaipu.

4. Tucurui Dam, Brazil, 8,370 MW

Tucurui is a 6.9-km-long, 78-m-high concrete gravity dam on the Tocantins River in north central Brazil. Earthfill dikes bring the total length to 12.5 km. Camargo Correa built the dam, with work starting in 1975 and the reservoir filling up by 1984. The construction cost was $5.5 billion. A second powerhouse was completed in 2007, at an additional cost of $1.35 billion. The first powerhouse contains eleven 375-MW turbines, and the second powerhouse contains twelve 350-MW turbines. The dam brought electricity to 13 million people, as well as major industrial users, such as aluminum smelters.

5. Grand Coulee Dam, U.S., 6,809 MW



A concrete gravity dam on the Columbia River in northeast Washington state, the Grand Coulee Dam supplies water for the irrigation of 671,000 acres in addition to producing electricity. Construction began in 1933 on a "low dam," 88 m high, which would generate electricity but not support irrigation. After visiting the site in 1934, Pres. Franklin Roosevelt endorsed a competing "high dam" design, which would supply enough electricity to pump water to irrigate the Columbia Basin. Congress approved the high dam in 1935. The 1,592-m-long, 168-m-high dam was built by the MWAK consortium, made up of the Silas Mason Co., Walsh Construction Co. and Atkinson-Kier Co. The dam was completed in 1943, and the last of the 18 original generators was operational in 1950. During World War II a sizable portion of the electricity produced by Grand Coulee was used to supply plutonium production plants at the Hanford Engineer Works nearby. A third powerplant was added later. It was built between 1967 and 1974, and the last of its six generators went into service in 1980.

6. Sayano-Shushenskaya Dam, Russia, 6,721 MW

A concrete gravity-arch dam, located on the Yenisey River in south-central Siberia. It is 1,066 m long and 245 m high, and construction lasted from 1961 to 1978. Originally its powerplant contained ten 640-MW turbines, and it supplied about 70% of its electricity to four aluminum smelters owned by Rusal. In August 2009 one turbine broke loose from its casing, causing extensive damage to the generator hall and nine of the turbines, and 75 people were killed. By December 2011 five turbines had been restored and resumed operating, raising the capacity to 3,200 MW. Installation of the five remaining new turbines is expected to be completed in 2014.

7. Longtan Dam, China, 6,426 MW

Longtan is a roller-compacted concrete dam on the Hongshui River in the Guangzi region of southern China, about 450 miles northwest of Hong Kong. Construction lasted from 2001 to 2009, and cost $4.2 billion. It is 849 m long and 216 m high, and is currently the tallest roller-compacted concrete dam in the world. Its underground power station contains nine 714-MW turbines. It is owned by Longtan Hydropower Development Co., Ltd.

8. Krasnoyarsk Dam, Russia, 6000 MW

A concrete gravity dam on the Yenisey River in south-central Siberia. It is 1,065 m long and 124 m high. Construction began in 1956, and was completed in 1972. Most of its electricity is used to supply aluminum smelters. The dam includes an electric "ship elevator" capable of handling ships up to 1,500 tons and up to 80 m long.

9. Robert-Bourassa Generating Station, Canada, 5,616 MW

Formerly known as La Grande-2, the Robert-Bourassa Generating Station is the largest of four power plants that comprise the James Bay Project in northern Quebec. The Robert-Bourassa Dam on the La Grande River is an embankment dam that is 2,835 m long and 162 m high, surrounded by 16 miles of dikes. Construction began in 1974 and finished in 1981. The generating station is located underground, 6 km downriver from the main dam, and contains sixteen 351-MW turbines. Construction of the powerhouse required blasting of 4 million cu yd of rock for 8.5 miles of access, penstock and tailrace tunnels and for the huge surge chamber and machine hall 450 ft underground. It is the largest underground power plant in the world. The prime contractor was Societe d'energie de la Baie James (SEBJ), a subsidiary of the owner, Hydro-Quebec, a public utility. Hydro-Quebec is the largest hydroelectricity producer in the world.

10. Churchill Falls Generating Station, Canada, 5,428 MW

The generating station is supplied with water from the Smallwood Reservoir, which was created by a series of 88 dikes, totaling 64 km in length, that contain the Churchill River in western Labrador. The powerhouse was hollowed out of solid rock, 1,000 ft underground, and contains 11 turbines. It measures 972 ft long, 81 ft wide and 154 ft high. Construction began in 1967 and was completed in 1974. It is owned by the Churchill Falls (Labrador) Corp. Ltd., whose shareholders are Nalcor (the provincial energy company of the province of Newfoundland and Labrador) and Hydro-Quebec. It is operated by the Newfoundland and Labrador Hydro Co., a subsidiary of Nalcor.

(Scott Lewis / Engineering News – Record, 02.01.2014, http://enr.construction.com/infrastructure/water_dams/2014/0102-10-largestcapacity-hydropower-plants.asp)

Longest Immersed - Tube Tunnels

Immersed-tube tunnels are rare birds: Only a handful are built in the world each year. They consist of large tubes, constructed in sections often more than 100 meters in length, which are floated into position in a waterway, sunk into position and joined with watertight seals. They are always placed in a trench on the bottom of a river or bay. They are constructed of steel or reinforced concrete.

"While bridges are generally cheaper to build, immersed-tube tunnels are usually located at sites where bridges would not be possible—either soil conditions are poor, or there is constricted space on the sides of the waterway, or there is a high clearance required for navigation by ships," says Jonathan Baber, a project director for Mott MacDonald and co-author of "Immersed Tunnels."

In certain conditions, immersed-tube tunnels can be a less expensive choice. "If you are crossing a river between a half kilometer to one kilometer wide, an immersed tube will probably be competitive price-wise compared to bore tunnels because of the procurement cost of a tunnel-boring machine," explains Baber.

The first immersed-tube tunnel was a sewer tunnel built in Boston in 1894. The Michigan Central Railway Tunnel linking Detroit with Windsor, Ontario, Canada, under the Detroit River, was the first immersed-tube vehicular tunnel, when it was completed in 1910. The first immersed-tube tunnel in Europe was the Maastunnel, a road tunnel in Rotterdam that opened in 1942.

The Dutch are probably the most prolific builders of immersed-tube tunnels. "Their flat, delta-type landscape and soft, peaty soils are ideally suited for immersed-tube tunnels," says Baber, who also serves as animateur (chairman) of the International Tunnelling Association's working group for immersed tunnels.

The Busan-Geoje tunnel in South Korea is a project whose challenging conditions spurred several new approaches. Strukton Afzinktechnieken, a Dutch firm, serving as a subcontractor, was responsible for the flotation, transportation and immersion of the tunnel sections.

"The most challenging conditions were the swell waves. They influenced the immersion," says Peter van Westendorp, project manager with Strukton, who served as the immersion commander on the project. "We used two purpose-built pontoons and four tugboats to transport the tunnel sections 32 kilometers from the casting yard to the site. We had to travel by night. It took us 10 hours. The second night we would do the immersion, which took 16 hours each time."

"Our model tests showed that, during the positioning of each element on the seabed, the elements were still being moved by the currents. So we developed the external positioning system in order to set down the elements at a safe distance from each other in the bottom of the trench. We then jacked up each element, using 800-ton jacks located in the legs of the external positioning system, and moved the element forward by winching."

Another precedent for Strukton was its decision to use a submarine. "By doing immersion at that great of a depth, the exit shaft had to be extremely rigid, which was not practical. We had all kinds of equipment inside the tunnel, which were remotely controlled, such as cameras to watch the bulkheads inside the tunnel and level gauges to measure the ballast-tank level. If the systems had failed, we would have had to go inside the tunnel sections, so we put technicians in the submarine. But the systems worked, so we did not have to use the submarine for real."

More recently, Strukton has worked on an immersed-tube tunnel in Amsterdam. The project involves building a new metro station beneath the central train station and a new metro line under the IJ river.

A tunnel between Germany and Denmark that is currently in the design stage is expected to be the new world record-holder when it is completed. The Fehmarn Belt Fixed Link is a proposed 18-km-long immersed-tube tunnel, running between Fehmarn Island in Germany and Lolland Island in Denmark, that will carry both a highway and rail line. It will significantly cut the current travel time between Hamburg and Copenhagen. It is expected to cost $7 billion to build.

Femern A/S, the project owner, has prequalified nine large contractor consortia to bid for the four major contracts: northbound tube, southbound tube, portals and ramps, and dredging and land reclamation. Preliminary bids are expected to be submitted in 2014, with construction beginning in 2015. It is expected to be completed in 2021.

1. **Bay Area Rapid Transit Tunnel, 5.825 km long, San Francisco.**

The world's longest immersed-tube tunnel, known as the Transbay Tube, carries four lines of the Bay Area Rapid Transit system under San Francisco Bay, between the cities of San Francisco and Oakland. The tube sits in a 60-ft-wide trench that was excavated at varying depths, ranging from 15 ft to 85 ft. It is made up of 57 prefabricated-steel sections, each of them 48 ft wide, 24 ft high, and ranging in length from 323 ft to 350 ft. The sections were fabricated by Bethlehem Steel and towed to an outfitting dock, where Trans-Bay Constructors (TBC), a joint venture of Peter Kiewit Sons' Co., Raymond International, Inc., Tidewater Construction Corp. and Healy-Tibbitts Construction, took command of the 800-ton shells. After placing a concrete lining, they were towed out along the tunnel alignment and sunk by adding 500 tons of gravel ballast to cribs along the tops of each tube section. Hydraulic rams drew together railroad-type couplers built into each section, seating rubber gaskets extending around the abutting ends of each section for a watertight seal. Finally, workers grouted each joint, and barges placed five feet of sand atop each section. The bay bottom consists of soft alluvial deposits, which the designers determined would insulate the tube from severe shaking during earthquakes. It was designed by Parsons-Brinckerhoff-Quade & Douglas. TBC built the tube's basic structure for $90 million, with an additional $90 million for ventilation structures at either end, 2.8 miles of aerial and subway approaches in Oakland and San Francisco, trackage, final finish work and electrification. Dredging began in 1966, and construction of the tube was completed in late 1969. BART transit service began operating in 1974.

2. Øresund Link Tunnel, 3.5 km long, Denmark.

The Øresund Link is a massive combined road-and- rail crossing of the Øresund Strait, connecting Denmark and Sweden. It includes a 7.8-km-long bridge and a 4-km-long tunnel. The link connects the road and rail networks of Scandinavia with those of central and western Europe. The Drogden Tunnel consists of a 3.5-km-long immersed-tube tunnel and two 270-m-long approach tunnels, running from the artificial island of Peberholm to Kastrup on Amager Island. It was built by Øresund Tunnel Contractors, a design-build joint venture, comprising NCC AB (Sweden), E. Pihl & Son A.S. (Denmark), Dumez-GTM S.A. (France), John Laing Construction Ltd. (U.K.) and Boskalis Westminster Dredging BV (the Netherlands), under a $670- million contract. OTC's designer was Symonds Traverse Morgan Ltd. (UK). The tunnel consists of 20 precast-concrete sections, each 176 m long, 40 m wide and 8.6 m high and weighing 55,000 tonnes. After casting, each section was pushed into a shallow basin, where ballast was added. The adjacent sea lock was then opened, and the section was towed to the site with pontoons attached; then, it was lowered into the rock-lined trench. The tunnel's five galleries hold two rail lines, two two-lane roadways and a service passage. Casting began in 1996, and the link opened to traffic in 2000.

3. Busan-Geoje Fixed Link, 3.2 km long, South Korea.

Busan, South Korea's second-largest city with a population of 3.6 million, is separated from Geoje Island, a major shipbuilding hub, by 8 km. The Fixed Link, which consists of two cable-stayed bridges and a tunnel, reduced the driving time between Busan and Geoje from over three hours to only 40 minutes. The immersed-tube tunnel runs from Busan to the small islands of Daejuk and Jungjuk and is considered necessary in order for the shipping channel to be more navigable. Daewoo Engineering & Construction Ltd. led a consortium, called GK Corp., of seven Korean contractors that won the concession to design, build, finance and operate the overall Link project. Halcrow Group Ltd. of Britain and Tunnel Engineering Consultants of the Netherlands served as technical consultants to Daewoo. A joint venture of Danish engineering firm COWI and Daewoo designed the tunnel. A trench was dredged 12.5 meters deep through soft clay, and cement and soil were mixed to form soil-cement columns over areas of weak ground. Strukton Afzinktechnieken, a Dutch firm, serving as subcontractor, was responsible for the flotation, transportation and immersion of the tunnel sections. The tunnel is made up of 18 concrete sections, each of which is 26.5 m wide, 10 m high and 180 m long and weighing 50,000 tonnes. After they were cast, the tunnel segments were floated into position by two large submersible, remote-controlled pontoons. The first tunnel section was placed in position in February 2008. Strukton used huge three-sided, hinged steel frames with hydraulic jacks, called external positioning systems, to precisely position each section. Strukton also used a small submarine to inspect the sections underwater. The Fixed Link opened in December 2010 and cost $1.8 billion to build.

4. Rotterdam Metro Tunnel, 2.855 km long, the Netherlands.

Due to the Netherlands' notoriously soft soils, prior to the 1990s, engineers could not build bored tunnels there. In order to construct the first subway system in the Netherlands, the city of Rotterdam decided an immersed-tube tunnel was the only possible solution. The tunnel runs under the Nieuwe Maas River and carries the subway's north-south line from Centraal Station in Rotterdam to Zuidplein. The tunnel was designed and built by the firm Christiani & Nielsen, a Danish engineering firm, and built by Hollandsche Beton, a Dutch contractor. The tunnel was completed in 1966, and the metro began operating in 1968.

5. Pulau Seraya Utility Tunnel, 2.6 km long, Singapore

The Public Utilities Board of Singapore needed a tunnel to carry electric transmission lines from a powerplant located on Pulau Seraya Island to the Singapore mainland. The PUB selected Mott MacDonald to design and supervise construction of the immersed-tube tunnel. The tunnel comprises 26 sections, each 3.7 m high, 6.5 m wide and 100 m long. The sections were floated out and sunk in a dredged trench, on a gravel bed, and then armored with rock. The tunnel carries seven 230-kV, 500-MVA power lines and accommodates maintenance personnel using battery-powered vehicles. The tunnel was completed in 1988. In the 1990s, Pulau Seraya and many other small neighboring islands were merged through land reclamation to form Jurong Island, which hosts many large refineries and petrochemical plants.

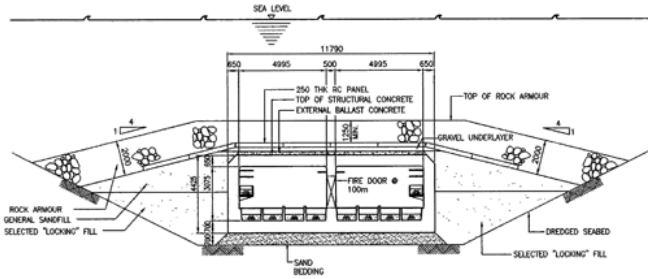
6. Parana Tunnel, 2.367 km long, Argentina.

The provinces of Entre Rios, Corrientes and Misiones in northeast Argentina were cut off from the rest of the country by the Parana and Uruguay rivers and were reachable only by ferry until the 1960s. This isolation limited trade and communication. The Parana Tunnel helped end the divide by linking the city of Parana in Entre Rios with the city of Santa Fe. Both cities are port towns on the Parana River, and trans-shipment points for wheat, meat, lumber and other products. The tunnel is made up of 37 cylindrical sections of reinforced concrete, 10 m in dia, 65 m long and weighing 4,500 tonnes. At its deepest point, the tunnel is 32 m below the river's average water level. It was built by a consortium headed by Hochtief. Construction began in 1962, and the tunnel opened in 1969. It was the first immersed-tube tunnel built in Latin America.

7. Hampton Roads 2, 2.229 km long, Virginia.

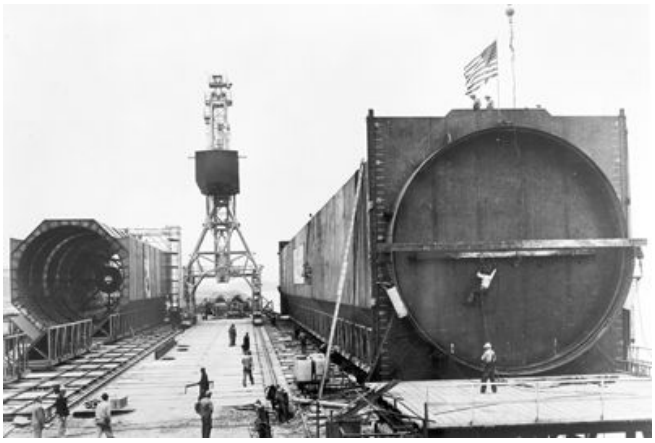
To accommodate increased traffic, a second Hampton Roads Bridge-Tunnel was built in the 1970s (for information about the first one, see entry No. 9 on this list). The second tunnel is also two lanes wide. Made up of 21 sections, it was designed by Parsons, Brinckerhoff, Quade & Douglas. It was built by a joint venture of Tidewater Construction Corp., Peter Kiewit Sons' Co. and Raymond International Inc. After the second bridge-tunnel was completed, the original tunnel carried the westbound traffic, while the new tunnel carried the eastbound traffic. It opened in 1976.

8. Tuas Bay Cable Tunnel, 2.1 km long, Singapore.



This tunnel was built to transmit power from two powerplants located on Singapore's Tuas Peninsula to electrical substations on the other side of Tuas Bay. Given Singapore's population density, utility PowerGrid Ltd. decided it would be advantageous to route the power lines through an underwater tunnel rather than face the challenges of an overland route. The tunnel was designed by Parsons Brinckerhoff, with concept work by Development Resources Pte. and Mott MacDonald. Obayashi Corp. was the design-builder. The tunnel is made up of 21 reinforced-concrete sections, 17 straight sections 100 m long and four shorter, curved sections. The sections are 11.8 m wide and 4.4 m high. The tunnel sections were placed in a dredged trench and covered with rockfill and concrete panels, calculated to protect the tunnel against possible damage from sinking ships and falling or dragging anchors. The top of the tunnel is 13 m below sea level at its lowest point. Inside the tunnel, cable troughs hold together ten 400-kV and 230-kV power lines with cooling water pipes and thermal sand, which is necessary for temperature control. The tunnel accommodates a battery-powered maintenance vehicle that runs on rails. Terminal buildings at both ends of the tunnel house ventilation and electrical equipment. Obayashi was awarded the job in 1966, and the tunnel went on line in early 1999. It cost 65 million British pounds to build.

9. Hampton Roads 1, 2.091 km long, Virginia.



Hampton Roads is one of the largest natural harbors in the world. It incorporates the mouths of the Elizabeth and James rivers and empties into Chesapeake Bay. It is home to Norfolk Naval Base, the largest U.S. naval base. The Hampton Roads Bridge-Tunnel is a 5.6-km-long crossing for Interstate 64 and U.S. Route 60 that encompasses man-made islands, trestles and an immersed-tube tunnel. A bridge-tunnel was chosen rather than a drawbridge because, if a bridge-tunnel was destroyed in wartime or by a natural disaster, it would not block vital shipping channels. It was designed by the Virginia Dept. of Highways, with

Parsons Brinckerhoff Hall & MacDonald serving as a consultant. Merritt-Chapman & Scott of New York was the general contractor for the entire bridge-tunnel, and Baldwin-Lima-Hamilton Corp. of Philadelphia fabricated the tunnel sections of steel. There were 23 tubular sections, each 300 ft long, with double shells: an inner circular section 37 ft in dia and an outer shell, roughly octagonal shape, about 2 ft larger than the core. At the fitting-out, pier workers cast 18-in.-thick concrete layers to the perimeter of the inner tube as well as the 18-inch slab for the roadway. When the casting was completed, the sections were towed to the site, docked between two halves of a screed barge; then, additional concrete was placed on the outer shell, and the sections were sunk into position. The tubes were connected to each other by collars at their ends, aligned by drift pins set by divers. Dredging began in 1954, and the tunnel opened in November 1957.

10. Blayais Power Station Outfall, 1.935 km long, France.

The Blayais Nuclear Power Plant is located on the Gironde estuary near the city of Bordeaux in southwest France. Its four reactors have a total capacity of 3,804 MW and came on line between 1981 and 1983. It is owned and operated by Électricité de France S.A. (EDF), the largest electricity producer in the world. The powerplant's outfall tunnel, for dispersing out to sea used cooling water, was built by Campenon Bernard Cetra-Dodin. The dredging subcontractor was Atlantique Dragage, the steel work was done by Welbond, and the prestressing was carried out by STUP Freyssinet. The tunnel was completed in 1978.

(Scott Lewis / McGraw-Hill, 23.10.2013,
http://enr.construction.com/infrastructure/transportation/2013/1023-longest-immersed-tube-tunnels.asp)

Elizabeth River Tunnels, Portsmouth and Norfolk, Va.
Under Construction (Completion 2016)

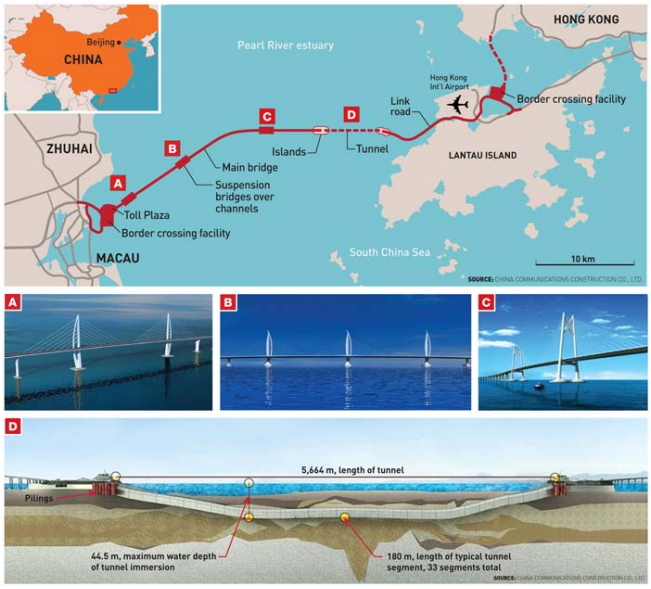
The centerpiece of the Elizabeth River Tunnels project is a new, one-mile-long tunnel adjacent to the existing Midtown Tunnel under the Elizabeth River. The Midtown Tunnel is the most heavily traveled two-lane road east of the Mississippi, and this project will double its capacity. The new tunnel – being built by SKW Constructors, a partnership of Skanska, Kiewit and Weeks – will be made of 11 hollow concrete segments, each approximately 350 feet long, 54 feet wide, 29 feet tall and weighing 16,000 tons. Instead of a traditional steel-shell immersed tube tunnel, this will be an all-concrete tunnel – only the second one in the U.S.

This project – which also includes rehabilitating the Downtown and Midtown tunnels and improving connecting roadways, as well as operations and maintenance until 2070 – is being done via a public-private partnership (P3) with the Virginia Department of Transportation. Skanska Infrastructure Development and Macquarie Infrastructure and Real Assets are leading the private-sector part of this P3.

(January 21, 2014, http://blog.usa.skanska.com/building-some-of-the-worlds-longest-immersed-tube-tunnels)

Immersed In Innovations, Hong Kong-Macau Link Takes Shape

Chinese engineers had never built an immersed tunnel on the open sea, let alone one that, upon completion, would be the world's longest, at a total length of 6.7 kilometers, and one of the deepest, at almost 45 meters, under China's Pearl River Delta.



Officials say the new Hong Kong-Zhuhai-Macau Bridge will provide a direct connection between the east and west banks of the Pearl River and facilitates economic development, particularly on the west coast. The approximately 50-kilometer new highway system includes 5,664 meters of immersed tunnel that goes as deep as 44.5m.

The idea of directly linking the economic powerhouses of Hong Kong and Macau—shortening the three-hour drive to about a half hour—had floated around for almost 20 years. But it's no wonder the goal has not been met until now: The approximately 50-km-long new highway system has to squeeze past the Hong Kong airport, including air-space restrictions; traverse the aquatic version of a busy interstate highway; and lie in variable layers of soils, ranging from mucky to clay-like to sandy.

Typhoons and open-sea conditions posed risks. Environmental issues included potential excessive Pearl River silting and disturbing a rare species of white dolphin. And there are three major entities—with three different quality standards—involved: the governments of Hong Kong, Macau and, in between, the Guangdong Province city of Zhuhai.

"It set the tone for a difficult project," says Luo Dong, vice general project manager with China Communications Construction Co. Ltd. (CCCC) With its many subsidiaries and a host of international consultants, CCCC now is building the tunnel as well as two artificial islands on either side, 23 km of bridge structures, two reclamation sites and related link roads.

CCCC has little time to complete the project. The governments want the link operational by 2016, as a precursor to the 20th anniversary of Hong Kong's 1997 handover to China from the U.K.

Feasible Feats

After years of discussion, the governments of Hong Kong and China launched a five-year feasibility study, in 2004. More than 30 research projects were carried out to support the study, including environmental impact analyses, studies on the project's control points, impacts on the marine environment, and economics and finance, says Tian Feng, deputy general manager with CHELBI Engineering Consultants Inc., a joint venture between Louis Berger International and China Highway Planning and Design Institute Consultants, which is now affiliated with CCCC.

"Hong Kong has British standards, Macau has European standards, and, then, there are Chinese standards," Dong says. Designers opted for the highest standard that applied to each component. For example, European standards for concrete were the highest, Chinese capacity standards called for six lanes, and British standards mandated a 120-year overall design life, Dong says.

The route consists mostly of bridge structures that, at several points, have to allow for passage of thousands of vessels daily, says Dong. There were "long arguments" regarding whether to go with an immersed tunnel or a bored tunnel, he notes, adding, "A tunnel-boring machine would have to go 60 meters deep and would need to be longer [than an immersed option]." The immersed option would be a bit cheaper but less environmentally friendly since, Dong says, "we would have to dredge and build a trench."

A rendering of how one of the artificial islands will look when complete.

Working with international firms—Denmark's COWI, the Netherlands' Tunnel Engineering Consultants, AECOM, Mott MacDonald and Ove Arup, among others—CCCC and its subsidiaries began construction in 2009. The immersed tunnel construction is quite similar to that of the $1.8-billion Busan-Geoje project (ENR 2/2/09, p. 24): Tunnel elements are immersed in a dry dock, towed to the jobsite and then placed atop specially designed gravel beds with tight tolerances. COWI brought its experience on that Korean project to this one, says Tommy Olsen, COWI project manager. COWI worked with HDPI on the preliminary design phase and then with CCCC.

But this project is unique in complexity because the tunnel sits between not one but two artificial islands, atop soft soil layers, Olsen adds. The deep tunnel lies well below an existing seabed, to make room for a future channel that will accommodate 300,000-tonne vessels. With an unusual width due to the six planned lanes, "it is a highly loaded tunnel that is very heavily reinforced," says Olsen.

For Chinese engineers, says Lin Ming, CCCC chief engineer, "it was a new experience of solving world-class project problems. We forced ourselves to solve those problems with the help of international firms. But it's not just about setting records. It's about new technology for the industry."

A rendering of the Guihan Island tunnel prefabrication facility.

Thanks to such technology, crews placed, this July, the 11th of 33 tunnel elements into a carefully dredged trench, which has a slope gradient of up to 3%. Weighing over 75,000 tonnes each, the 180-m-long elements are on average 38 m wide and 10 m tall.

Each tunnel element includes eight 22.5-m-long segments prefabricated in factory conditions on Guihan Island, about 11 km from the site. A custom-designed barge equipped with a positioning system and water ballast control system tows each element to the site to be lowered into place. In July, the 11th element became the first to sit on a deep trench.

The 11th element was the first to be lowered into the bottom of the trench, which varies in depth along with the seabed levels. Engineers worried about the unknown effects of different current's velocities within the trench: about 1 m per second versus, at seabed level, 0.6 to 0.8 m per second, says Yin Haiqing, CCCC vice general engineer. "We constantly monitored the tunnel-element movement," he says.

The placement went smoothly. Before resuming work, the team celebrated with traditional banquets. At the end of August, the team also placed the twelfth element, Dong says.

Monster Piles

The bridge portions of the new crossing transition into the tunnel section via two nearly identical artificial islands. Each 625-m-long, 160-m-wide island is about 1,000 sq m, with soil layers as thick as 30 m. CCCC subsidiaries First Harbor Engineering Co. Ltd. and Third Harbor Engineering Co. Ltd. led construction of the western and eastern islands, respectively.

A barge crane lifts a pile segment.

Peng Li Yan, president of First Harbor Engineering, says that, in 2009, it contacted American Pile- driving Equipment (APE) to ask whether, to shave more than two years off construction, it would be possible to drive huge steel caissons, instead of sheet piles, to create the island perimeters.

"Our group cooperated once before with APE on the Yangtze River estuary project in 2003," Yan says. "In that case, we needed to drive a 13.4-meter- diameter concrete pile in as quick a manner as possible. But we had never driven a very large-diameter pile driven with a vibratory hammer."

An aerial view of the piledriving process.

CCCC's Fourth Harbor Engineering subsidiary had designed the Yangtze pile and urged pursuing the even bigger feat, Yan adds. "Nearly a year was spent convincing the [government] of the benefits of the large-diameter pile solution."

The risks were formidable. APE employees' reputations in China were at stake, says Yang Yun Fu, an APE sales representative. "There was zero time in the schedule to account for any failure or breakdown, and there were very few backup parts."

APE won the bid to build the approximately $20-million hammer—actually eight vibratory hammers combined—in 2011. "The single-most difficult technical obstacle to over-

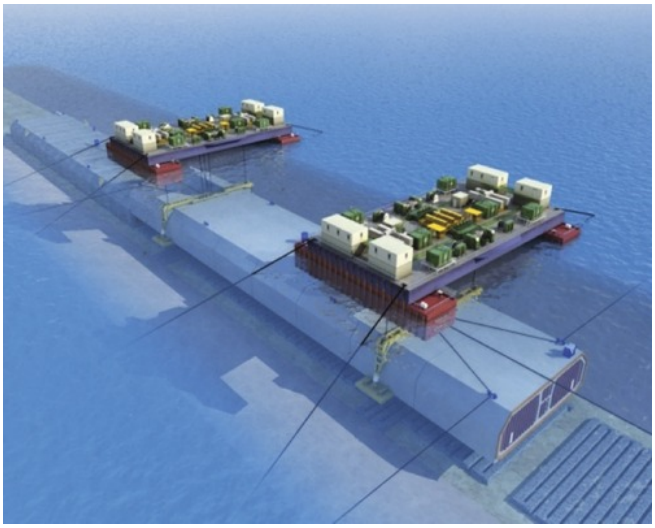
come was to engineer a way for all eight hammers to remain in perfect sync," says David White, APE China managing director. "If even one hammer vibrates out of phase from the others, it would generate so much heat that it would melt the steel in less than 15 seconds." The team had a 1/300th-of-a-second maximum margin of error, he adds. Dubbed the "Octakong," the monster hammer required 9,600 HP in order to drive piles weighing 600 tonnes.

APE installed 61 cylinders for the west island and 59 for the east island. The monster cylinders were fabricated by Shanghai Zhenhua Heavy Industries and shipped to the site. With 40.5 m to 50.5 m heights, 22 m diameters, steel-plate thicknesses of up to 25 millimeters and reaching as deep as 29 m into sandy soils, "piles this big have simply never been driven at all," says White. Once the island perimeters took shape, crews backfilled the interiors and used plastic pipes to dewater them. Potential soil settlement had to be controlled within 30 centimeters, says Dong. Short cut-and-cover excavations allow for the transition from island to underwater tunnels.

Factory Precision

On Guihan, a natural and uninhabited island, CCCC brought in power generators and built a precasting factory and living quarters for some 1,000 workers involved in prefabricating each approximately 38-m-wide, 11.4-m-high, 180-m-long tunnel element. Each element consists of eight 22.5-m-long concrete segments, cast continuously within 33-hour windows. Rigorous standards allowed for cracks no larger than 0.2 mm. Every cu m of concrete has more than 300 km of rebar, about twice as much as average, says Luo. Factory operations have been nonstop since 2011, with crews working in three shifts over 24 hours, Dong notes.

The team built a conveyor belt that delivers ice-cooled concrete to a hydraulic formwork system. Each pair of segments is match-cast on fixed beds, then pushed forward along sliding tracks to make room for the next segment: a huge assembly line. Ultimately, the completed element is pushed out on rails into the dry dock, which is then immersed with water.



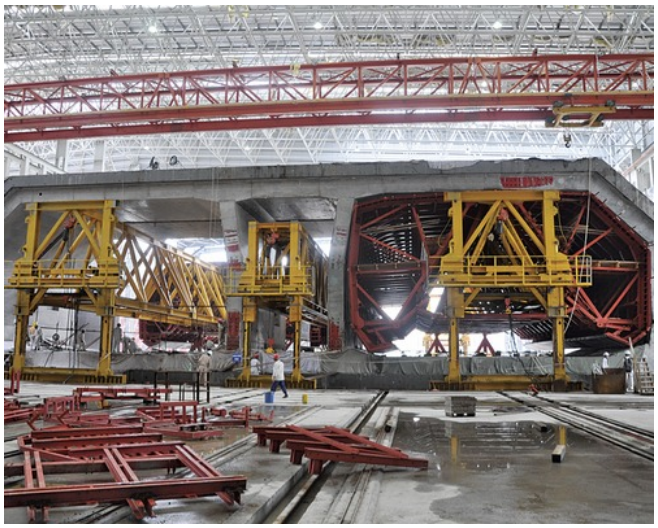
A rendering of the barges installing a tunnel segment.

CCCC customized a barge for the towing and placing of elements in the open sea, some 11 km from the factory site. Waves, winds, forces created by the immense elements, extensive marine traffic and the white-dolphin habitat make each journey a nail-biter. For the first element, the team used six tugboats and "went against the current to have better control" over navigation, says Dong. The installation took 96 hours, but, after the learning curve, the second element employed 10 tugboats, flowed with the current and took less than half that time, he adds.

Of the 6.7 km total length, the immersed elements total 5,664 m. The rest of the elements include the cut-and-cover sections and associated ramps. Special barge-mounted equipment also dredged the seabed trench, which will hold most of the 74,000-tonne elements. Allowable dredging tolerance was within 0.5 m and needed constant monitoring of sedimentation.

COWI's Olsen says the team developed a computer model to address the gravel bed's settlement differential, which varied from 1 to 2 m in thickness due to the variations in soil layers, with several types of soft, weak soils atop a hard layer of rock. "The material properties could vary by 30%," he notes.

COWI engineers hope for an opportunity to use the modeling on the planned Fehmarnbelt Tunnel between Germany and Denmark. At 18 km, that immersed tunnel will succeed this one as the world's longest.



An automated hydraulic formwork process formed each tunnel section, while a rail system pushes the finished section into the dry dock.

Silt Curtains and Cells

Last year, CCCC companies completed another major component of the program: a $400-million reclamation project that created 209 hectares of land, which will host new shipping and border processing facilities for Zhuhai and Macau in Gongbei Bay. The artificial island is designed to resist a 300-year tidal event. On the other side of the project, China Harbor Engineering Co. Ltd. (CHEC) is at the halfway mark on a $900-million project to build a 150-hectare equivalent just northeast of the Hong Kong International Airport. The project has a 6,140-m-long seawall that includes 134 steel sheet-pile cellular structures, about 34 m long with approximately 30 m diameters. "This is the first time in Hong Kong that reclamation is being done without dredging any marine deposits," says Kim Chuan Lim, CHEC project manager. Environmental concerns dictate that crews cease piling work every May and June, so that the white dolphins can calve, he adds.

CHEC custom-built lifting equipment with a guideframe that can rotate the cellular structures into position before installing them with vibratory hammers, says Lim. "Using cellular structures to form a seawall has been done, but we had never used a scheme with a guideframe that rotates 270°," he says.

Eight vibratory hammers were combined into the "Octa-kong," to drive 72-m-diameter steel cylinders into place to form island perimeter walls—the largest piles ever driven.

The massive steel pipes that form the outlines of the artificial islands were custom-built by Shanghai Zhenhua Heavy Industries and placed by eight vibratory hammer provided by American Piledriving Equipment Inc.

Pipes with 22-m diameters form two 100,000-sq-m artificial islands to provide transition points between the tunnel and bridge sections.

Aerial view of one of the artificial islands.

Stone columns within the cellular structures and, in front of them, rockfill berms are used for compaction and stabilization. Atop the seawall, geotextiles overlaid with a sand blanket, acting as a curtain to cover the seabed to protect further against sedimentation, says Ian Chung, AECOM's Hong Kong managing transportation director.

CHEC is also in a joint venture with Dragages, a subsidiary of the French contractor Bouygues, and VSL for a $1.7-billion contract to build 9.4 km of viaduct. Its route runs from the border-crossing facility on the island through a tight channel, with the airport directly to the north and a section of virgin land, which cannot be touched, directly to the south. Airport height restrictions affect both construction operations and structures depending on the proximity to the runways. Construction plants used for reclamation were restricted to between 30 and 53 m, says Chung.

The nearly 5,700 segments will be mostly precast; however, because the main channel must be crossed, the balanced cantilevered method is used to place spans that reach 180 m in length, says Lim. Some 20,000 piles are in place, and work has begun on precast caps and piers, he adds.

The 54-month viaduct contract is said to be the territory's largest-ever design-build deal. To the east, China State Construction Engineering has a $1.2-billion contract to build a 1-km-long tunnel and a 1.6-km at-grade section of a link road.

To the west of the tunnel, the main project's bridge structures include both steel girders and cast-in-place concrete spans. Floating concrete mixers and cranes add to the busy water traffic. The 30-m-high piers are supported by steel piles bored 100 m into hard rock from temporary work platforms. Span lengths varied from about 90 m in shallow water to 110 m in deep water, Dong says.

Cable-stayed steel-box-girder structures will be built over three channels to allow marine passage. The pylons for the cable-stayed spans will reach as high as 180 m, Dong adds.

"Everything is big," Dong says.

(Aileen Cho, Macau, China, 27.08.2014 / Engineering News-Record Issue: 01.09.2014, http://enr.construction.com/infrastructure/transportation/2014/0901-Immersed-In-Innovations-Hong-Kong-Macao-Link-Takes-Shape.asp)

ΔΙΑΚΡΙΣΕΙΣ ΕΛΛΗΝΩΝ ΓΕΩΜΗΧΑΝΙΚΩΝ

Βράβευση
Δημήτρη Ζέκκου

ISSMGE Outstanding Innovator Award

This international recognition is awarded to an individual ISSMGE member (researcher, consultant, contractor) for innovations that have had a pronounced impact on geo-engineering practice, research and education. The term "innovation" is used broadly to describe any major, unprecedented achievements that led to a significant advancement in our profession.

The 2013 ISSMGE Outstanding Innovator Award goes to Professor Dimitris Zekkos of Greece-USA. Dimitris Zekkos received his Bachelor degree in Greece and his PhD from the University of California at Berkeley. He worked with Geosyntech for several years and became a professor at the University of Michigan where his specialty is geoenvironmental engineering. As a student at Berkeley he started Geoengineer.org which has become the go-to site for getting information on geotechnical engineering. Then he started the International Journal of Geoengineering Case Histories and GeoWorld, a professional exchange network for all geotechnical engineers worldwide.

Dr Zekkos (second from right) receiving the award for Outstanding Innovator

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

International Society for Soil Mechanics and Geotechnical Engineering

Message from the President

Vote of thanks to Professor Ikuo Towhata and his Editorial Board

Welcome to Professor Charles Ng and the new Editorial Board

Dear readers of the ISSMGE Bulletin,

I would like you to join me for an immense vote of thanks to Professor Ikuo Towhata who undertook the role of Editor-in-Chief of the ISSMGE Bulletin from the December 2009 (Vol 3, Issue 4) until the June 2014 issue (Vol 8, Issue 3), that is for 26 issues over 4 and a half years. We are truly grateful for his great devotion. Under his efficient leadership the ISSMGE Bulletin is now published 6 times per year. Our warmest thanks also go to all the members of the Editorial Board during these years: Pedro Sêco e Pinto, Jean-Louis Briaud, Neil Taylor, John Carter, Deepankar Choudhury, Marcelo Gonzalez, Erdin Ibraim, Osamu Kusakabe, Andre Lima, Susumu Nakajima, Makoto Namba, Pongsakorn Punrattanasin, Cholachat Rujikiatkamjorn, Imen Said, Fernando Schnaid and António Topa Gomes. I am also very grateful to some of those former members who have kindly agreed to continue to serve the Editorial Board.

Join me, as well, to welcome Professor Charles Ng as the new Editor-in-Chief, who prepared the current issue of the ISSMGE Bulletin with the new Editorial Board, whose names are printed at the bottom left, on the front page of this Bulletin. We wish them great success in the difficult task they accepted and for devoting themselves to the ISSMGE.

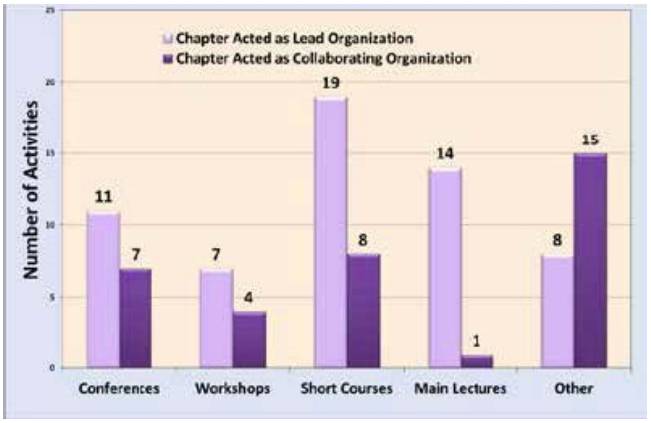
Roger Frank

Paris, 16th August 2014

International Geosynthetics Society

Summary of 2013 IGS Chapter Activities

The use of the standard reporting form for chapter reports allows IGS to understand the activities being carried out at local, regional and international level. This summary report for the year 2013 again shows an impressive number of technical activities being undertaken around the world. Out of the 41 chapters asked to submit a report, disappointingly 8 chapters did not submit a report by 28 July 2014. Figure 1 summarises the total number of technical activities carried out in 2013 by IGS chapters. These include activities where the chapter acted either independently or as a collaborating organisation.



It can be seen from the figure that the IGS chapters were involved with:

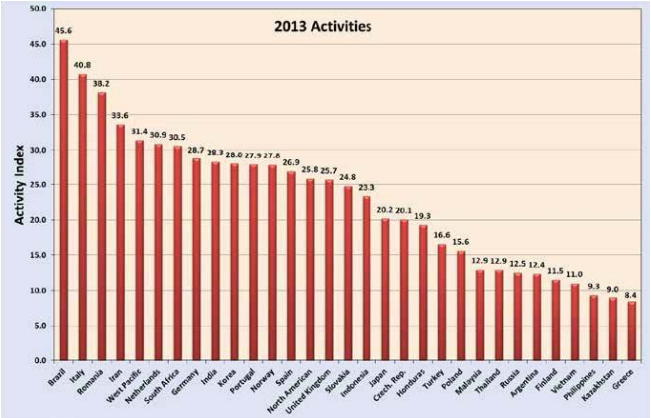
· 18 technical conferences;
· 11 workshops;
· 27 short courses; and
· 15 main lectures

These technical activities were supported by over 170 reported board/committee meetings (in-person and conference calls), which shows the effort being put in by the chapter officers and members.

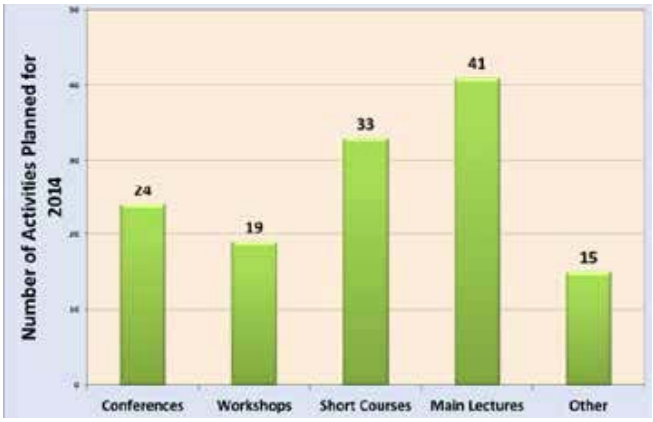
An assessment of the most active IGS chapter has again been carried out and it should be noted that this is based on the number reported by the chapters. It is felt that this is a worthwhile exercise not only to identify chapters that are worth recognition, but also to identify chapters that may benefit from more support and help in coordinating future activities.

Figure 2 shows a measure of the level of activities conducted by each of the IGS chapters in 2013. As previously, the Activity Index was defined as a weighted average of the self-reported technical activities. The weighting methodology used allows, for example, that conferences are worth more than workshops, which in turn are worth more than main lectures. Also, activities conducted by chapters are worth more than those conducted by chapters acting as a collaborating organisation. While the approach used to calculate the Activity Index is certainly subjective, the distri-

bution within Figure 2 is expected to be insensitive to the weighting approach.



The chapters have also reported a healthy number of technical activities planned for 2014. Figure 3 summarises the number of conferences, workshops, short courses and main lectures planned. Based on this information, the level of activities is expected to continue to be significant, which is very encouraging.



In summary, the overall level of activity is very high as clearly illustrated by a total of 94 technical events reported by the chapters for 2013. This is slightly less than the record 102 technical events reported for 2011, but this may be attributed to the higher number of non-reporting chapters. With 132 technical events planned for 2014, it certainly looks like the activities show no sign of slowing down.

Reported by
Russell Jones, IGS Vice President

GEO-INSTITUTE

Cassidy lecture on Sustainability / Offshore Geotechnics (now online)

Available in full on the Geo-Insitute YouTube Channel at http://youtu.be/sNfGzCF9B9w

"Sustainability in an Era of Increasing Energy Demand: Challenges for Offshore Geotechnics", presented at the 2014 Geo-Congress in Atlanta, Georgia, by Mark Cassidy, D.Phil., FIEAust, FTSE, of the University of Western Australia.

SUMMARY: The world's escalating demand for energy, combined with the depletion of oil reserves in shallow waters and traditional regions, is resulting in the move of offshore developments into deeper waters, new development regions and transformation to cleaner natural gas, and renewable energy sources. Summarized in this session are the geotechnical challenges facing the offshore industry as it attempts to sustain the world's expanding energy demands.

For more information on the Geo-Institute, go to http://www.asce.org/geo/

ASSMGE

Report from
Austrian Member Society of ISSMGE

50th Anniversary of Danube-European Conferences on Geotechnical Engineering, Vienna 2014 and other activities of the Austrian Member Society of ISSMGE

On September, 9-11, 2014 the 15th Danube-European Conference on Geotechnical Engineering (DECGE) will take place in Vienna, hosted by the Austrian Member Society of ISSMGE. This is a Jubilee Event celebrating the 50th Anniversary of DECGE. In the year 1964 this conference series was founded in Austria as a Memorial Conference, after Prof. K. Terzaghi had passed away on October 25th, 1963. K. Terzaghi had been Full Professor at the Vienna University at Technology (1929 – 1938), thus founding the first University chair of Soil Mechanics worldwide. The success of this first Conference in 1964 finally initiated a series of DECGEs until now. Since then the DECGE has been held in different countries of the "Danube-European Region". Meanwhile the Geotechnical Community is represented there in 20 countries, from Germany to the Black Sea, and its influence radiates far beyond this wide area. Accordingly, delegates from about 45 countries have already registered for the 15th DECGE.

Figures 1 and 2. Special post stamps at the 15th DECGE. Vienna University of Technology (left) and OIAV-Palais (right)

On occasion of this Jubilee Event the Austrian Postal Authorities will edit two special postal stamps (see Figs. 1, 2). They underline the importance of Geotechnical Engineering for the Public, which is frequently underestimated. One stamp shows the main building of the OIAV (Austrian Society of Engineers and Architects, founded in 1848), where

the first DECGE took place in 1964. The other stamp shows the main building of the Vienna University of Technology (TU Wien), where the 15th DECGE will take place in 2014. Next year this University celebrates its 200th Anniversary.

The postal stamps will be available for the conference participants during the 15th DECGE and later on from the OIAV (g.forster@oiav.at).

The special postal stamps of 2014 are not the first Austrian postal stamps referring to Geotechnics. Already in 1983 a special K. Terzaghi stamp was edited by the Austrian Postal Authorities, commemorating the centenary of his birth on October 2nd, 1983. It was distributed together with special postmarks and envelopes on occasion of the 11th ICSMFE in San Francisco, 1985. Figure 3 shows a special first day envelope, with the Terzaghi stamp and special postmarks commemorating K. Terzaghi's 100th birthday.

Figure 3. "Terzaghi Postal Envelope"

It has the following features:

- The official postmark of the Austrian Postal Direction with the first day mark on the upper stamp. The letters mean: "Terzaghi, the founder of scientific foundation engineering".

- A semi-private postmark of the "Philatelic Club of Graz", which franks the lower stamp. It shows the Terzaghi oedometer.

- The picture shows the old "Wiener Reichsbrücke" ("Vienna Empire Bridge"), crossing the River Danube in Vienna, near the UNO-City. The foundation was designed by K. Terzaghi in the 1930ies. The technical drawing is taken from his original publication.

- Between the Terzaghi stamps: The official seal of the Institute for Foundation Engineering (including Soil Mechanics), Geology and Rock Engineering at the Vienna University of Technology, chaired by Prof. H. Brandl.

Prof. Heinz Brandl, PhD
President of the Austrian Member Society of ISSMGE

ΠΡΟΣΕΧΕΙΣ ΕΚΔΗΛΩΣΕΙΣ ΓΕΩΤΕΧΝΙΚΟΥ ΕΝΔΙΑΦΕΡΟΝΤΟΣ ΣΤΗΝ ΕΛΛΑΔΑ

Η γέννηση ενός αρχιπελάγους

Πολύ πριν το Αιγαίο Πέλαγος αποτελέσει αντικείμενο διεκδικήσεων και διπλωματικών διενέξεων, η πολυτάραχη ιστορία του περιλάμβανε ηφαιστειακές εκρήξεις, σεισμούς, καταποντισμούς, ορογενέσεις, ακραίες καιρικές μεταβολές και πολλά ακόμα δραματικά γεγονότα. Από την ερχόμενη Τετάρτη, οι επισκέπτες του Ιδρύματος Ευγενίδου θα έχουν την ευκαιρία να ανακαλύψουν πώς διαμορφώθηκαν, μέσω γεωλογικών διεργασιών διάρκειας 20 και πλέον εκατομμυρίων ετών, τα χαρακτηριστικά νησιωτικά τοπία που έμελλε να αποτελέσουν λίκνο πολιτισμών αλλά και πεδία βίαιων συγκρούσεων.

Η Δονούσα από ψηλά. Οι γεωλογικές διεργασίες που έδωσαν στο Αιγαίο Πέλαγος τη σημερινή του μορφή διήρκεσαν πολλά εκατομμύρια χρόνια και συνεχίζονται έως τις μέρες μας.

Μια πρωτοβουλία του Μουσείου Φυσικής Ιστορίας Απολιθωμένου Δάσους Λέσβου, η πρωτότυπη έκθεση «ΑΙΓΑΙΟΝ: Η Γέννηση ενός Αρχιπελάγους» διοργανώνεται σε συνεργασία με το Μουσείο Γεωλογίας και Παλαιοντολογίας του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης και του Μουσείου Φυσικής Ιστορίας του Πανεπιστημίου Κρήτης. Από τις αρχές του 2013 και μέχρι τον περασμένο Μάιο, η έκθεση φιλοξενήθηκε στο «Νόησις» - Κέντρο Διάδοσης Επιστημών και Μουσείο Τεχνολογίας, στη Θεσσαλονίκη, όπου υποδέχθηκε χιλιάδες επισκέπτες καθώς και πολυάριθμα σχολεία της Βορείου Ελλάδος. Μια εμπλουτισμένη εκδοχή της, ανασχεδιασμένη ειδικά για τους χώρους του Ιδρύματος Ευγενίδου, θα παραμείνει στην Αθήνα έως τον ερχόμενο Οκτώβριο, πριν συνεχίσει το ταξίδι της ανά την Ελλάδα και τον κόσμο.

Συνηθισμένοι καθώς είμαστε να υπολογίζουμε τον χρόνο σε εποχές, αιώνες ή, στην καλύτερη περίπτωση, χιλιετίες -όταν, για παράδειγμα, αναφερόμαστε σε αρχαιολογικές ανακαλύψεις και γεγονότα της Ιστορίας-, είναι ευκολότερο να φανταζόμαστε τα τοπία της Γης ως κάτι σχετικά σταθερό, ένα σκηνικό πάνω στο οποίο ανθρώπινοι πολιτισμοί ανθούν και παρακμάζουν, αφήνοντας το «στίγμα» τους, αλλά χωρίς τη δύναμη να προκαλέσουν πραγματικά ριζικές αλλαγές. Ποτάμια και έλη αποξηραίνονται, ισθμοί διανοίγονται, υπεραιωνόβια δάση εξαφανίζονται, βουνά σκάβονται από λατομεία, όμως οι οροσειρές, τα νησιά και οι θάλασσες παραμένουν στη θέση τους, συντηρώντας μια αίσθηση ιστορικής συνέχειας της ανθρωπότητας στο πέρασμα του χρόνου. Η έκθεση «Αιγαίον» μας προκαλεί να απαλλαγούμε αυτή την ψευδαίσθηση μονιμότητας και να προσπαθήσουμε να αντιληφθούμε ότι τα πάντα γύρω μας έχουν μια αρχή και, αναπόφευκτα, ένα τέλος, αφού οι γεωλογικές διεργασίες συνεχίζονται μέχρι σήμερα.

Η άνυδρη Μεσόγειος

Απολιθώματα φυτών και ζώων, ευρήματα πρόσφατων υποθαλάσσιων ερευνών, ίχνη της παρουσίας των προγόνων του σύγχρονου ανθρώπου, εντυπωσιακά βίντεο και πανοραμικές φωτογραφίες νησιωτικών συμπλεγμάτων αφηγούνται την ιστορία της Αιγηίδος, της απέραντης χερσαίας έκτασης η οποία αναδύθηκε μέσα από τον μεγάλο ωκεανό της Τηθύος και κάλυπτε την περιοχή από το Ιόνιο έως τη Μικρά Ασία. Κατά μια έννοια, η σημερινή Μεσόγειος είναι κατάλοιπο του ωκεανού της Τηθύος – αν και για μερικές δεκάδες ή εκατοντάδες χιλιάδες χρόνια ολόκληρη η λεκάνη της Μεσογείου είχε μετατραπεί σε μια άνυδρη έρημο, που τελικά γέμισε με νερό από τον Ατλαντικό. Σταδιακά, ως αποτέλεσμα των μετατοπίσεων και συγκρούσεων των τεκτονικών πλακών, η ενιαία ξηρά της Αιγηίδος κατακερματίστηκε και ένα μεγάλο μέρος της βυθίστηκε ξανά στη θάλασσα. Έτσι γεννήθηκαν τα αιγαιοπελαγίτικα νησιά, αλλά και τα γεωλογικά μνημεία της περιοχής, όπως το Απολιθωμένο Δάσος της Λέσβου, που δημιουργήθηκε πριν από περίπου 18 εκατ. χρόνια και διατηρήθηκε καλυμμένο κάτω από ένα στρώμα ηφαιστειακών υλικών. Αν και η έκθεση εστιάζει κατά κύριο λόγο στις εξελίξεις των τελευταίων 20 εκατ. ετών, ορισμένα από τα γεγονότα που περιγράφονται συνέβησαν έως και πριν από 150 εκατ. χρόνια.

Ένας απολιθωμένος κορμός ύψους 14 μέτρων από το υποτροπικό δάσος με προγονικές μορφές σεκόιας, που πριν από 18 εκατομμύρια χρόνια κάλυπτε την περιοχή της σημερινής Λέσβου, είναι ίσως το πιο εντυπωσιακό από τα αντικείμενα της έκθεσης. Ωστόσο, μεταξύ των εκθεμάτων, που από αυτή την εβδομάδα φιλοξενούνται στους χώρους του Ιδρύματος Ευγενίδου, περιλαμβάνονται εξίσου μοναδικά εκθέματα, όπως τα απολιθώματα οστράκων από τον ωκεανό της Τηθύος ή τα δύο κομμάτια ηφαιστειακής στάχτης με απολιθωμένα φύλλα δέντρων: το αρχαιότερο είναι περίπου 20 εκατ. ετών και εντοπίστηκε στην περιοχή του σημερινού Σιγρίου, ενώ το απολιθωμένο φύλλο ελιάς από τη Σαντορίνη είναι σαφώς νεότερο, καθότι η ηλικία του δεν ξεπερνάει τα 60.000 χρόνια. Όπως υπογραμμίζει ο διευθυντής του Μουσείου Απολιθωμένου Δάσους και αναπληρωτής καθηγητής στο Πανεπιστήμιο Αιγαίου, Νίκος Ζούρος, οι απολιθωμένοι κορμοί δέντρων δεν προέρχονται μόνο από τα επιφανειακά πετρωμένα δάση της Λέσβου, αλλά και από τις υποβρύχιες έρευνες, που βρίσκονται σε εξέλιξη στην παράκτια ζώνη της νησίδας Νησιώπης, στα δυτικά του νησιού.

Οι γεωλογικοί σχηματισμοί, που διατηρούνται ως σήμερα, αφηγούνται μια πολυτάραχη ιστορία με σεισμούς, καταποντισμούς και ηφαιστειακές εκρήξεις.

Η πρώτη από τις τρεις ενότητες, με τίτλο «Μνήμες Γαίας - από την Τηθύ στο Αιγαίο», ανατρέχει στο πολύ μακρινό παρελθόν για να εξιστορήσει πώς «μέσα από τον ωκεανό δημι-

ουργήθηκε η χερσαία ζώνη του Αιγαίου και πώς φτάσαμε στο σημερινό αρχιπέλαγος», εξηγεί ο κ. Ζούρος.

Η δεύτερη τιτλοφορείται «Στα νησιά του Ηφαίστου και του Ποσειδώνα» και εστιάζει στη δράση των ηφαιστείων, τα οποία έπαιξαν καθοριστικό ρόλο στη δημιουργία του αρχιπελάγους. Ανάμεσά τους, τα ενεργά ηφαίστεια της Σαντορίνης, της Νισύρου, των Μεθάνων και του Σουσακίου, που ανήκουν στο ηφαιστειακό τόξο του Νοτίου Αιγαίου. Ορισμένα από τα πιο ποικιλόμορφα -και δημοφιλή- νησιά του ελληνικού αρχιπελάγους, όπως η Μήλος, η Λήμνος, η Θήρα, η Κίμωλος και η Σαμοθράκη, οφείλουν την ύπαρξή τους στην ηφαιστειακή δραστηριότητα.

«Γαία: Από τον μύθο στην επιστήμη» είναι ο τίτλος της τρίτης ενότητας, που περιστρέφεται γύρω από τα οικοσυστήματα του Αιγαίου. Η εξέλιξη της βιοποικιλότητας της περιοχής τα τελευταία 150 χρόνια αναδεικνύεται μέσα από την αντιπαράθεση αναπαραστάσεων προγονικών μορφών δέντρων και ζώων -ανάμεσά τους, μία κοντόλαιμη καμηλοπάρδαλη από τη σημερινή Χίο, ένας ελέφαντας νάνος από την Τήλο και ένα κρανίο αντιλόπης από την περιοχή της Σάμου- με τους σύγχρονους «απογόνους» τους. Παρουσιάζονται, επίσης, ευρήματα που τεκμηριώνουν την πρώιμη παρουσία των προγόνων του σύγχρονου ανθρώπου, καθώς και τρία εκμαγεία κρανίων ανθρωπιδών από τον ελλαδικό χώρο: του μακεδονικού ουρανοπίθηκου, ο οποίος ανακαλύφθηκε το 1988 στην Κασσάνδρα Χαλκιδικής, του πεντελικού μεσοπίθηκου, προϊστορικού κατοίκου της Ευρώπης και της Δυτικής Ασίας, και του ανθρώπου των Πετραλώνων, από το ομώνυμο σπήλαιο της Χαλκιδικής. Όπως υπογραμμίζει ο κ. Ζούρος, η σημασία των φαινομένων που οδήγησαν στη γέννηση του Αιγαίου δεν είναι αποκλειστικά γεωλογική.

Το Ακρωτήριο Ταίναρο , το νοτιότερο άκρο της ηπειρωτικής Ελλάδας. Εκατομμύρια χρόνια πριν αποτελούσε κομμάτι της ενιαίας ξηράς Αιγηίδος.

Υλικά πολιτισμού

Οι κινήσεις των τεκτονικών πλακών όχι μόνο διαμόρφωσαν το ανάγλυφο που αντικρίζουμε σήμερα, αλλά διαδραμάτισαν καθοριστικό ρόλο και στην ανάπτυξη των ανθρώπινων πολιτισμών, προσφέροντας άφθονες ποσότητες ορυκτών πρώτων υλών, από τον οψιδιανό της Μήλου έως τον χαλκό της Κύθνου και της Σερίφου. Επιπλέον, για πολλές χιλιάδες χρόνια τα -ανεξήγητα- φυσικά φαινόμενα και οι καταστροφές αποτελούσαν έναυσμα για τη δημιουργία μύθων, έργων τέχνης και μεταφυσικών θεωριών, αφού η ανθρώπινη φαντασία σπεύδει να καλύψει τα κενά που αφήνει η ανεπάρκεια της γνώσης.

Η έκθεση απευθύνεται σε μικρούς και μεγάλους, δεδομένου ότι το κοινό μπορεί να επιλέξει μεταξύ μιας πιο «επιφανειακής» περιήγησης, με έμφαση στα απτά εκθέματα και το πλούσιο οπτικοακουστικό υλικό, ή να αποκτήσει βαθύτερες γνώσεις σχετικά με τη γεωλογική ιστορία του Αιγαίου, αφιερώνοντας περισσότερο χρόνο στην ανάγνωση των εύληπτων συνοδευτικών κειμένων και παρακολουθώντας το 15λεπτο ενημερωτικό βίντεο. Σύμφωνα, πάντως, με τον κ. Ζούρο, οι επισκέπτες θα χρειαστούν περίπου μία ώρα για να περιεργαστούν το σύνολο των εκθεμάτων, που παρουσιάζονται στο ισόγειο και τον πρώτο όροφο του Ιδρύματος Ευγενίδου.

Οι διαδικασίες, για την πραγματοποίηση της πρώτης έκθεσης για τη γέννηση του Αιγαίου που έχει διοργανωθεί ποτέ, ξεκίνησαν πριν από περίπου δύο χρόνια, αναφέρει ο κ. Ζούρος. Το αρχικό, πιο φιλόδοξο σχέδιο αφορούσε ένα αφιέρωμα στη δημιουργία ολόκληρης της Ανατολικής Μεσογείου, αλλά κάτι τέτοιο δεν κατέστη δυνατόν εξαιτίας των τελευταίων κοινωνικοπολιτικών συνθηκών.

Περιοδεία στην Ευρώπη και την Ασία

Η έκθεση «ΑΙΓΑΙΟΝ: Η Γέννηση ενός Αρχιπελάγους» διοργανώνεται από το Μουσείο Φυσικής Ιστορίας Απολιθωμένου Δάσους Λέσβου σε συνεργασία με το Μουσείο Γεωλογίας και Παλαιοντολογίας του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, το Μουσείο Φυσικής Ιστορίας του Πανεπιστημίου Κρήτης και το Ίδρυμα Ευγενίδου, ενώ την παραγωγή και επιμέλεια έχει αναλάβει η Tetragon. Σχεδιασμένη εξαρχής με σκοπό να περιοδεύσει στην Ελλάδα και στο εξωτερικό, ξεκίνησε το ταξίδι της από τη Θεσσαλονίκη. Θα παραμείνει στο Ίδρυμα Ευγενίδου από τις 3 Σεπτεμβρίου έως τις 23 Οκτωβρίου και στη συνέχεια κατά πάσα πιθανότητα θα μεταφερθεί σε ακόμη μία ελληνική πόλη, ενώ ήδη βρίσκονται σε εξέλιξη οι διαπραγματεύσεις με μουσεία και εκθεσιακούς χώρους στην Ευρώπη και την Ασία. Η εκπαιδευτική και επιστημονική αξία της έχει αναγνωριστεί από τα υπουργεία Ναυτιλίας και Αιγαίου, Τουρισμού, και Πολιτισμού και Αθλητισμού, τα οποία την έθεσαν υπό την αιγίδα τους. Επιπλέον, έχει εξασφαλίσει τη στήριξη της ελληνικής Εθνικής Επιτροπής για την UNESCO. Η είσοδος για το γενικό κοινό θα είναι ελεύθερη με σειρά προτεραιότητας. Ώρες λειτουργίας: Τετάρτη έως Παρασκευή 5 με 8 μ.μ., Σάββατο και Κυριακή 10 π.μ. με 8 μ.μ. Τα πρωινά από Δευτέρα έως Παρασκευή θα γίνονται δεκτές σχολικές ομάδες των δύο τελευταίων τάξεων του Δημοτικού και όλων των τάξεων του Γυμνασίου και του Λυκείου, με ελεύθερη είσοδο κατόπιν συνεννόησης. Περισσότερες πληροφορίες για την έκθεση, στην ιστοσελίδα www.aegeon.org.gr.

(Χριστίνα Σανούδου / Η ΚΑΘΗΜΕΡΙΝΗ, Κυριακή 31 Αυγούστου 2014, http://www.kathimerini.gr/781413/article/politismos/eikastika/h-gennhsh-enos-arxipelagoys)

Ημερίδα Σταδιοδρομίας για Επαγγελματίες Υπογείων και Γεωτεχνικών Έργων

Στο πλαίσιο του συνεδρίου 2nd Eastern European Tunnelling Conference (EETC2014) που διοργανώνεται από την ΕΕΣΥΕ στην Αθήνα (28 Σεπτεμβρίου - 1 Οκτωβρίου 2014), συμπεριλήφθηκε, με πρωτοβουλία της «Ομάδας Εργασίας Νέων Μελών» της Ελληνικής Επιτροπής Σηράγγων και Υπογείων Έργων* η εκδήλωση «**Ημερίδα Σταδιοδρομίας για Επαγγελματίες Υπογείων Έργων**».

Τι είναι η ημερίδα σταδιοδρομίας;

Στόχος της εκδήλωσης είναι η διασύνδεση υποψηφίων επαγγελματιών με γνώση ή/και εμπειρία στο χώρο των υπο-

γείων έργων με εταιρείες από την Ελλάδα και την Ευρώπη με σημαντική δραστηριότητα στο συγκεκριμένο χώρο. Πιο συγκεκριμένα, η Ημερίδα θα περιλαμβάνει (α) την παρουσίαση του προφίλ των εταιριών που συμμετέχουν, των έργων στα οποία δραστηριοποιούνται και των προοπτικών σταδιοδρομίας που προσφέρουν και (β) συζήτηση μεταξύ των υποψηφίων και των εκπροσώπων των εταιρειών.

Πότε και που διοργανώνεται;

Η Ημερίδα θα πραγματοποιηθεί στην Αθήνα, στο ξενοδοχείο Athens Royal Olympic Hotel όπου διοργανώνεται και το συνέδριο EETC2014, την **Κυριακή 28 Σεπτεμβρίου 2014 (14:00 έως 19:00)**.

Σε ποιόν απευθύνεται;

Η Ημερίδα απευθύνεται σε μηχανικούς και επαγγελματίες κάθε ηλικίας με αποδεδειγμένη ειδική εκπαίδευση ή/και εργασιακή εμπειρία στον τομέα των υπογείων και γεωτεχνικών έργων (ενδεικτικά και όχι περιοριστικά αναφέρονται πολιτικοί μηχανικοί, μεταλλειολόγοι, γεωλόγοι, τοπογράφοι).

Πως μπορώ να συμμετάσχω;

Για τη δήλωση συμμετοχής απαιτείται η αποστολή email στην ηλεκτρονική διεύθυνση **ymg.gts@gmail.com** με συνημμένα (α) βιογραφικό σημείωμα στα αγγλικά και (β) συνοδευτική επιστολή / cover letter στα αγγλικά. Στην εκδήλωση θα υπάρχει συγκεκριμένος αριθμός συμμετεχόντων και θα τηρηθεί σειρά προτεραιότητας. Για το λόγο αυτό παρακαλούνται οι ενδιαφερόμενοι να υποβάλουν άμεσα δήλωση συμμετοχής.

Που μπορώ να βρω επιπλέον πληροφορίες;

Website του συνεδρίου EETC2014:
http://www.eetc2014athens.org

Facebook group «Ομάδας Εργασίας Νέων Μελών»:
www.facebook.com/groups/YMGGTS

Twitter «Ομάδα Εργασίας Νέων Μελών»:
@YMG_GTS

LinkedIn Group «Ομάδας Εργασίας Νέων Μελών»:
YMG - GTS

Για περισσότερες πληροφορίες και εγγραφή όσο αφορά στην Ομάδα Εργασίας Νέων Μελών της ΕΕΣΥΕ μπορείτε να απευθυνθείτε στην ηλεκτρονική διεύθυνση **ymg.gts@gmail.com.*

30 September - 3 October 2014, Athens, Greece
www.eetc2014athens.org

It is our pleasure to inform you that the Greek Tunnelling Society is organizing the 2nd Eastern European Tunnelling Conference in Athens on September 28 – October 1 2014 (EETC2014, Athens).

The Eastern European Tunnelling Conference is a biennial regional traveling conference. It aims to promote the sharing of knowledge, experience, skills, ideas and achievements in the design, financing and contracting, construction, operation and maintenance of tunnels and other underground facilities among the countries of Eastern Europe, on an organized basis and with agreed aims. EETC2014 aims mainly to bring together colleagues from Eastern Europe but people from the rest of the world are also welcome.

The theme of EETC2014 Athens is:

"Tunnelling in a Challenging Environment"
Making tunnelling business in difficult times

The construction of underground projects is becoming increasingly demanding as new challenges are emerging in every aspect and sector of this multidisciplinary and multivarious business. Further to the usual geological, geotechnical, structural and operational challenges, we are now facing a difficult business and financial environment, which requires the deployment of even more intelligent and effective tools and solutions.

I really do hope that the EETC2014 Athens will contribute and further facilitate the growth of the tunnelling business and will be a forum for scientific and professional collaboration.

TOPICS:

- Innovative methods for Analysis and Design
- Tunnelling in difficult ground conditions
- Conventional urban or shallow tunnelling
- Mechanized tunnelling
- Hydraulic tunnels
- Underground complexes
- Caverns for Hydropower or Storage
- Pipe jacking and microtunnelling
- Innovations in tunnelling construction technology
- Tunnels and shafts for mining
- Rehabilitation and repair
- Safety and security in tunnels and tunnelling
- Contractual and financial issues
- Education and training
- Case histories
- Underground space use
- Tunnels and monuments

5 – 7 Νοεμβρίου 2014, ΑΙΓΛΗ Ζαππείου, Αθήνα
http://www.7hcge2014.gr

Η Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής, στο πλαίσιο των δραστηριοτήτων της, διοργανώνει το 7ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής υπό την αιγίδα του Δήμου Αθηναίων και του Τεχνικού Επιμελητηρίου Ελλάδας. Στόχος του Συνεδρίου είναι να καταγράψει τις προόδους της γεωτεχνικής μηχανικής στην Ελλάδα του 21ου αιώνα όπως αντικατοπτρίζονται στα σημαντικά γεωτεχνικά αλλά και άλλα έργα (σιδηροδρομικά, οδοποι-

ίας, λιμενικά, υδραυλικά, κτιριακά, περιβαλλοντικά) με σημαντικό γεωτεχνικό αντικείμενο, που έχουν μελετηθεί και κατασκευαστεί ή κατασκευάζονται, καθώς και στα αποτελέσματα της ερευνητικής δραστηριότητας των ελληνικών πολυτεχνείων και πολυτεχνικών σχολών. Επιδίωξη είναι οι εργασίες του Συνεδρίου να αναδείξουν πρωτότυπα στοιχεία συμβολής της γεωτεχνικής μηχανικής αλλά και να προβάλουν θεωρητικές και πειραματικές έρευνες σε εδαφικά, βραχώδη και ημιβραχώδη υλικά που βρήκαν ή μπορούν να βρουν εφαρμογή στην πράξη."

Θεματικές Ενότητες

1. Συμπεριφορά Εδαφών: Έρευνες Υπαίθρου και Εργαστηρίου
2. Συμπεριφορά Εδαφών: Προσομοιώματα
3. Επιφανειακές και Βαθειές Θεμελιώσεις
4. Αλληλεπίδραση Εδάφους - Κατασκευής
5. Πρανή - Κατολισθήσεις
6. Βαθειές Εκσκαφές - Αντιστηρίξεις
7. Σήραγγες
8. Βελτιώσεις Εδαφών
9. Φράγματα, Άοπλα Επιχώματα
10. Οπλισμένα Επιχώματα
11. Εφαρμογή Ευρωκωδίκων
12. Εφαρμογές Γεωσυνθετικών Υλικών
13. Εδαφοδυναμική / Τεχνική Σεισμολογία
14. Βραχομηχανική
15. Περιβαλλοντική Γεωτεχνική
16. Ενεργειακή Γεωτεχνική (energy geotechnics)
17. Πολιτιστική Κληρονομιά και Γεωτεχνική Μηχανική
18. Διδασκαλία και Μάθηση Γεωτεχνικής Μηχανικής

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

International Symposium on Geomechanics from Micro to Macro (TC105), 01 - 03 September 2014, Cambridge, United Kingdom, http://is-cambridge.eng.cam.ac.uk

International Conference on Industrial and Hazardous Waste Management "CRETE 2014", September 2nd – 5th, 2014, Chania, Crete, Greece, http://www.hwm-conferences.tuc.gr

Geosynthetics mining solutions 2014, September 8 – 11, 2014, Vancouver, Canada, http://www.geosyntheticssolutions.com

JUBILEE CONFERENCE 50th Anniversary of Danube-European Conferences on Geotechnical Engineering Geotechnics of Roads and Railways, 9 - 11 September 2014, Vienna, Austria, www.decge2014.at

IAEG XII CONGRESS Torino 2014 Engineering Geology for Society and Territory, IAEG 50th Anniversary, September 15-19, 2014, Torino, Italy, www.iaeg2014.com

Reclaim - 1ο Πανελλήνιο Συνέδριο για την Εξόρυξη Αποβλήτων, 16 Σεπτεμβρίου 2014, http://us3.campaign-archive1.com/?u=234903e30e14c301e8f4d6547&id=7108cb488a&e=e6374bee25

http://www.mecc2014.de

Main Topics

- Crystal structure of clay minerals
- Clays, reservoir rocks and energy issues
- Clays in geotechnical applications
- Stability of engineered clay barriers in radioactive waste disposal
- Clay minerals in diagenetic and low temperature metamorphic environments
- Clay minerals in hydro- and geothermal systems
- Analytical tools for improved characterization of clays and clay minerals
- Industrial clays
- Clays and clay-sized minerals in soils and young sediments
- Properties and processes at the aqueous interface of clay minerals
- General session

Conference organisation & Industrial exhibition
Conventus Congressmanagement & Marketing GmbH
Martin Singer
Carl-Pulfrich-Straße 1
07745 Jena (DE)
Phone +49 (0)3641 31 16 310
Fax +49 (0)3641 31 16 243
martin.singer(@conventus.de
www.conventus.de

10th International Conference on Geosynthetics – 10ICG, Berlin, Germany, 21 – 25 September 2014 www.10icg-berlin.com

14th International Conference of the International Association for Computer Methods and Advances in Geomechanics (14IACMAG), September 22 – 25, 2014, Kyoto, Japan, www.14iacmag.org

14th World Conference of the Associated Research Centers for the Urban Underground Space (ACUUS 2014), September 24-26, 2014, Seoul, Korea http://acuus2014.com

EETC 2014 ATHENS 2nd Eastern European Tunnelling Conference, 28 September - 1 October 2014, Athens, Greece, www.eetc2014athens.org

7th Basements and Underground Structures Conference, 30 September – 1 October 2014, London, geevents@emap.com

5th International Forum on Opto-electronic Sensor-based Monitoring in Geo-engineering (5th OSMG-2014), Oct 12-14, 2014, Nanjing, China, http://www.osmg2014.com

International Congress Tunnels and Underground Space risks & opportunities, 13-15 October 2014, Lyon, France, www.congres.aftes.asso.fr/en/content/invitation

HYDRO 2014 Building on Recent Development Progress, 13 to 15 October 2014, Villa Erba, Cernobbio, Italy, www.hydropower-dams.com/pdfs/hydro2014.pdf

ARMS 8 - 8th ISRM Rock Mechanics Symposium, 14-16 October 2014, Sapporo, Japan www.rocknet-japan.org/ARMS8/index.htm

Geostructures Asia, 14-16 October 2014, Singapore, johnk@trueventus.com

9th International Conference on Structural Analysis of Historic Constructions, 14 – 17 October 2014, Mexico City, Mexico, www.linkedin.com/groups/SAHC-2014-Mexico-City-3930057.S.213150607

International Seminar
GEOSYNTHETICS INDIA 2014
and Workshop on
"Design of Geosynthetic Barriers"
15-17 October 2014, New Delhi, India
http://cbip.org/ExternalFile/Geo%20India%2014.pdf

Geosynthetics are now being increasingly used the world over for every conceivable application in civil engineering, namely, construction of dam, embankments, canals, approach roads, runways, railway embankments, retaining walls, slope protection works, drainage works, river training works, seepage control, etc. due to their inherent qualities. Its use in India though is picking up, is not any where close to recognition. This is due to limited awareness of the utilities of this material and development taking place in its use.

To be abreast with the latest development in the field of Geosynthetics, an International Seminar "Geosynthetics India 2014", preceded by a Workshop on "Design of Geosynthetic Barriers", is being organised by the Indian Chapter of International Geosynthetics Society and the Central Board of Irrigation & Power (CBIP).

The International Geosynthetics Society (India), registered under Societies Registration Act 1860, in June 1992, acts as Indian Chapter of International Geosynthetics Society (IGS), which was founded in Paris, on 10 November 1983.

The IGS is a non-profit organization dedicated to the scientific and engineering development of geosynthetics and associated technologies. The IGS brings together individual and corporate members from all parts of the world, who are involved in the design, manufacture, sale use or testing of geotextiles, geomembranes, related products, and associated technologies, or who teach or conduct research about such products. There are 41 national or regional chapters of the IGS.

Since its inception in 1927, the Central Board of Irrigation & Power (CBIP), which is the Secretariat of the Indian Chapter of International Geosynthetics Society, is engaged in the dissemination of information regarding recent technological advancements in the twin disciplines of water resources and power. Besides, it provides a forum for exchange of experiences, facilitating flow of technology through the organisation of symposia, seminars, workshops, training courses both at national as well international levels, in liaison with international organisations.

Topics

The following will be the topics for discussion during the seminar:
1. Geosynthetics Materials
2. Testing & Evaluation, Specifications and Standardization
3. Reinforced Soil Structures
4. Soil Slopes Stabilisation and Landslide Mitigation
5. Filtration and Drainage
6. Roads and Railways
7. Hydraulic Structures
8. Hazardous Waste Management - Landfills & Ash Ponds
9. Erosion Control
10. Ground Improvement
11. Natural Fibre Geotextiles

Seminar Secretariat
Central Board of Irrigation & Power
Malcha Marg, Chanakyapuri, New Delhi 110 021, India

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E-mail : uday@cbip.org; cbip@cbip.org
Web : www.cbip.org

6th International Conference on Protection of Structures Against Hazards, 16-17 October 2014, Tianjin, China, http://cipremier.com/page.php?764

2nd International Conference Innovations on Bridges and Soil - Bridge Interaction IBSBI 2014, Athens, 16 - 18 October, 2014, http://ibsbi2014.ntua.gr

1st International Conference on Volcanic Landscapes (VOLAND 2014), 16 - 18 October 2014, Santorini Island, Greece, voland@heliotopos.net

1st International Conference on Discrete Fracture Network Engineering, October 19 - 22, 2014, Vancouver, British Columbia, Canada, www.dfne2014.ca

DRILL AND BLAST Africa 2014

Optimising Drilling and Blasting Operations on the First Shot
20 – 21 October 2014, Johannesburg, South Africa

Drilling and blasting is the principle means of rock breaking and extraction of ore in Africa and is the pillar of all mining operations affecting all other downstream processes. Timely and error-free drilling and blasting operations are necessary for the profitability and sustainability of operations from mine to mill. Our in-depth research has shown that mines in the region are **operating on a trial and error basis which is both ineffective and unproductive**. It is vital that drill and blast professionals **explore new ways and technologies to optimise all drilling and blasting operations** to increase efficiency leading to better downstream operations and an increase in profit margins.

IQPC South Africa is proud to announce **Drill & Blast Africa 2014**. The conference will discuss measures that can be taken to optimise mining operations through improving:

1. Drilling pattern analysis
2. Blast accuracy optimization through better blast analysis
3. Fragmentation analysis

Delegates will hear practical presentations from Kevin Landley, *Blast Hole Drilling Consultant,* Anglo American Technical Solutions, South Africa, Wolter De Graaf, *Blasting Consultant and Senior Lecturer*, University of Pretoria, South Africa, Yusuf Ravat, *Blast Section Manager,* Magalakwena Platinum, South Africa, and many more.

Questions? Contact us on +27 11 593 2267 fax +274 612 3182 or email enquiry@iqpc.co.za now! © IQPC

12th International Conference Underground Infrastructure of Urban Areas, 22-23th October 2014, Wroclaw, Poland, http://www.uiua2011.pwr.wroc.pl

Η χρήση νέων τεχνολογιών στην πρόληψη και τη διαχείριση φυσικών καταστροφών - Ο ρόλος της πολιτικής προστασίας, 24 ÷ 26 Οκτωβρίου 2014, Ρόδος, http://saferhodes.blogspot.gr

AusRock 2014 - 3rd Australasian Ground Control in Mining Conference - an ISRM Specialized Conference, 5 – 6 November 2014, Sydney, Australia www.groundcontrol2014.ausimm.com.au

3rd ISRM International Young Scholars' Symposium on Rock mechanics - an ISRM Specialized Conference, 8 – 10 November 2014, Xi'an, China http://www.isrm.net/fotos/editor2/NI26/sysrock2014_copy.pdf

JTC-1's First International Landslide Workshop

November 2014, Seoul, Korea

sglee@uos.ac.kr

JTC-1's first International Landslide Workshop will be held in Seoul in November 2014 and Prof. Su-Gon Lee is the chairman of the organizing committee of the workshop. If colleague is interested in the workshop, please contact Prof. Su-Gon Lee: sglee@uos.ac.kr.

7th International Congress on Environmental Geotechnics, 10-14 November 2014, Melbourne, Australia, www.7iceg2014.com

17 - 19 November 2014, Bonn, Germany

http://www.amiplastics.com/events/event?Code=C628#4423

The 8th AMI international conference, **Waterproof Membranes 2014**, will take place at the Maritim Hotel in Bonn, Germany from 17-19 November 2014. The event will start with an evening Welcome Cocktail Reception on the first evening followed by a 2-day programme on technical developments and market trends in the roofing and geomembrane waterproofing industry. An exhibition will run alongside the conference.

Waterproofing technology has been established for centuries from bitumen-based roofing in the hanging gardens of Babylon to the synthetic materials developed in the last hundred years. There are now decades of experience with elastomers and thermoplastic materials in roofing and geomembranes. These are now much more multifunctional offering enhanced product performance with flame retardants for fire resistance, reflective pigments and coatings for thermal regulation, inbuilt photovoltaic energy-generating systems, and vegetation-resistant properties for horticultural structures. There are now more material and installation options for underground structures from tunnels to reservoir liners.

Waterproof Membranes 2014 provides a global forum for all companies involved in waterproofing, including specifiers, architects, civil engineers, expert installers, manufacturers, researchers, materials experts and suppliers to the industry. The conference provides a debating forum reviewing the latest technology in membranes and the extensive potential on offer to the building and civil engineering industry.

Please contact Giulia Esposito.
Email: ge@amiplastics.com Tel: +44 117 314 8111.

GEOMATE 2014 Fourth International Conference on Geotechnique, Construction Materials + Environment, 19 - 21 Nov. 2014, Brisbane, Australia, www.geomate.org

International Symposium "Geohazards" Science, Engineering & Management, 20-21 November 2014, Kathmandu, Nepal, www.ngeotechs.org/ngs/index.php/geohazards-2014

7th International Conference on Scour and Erosion (ICSE-7), 2nd – 4th December 2014, Perth, Western Australia, http://www.2014icse.com

7-10 December 2014, Dubai, United Arab Emirates

As the UAE is set to spend over $300 billion on infrastructure development by 2030, projects ranging from high-rises to metros are under construction in the region with several more projects at the design stages.

With such a high number of buildings and infrastructure being developed, it is fundamental for the UAE to put in place the best piling and foundation structures to support these projects, and the most efficient methodologies to create robust underground infrastructure. This must be achieved whilst considering the geotechnical conditions specifically faced in the UAE.

In light of this, IQPC is proud to present the **Underground Infrastructure & Deep Foundations UAE Summit** which stems from the popular Underground Infrastructure & Deep Foundations series. This exclusive UAE-specific gathering will be held from 7-10 December 2014 with a **Dewatering Workshop** on 7 December and a **High-Rise Foundations**

Workshop on 10 December. The event will feature piling and foundation specialists and tunnelling experts discussing key trends, innovations and market requirements in the field, and how this will impact the UAE construction sector.

Top 5 challenges in 2014 to be addressed:

- Tackling **environmental restrictions** on **dewatering** and how to efficiently dispose of discharge
- Examining innovations in **cavity management** and **soil testing** to deliver quality foundations, including how to improve **risk assessment**
- Discovering new and alternative methods for **deep excavations** and assessing the advantages and disadvantages
- Managing the huge **logistical challenge** of incorporating tunnels into **existing underground infrastructure** in the UAE
- Effective planning of **materials** and **workforce** to avoid shortage and deliver projects in time for Expo 2020

Questions? Contact us on +971 4 364 2975 or email enquiry@iqpc.ae now! © IQPC

Third Australasian Ground Control in Mining Conference 2014, Sydney, Australia, www.mining.unsw.edu.au/node/608

Proceedings of the Institution of Civil Engineers, Geotechnical Engineering, THEMED ISSUE 2015, Construction processes and installation effects, Editors: Benoît Jones, University of Warwick, UK and Stuart Haigh, University of Cambridge, UK, sarah.walker@ice.org.uk

IGS Chennai 2015 6th International Geotechnical Symposium on Disaster Mitigation in Special Geoenvironmental Conditions, January 21-23, 2015, IIT Mandras, Chennai, India, http://igschennai.in/6igschennai2015

Geosynthetics 2015, February 15 – 18, 2015, Portland, Oregon, USA, http://geosyntheticsconference.com

12th Australia New Zealand Conference on Geomechanics (ANZ 2015), 22-25 February 2015, Wellington, New Zealand, http://www.anz2015.com

GeoProc2015: International Conference on Coupled THMC Processes in Geosystems
25-27 February 2015, Salt Lake City, USA
robert.podgorney@inl.gov

AFRICA 2015 - Water Storage and Hydropower Development for Africa, 10 to 12 March 2015, Marrakesh, Morocco http://www.hydropower-dams.com/AFRICA-2015.php?c_id=89

16th African Regional Conference on Soil Mechanics and Geotechnical Engineering, April 27 to 30, 2015 in Hammamet, Tunisia, http://www.cramsg2015.org

ISP7-PRESSIO2015 1 to 2 May 2015, Hammamet, Tunisia, http://www.cramsg2015.org/isp7-pressio2015

13th ISRM International Congress on Rock Mechanics Innovations in Applied and Theoretical Rock Mechanics 10–13 May 2015, Montreal, Canada, www.isrm2015.com

Shale and Rock Mechanics as Applied to Slopes, Tunnels, Mines and Hydrocarbon Extraction, Special One day Symposium, May 12, 2015, Montreal, Quebec, Canada, www.isrm2015.com/Page/PageContent/ShaleSymposium

World Tunnel Congress 2015 and 41st ITA General Assembly : Promoting Tunnelling in South East European (SEE) Region, 22 - 28 May 2015, Dubrovnik, Croatia, http://wtc15.com

83rd ICOLD Annual Meeting & Congress Hydropower' 15, June 2015, Stavanger, Norway, www.icoldnorway2015.org

ISFOG 2015 3rd International Symposium on Frontiers in Offshore Geotechnics, Oslo, Norway, 10-12 June 2015, www.isfog2015.no

DMT 15 The 3rd International Conference on the Flat Dilatometer, Rome 15-17 June 2015, www.dmt15.com

ICGE 2015 International Conference in Geotechnical Engineering – Colombo-2015, 10 - 11 August 2015, Colombo, Colombo, Sri Lanka, http://www.slgs.lk/?p=564

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

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

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

EUROCK 15 ISRM European Regional Symposium & 64th Geomechanics Colloquy, 7 – 9 October 2015, Salzburg, Austria, www.oegg.at/eurock-2015

Environmental Connection Conference
February 15–18, 2015, Portland, Oregon, USA
http://www.ieca.org/conference/annual/ec.asp

This is IECA's premier educational event for the erosion, sediment control and stormwater industry. **Environmental Connection** combines intense, full and half day training courses with topic-focused technical sessions and the largest expo of its kind. Environmental Connection 2015 will be a co-located event with the Industrial Fabrics Association International's Geosynthetics 2015. Attendees will have access to both associations' educational offerings plus one giant exhibition - all under one roof.

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

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

Erosion and Sediment Control

The educational cornerstone of IECA has long been erosion and sediment control. This wide-ranging track encompasses many of the long-standing technology sections that have been a part of the association's educational offerings. Topics in this track include erosion and sediment control BMPs, SWPPP management, vegetative establishment, wind erosion, slope technology, inspecting, monitoring and maintenance and professional certifications. This track also includes construction stormwater-related business and legal issues.

Areas of Focus

- **Wind Erosion**
  - Dust Suppression
  - Wind Erosion Control Methods
  - Construction/Demolition Controls
- **Slope Technology**
  - Mechanically Stabilized Embankments
  - Cellular Confinement Systems
  - Rolled Erosion Control Products
  - Retaining/Gravity Walls
  - Benching
  - Serrated Cut Slopes
  - Soil Bioengineering
  - Incremental Vegetation (Temporary or Permanent)
  - Monitoring & Maintenance
  - Gabions
- **Vegetative Establishment**
  - Selection & Criteria for Grass & Seed Woody Mixes
  - Mulches
  - Tackifiers
  - Live Plants & Nursery Stock
  - Fertilizers
  - Soil Amendments
  - Application Techniques
- **SWPPP Management**
  - Sequential Grading Plans
  - SWPPP Preparation
  - Hydraulics & Hydrology
  - RUSLE2
  - Historic Preservation
- **Erosion & Sediment Control BMP's**
  - Erosion Controls
    - Velocity Controls
    - Vegetative Establishment for Construction Sites
    - Temporary
    - Permanent
    - Emergency
    - Stabilization Techniques
    - Vegetation Preservation
  - Sediment Controls
    - Sediment Trap Design
    - Perimeter Controls
  - Solid Waste Management
  - Hazardous Materials
  - Selection & Maintenance
- **Construction Inspection, Monitoring & Maintenance**
  - Certification Courses
    - CISEC
    - CESSWI
    - State/DOT/Local Programs
  - ELG's
  - Monitoring and Reporting
- **Professional Certification**
  - CPESC
- **Research and Development**
- **Business and Legal Issues**

IECA's Education Department is dedicated to providing you with as much assistance and information as possible for successfully participating in Environmental Connection 2015. Please refer questions to Joanna Fetherolf - joanna@ieca.org, 303-640-7554 or 800-455-4322.

European Conference in Geo-Environment and Construction, October/November 2015, Tirana, Albania, Prof. Dr. Luljeta Bozo, lulibozo@gmail.com; luljeta_bozo@universitetipolis.edu.al

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

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

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

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

2015 6th International Conference Recent Advances in Geotechnical Engineering and Soiul 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

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84th ICOLD Annual Meeting
May 2016, Johannesburg, South Africa
www.sancold.org.za/index.php/activities/icold-annual-meeting-2016

7th In-Situ Rock Stress Symposium 2016
An ISRM Specialised Conference
10-12 May 2016, Tampere, Finland
www.ril.fi/en/international-conferences/rs2016-symposium.html

Contact Person: Erik Johansson
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Finnish ISRM Group and Finnish Association of Civil Engineers - RIL

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

Contact

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

EUROCK 2016
ISRM European Regional Symposium
Rock Mechanics & Rock Engineering: From Past to the Future
29-31 August 2016, Ürgüp-Nevşehir, Cappadocia, Turkey
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Turkish National Society for Rock Mechanics
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3rd ICTG
International Conference on Transportation Geotechnics

4 - 7 September 2016, Guimaraes, Portugal
www.spgeotecnia.pt/cpgt

The Transportation Geotechnics International Conference series began under the auspices of ISSMGE-TC 3 and was initiated in 2008 at the University of Nottingham, UK, as an International event designed to address the growing requirements of infrastructure for societies. The 2nd International Conference on Transportation Geotechnics took place in 2012, at Sapporo, Japan, under the ISSMGE-TC202 that follows the TC-3 activities for the period 2009-2013. To continue the successful of these conferences and the output of ISSMGE-TC-202, the 3rd was scheduled for 2016, at Guimarães, Portugal. Following the previous one, the challenges addressed by this conference will include a better understanding of the interactions of geotechnics on roads, rails, airports, harbours and other ground transportation infrastructure with the goal of providing safe, economic, environmental, reliable and sustainable infrastructures. The

3rd ICTG will be composed of workshops and several types of sessions, as well as a technical exhibition, to better disseminations of findings and best practices. A special attention will be paid to the publication of all the peer review papers, some of them in specialised international journals. On behalf of the organizing committee I am honoured to invite you to the 3rd ICTG in the City of Guimarães, UNESCO World Heritage (September 4-7, 2016).

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EuroGeo 6 – European Regional Conference on Geosynthetics
25 – 29 Sep 2016, Istanbul, Turkey
eguler@boun.edu.tr

ARMS 9
9th Asian Rock Mechanics Symposium
ISRM Regional Symposium
October 2016, Bali, Indonesia
rkw@mining.itb.ac.id

Contact Person: Dr Ridho Wattimena
Indonesian Rock Mechanics Society (IRMS)
Telephone: +22 250 2239

6th Asian Regional Conference on Geosynthetics
November 2016, New Delhi, India
uday@cbip.org

11th International Conference on Geosynthetics (11ICG)
16 - 20 Sep 2018, Seoul South Korea
csyoo@skku.edu

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

'This is devastation': Toxic British Columbia mine spill compared to Exxon Valdez disaster

A ruptured dam in a Canadian mine released 4.5 million cubic meters of toxic silt and 10 million cubic meters of water into a nearby lake on Monday, with local First Nations activists already comparing the incident to other disasters, the *Seattle Post-Intelligencer* reported.

"Like the Exxon Valdez, Mount Polley will be synonymous with one of the most disastrous environmental events in British Columbia," Grand Chief Stewart Phillip of the Union of B.C. Indian Chiefs said in a statement. "The frightening fact is both environmental disasters could have been prevented by vigorous government oversight by an effectively resourced agency bound by robust legislative and environmental safeguards."

The breach at the Mount Polley Mine tailings dam reportedly follows years of neglect by its operator, Imperial Mines. Imperial and provincial lawmakers in British Columbia, where the mine is located, have clashed with First Nations communities since the country's Supreme Court granted the Aboriginal First Nations of Canada new rights over ancestral lands like those in the Cariboo Region.

The dam's breach has allowed the toxic materials to spill into Polley Lake, which in turn drains into Quesnel Lake, which is near a heavy spawning ground for sockeye salmon.

"This is devastation," Tsihqot'in Tribal Council member Joe Alphonse said in a separate statement. "This year we are expecting over 2 1/2 million salmon to return with this run just entering the Fraser River. This is the worst situation at the worst time possible. The company will be held accountable."

The Vancouver Sun reported on Wednesday that Imperial Metals has been ordered by the Canadian Ministry of Environment to provide a report on the types of substances released by the breach, as well as the "initial impacts" and details on how it monitored the dam.

The company also has until Aug. 15 to file an analysis of the spill's long-term consequences for wildlife and water quality, and has been threatened with fines of up to $300,000 and six months in jail for violating the orders.

"I apologize for what happened," company president Brian Kynoch was quoted as saying. "If you had asked me two weeks ago if that could happen, I would have said it couldn't happen. So I know that for our company, it's going to take a long time to earn the community's trust back."

Watch aerial footage of the damage done by the toxic spill, as posted by Global News on Monday on https://www.youtube.com/watch?v=vg3yd8GPSnA

(Arturo Garcia / THE RAW STORY, August 6, 2014, http://www.rawstory.com/rs/2014/08/06/this-is-devastation-toxic-british-columbia-mine-spill-compared-to-exxon-valdez-disaster)

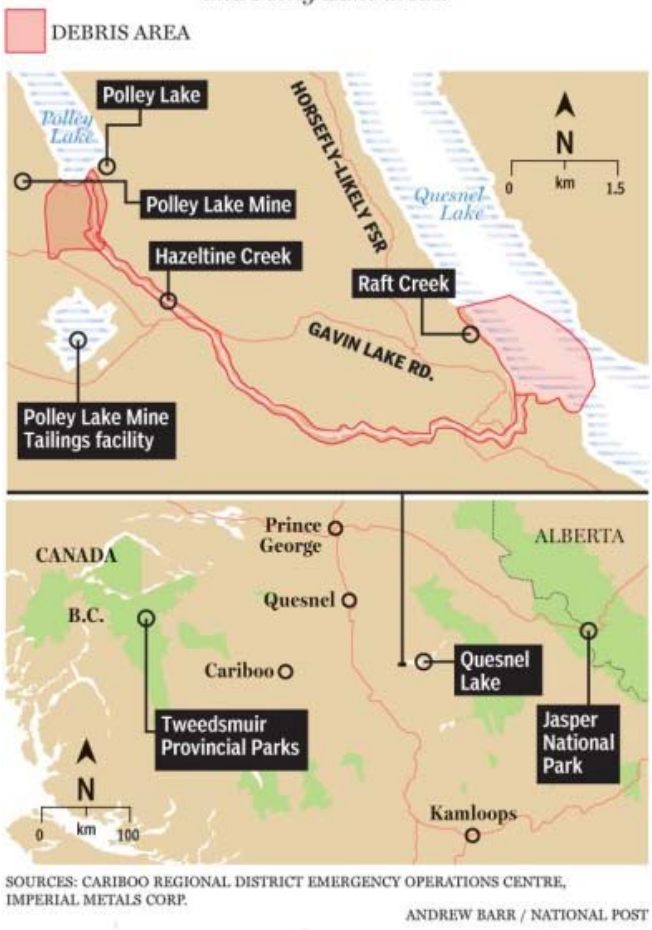
The tailings pond dike breach near the town at the Polley Mountain mine site in B.C. is pictured Tuesday August, 5, 2014. An early assessment of the environmental impact of a mine tailings pond failure in British Columbia is expected Thursday when the first water-testing results may be released. (Jonathan Hayward /The Canadian Press)

http://www.cp24.com/news/testing-after-b-c-mine-tailings-spill-shows-metals-within-water-guidelines-1.1949514#ixzz39oYg6p1S

http://www.theglobeandmail.com/news/british-columbia/bc-mine-had-issues-with-rising-waste-water-ahead-of-breach-consultant-says/article19920040

MINE WASTE LEAK FORCES WATER-USE BAN IN B.C.

Possible contamination after a breach in Imperial Metals' Polley Lake Mine's tailings pond sends millions of cubic metres of waste into the Quesnel and Cariboo rivers systems. An advisory has been issued to not drink water in the Quesnel Lake, Cariboo Creek, Hazeltine Creek and Polley Lake areas.



Frame grab from Cariboo Regional District video. An aerial view of the Mount Polley Mine tailings pond shows the area where the earthen wall gave way early Monday, morning, sending five million cubic metres of copper and gold mining wastewater into waterways near Likely, B.C.

http://business.financialpost.com/2014/08/05/imperial-metals-shares-tailings-spill

Sink-holes around the world

Dunedin, Florida

The rear portion of a residential home is consumed by a sink-hole November 14, 2013. According to reports, the large sink-hole began to form between two houses the morning of November 14, and grew to size of about 30 feet wide by 30 feet deep

Clermont, Florida

A building sits partially collapsed over a sink-hole at Summer Bay Resort near Disney World on August 12, 2013. The 40 to 60 foot sink-hole opened up under the resort building reportedly begining late August 11 into early August 12. There were no injuries or deaths reported

Shenzhen, China

Rescuers prepare to move a dead body found in a sink-hole on a road on May 21, 2013. Five people died when a 33 feet wide sink-hole opened up at the gates of an industrial estate in Shenzhen, the southern Chinese boom town neighbouring Hong Kong

Chicago, Illinois

Workers prepare to pull a truck from a sink-hole that opened up on a residential street in the South Deering neighborhood on April 18, 2013. The driver of the truck was hospitalized after driving into the 15-feet-deep hole while on his way to work. Two other vehicles were also swallowed by the sink-hole

Guangzhou, China

Workers use machinery to fill in a sink-hole that buildings collapsed into near a subway construction site. The hole measured about 1,000 square feet across and was around 30 feet deep, but no one was killed, according to a state media report

Guatemala City, Guatemala

A man inspects a sink-hole formed in a house on July 19, 2011 in the north of Guatemala City. When neighbors heard the loud boom overnight they thought a cooking gas canister had detonated. Instead they found a deep sink-hole the size of a large pot. The sink-hole was 40 feet deep and 32 inches in diameter.

The Dead Sea, Israel

Sink-holes created by the drying of the Dead Sea, near Kibbutz Ein Gedi, on November 10, 2011

Beijing, China

Workers use excavators to fill in a sink-hole which occured overnight on Shiliuzhuang road, in Beijing on April 26, 2011. A section of the road collapsed beneath a truck,

slightly injuring the driver and a passenger, who both jumped out of the vehicle before it sank into the hole

Chevy Chase, Maryland

Utlity workers examine the scene of a car caught in a sink-hole caused by a broken water main, which collapsed part of Friendship Blvd. on December 3, 2010. No one was reported injured in the accident

http://www.independent.co.uk/news/uk/home-news/car-swallowed-by-30ft-sinkhole-in-high-wycombe-9102783.html

Σοβαρές ζημιές από νεροποντή στην Ιερά Μονή Μεγίστης Λαύρας

Σήμερα τα ξημερώματα της Πέμπτης (7 Αυγούστου) στις 1:30 λόγω δυνατής νεροποντής υποχώρησε μέρος από την εσωτερική βορειοανατολική πτέρυγα στην Μονή της Μεγίστης Λαύρας.

Η πολύ δυνατή βροχή άρχισε νωρίς το βράδυ στις 10:00 με δυνατούς νότιους ανέμους που έφτασαν και τα 11 μποφόρ.

Στο σημείο κάτω από το κτίριο εκτελούνται έργα για την αποκατάσταση της Βιβλιοθήκης και του Σκευοφυλακίου.

Η δυνατή βροχή παρέσυρε τα θεμέλια του κτιρίου - ξενώνα στη βορειοανατολική πλευρά της Μονής, με αποτέλεσμα να κατεδαφιστεί μέρος του δίχως να φιλοξενεί ευτυχώς κόσμο.

Στο κτήριο στεγάζονταν η Ιματιοθήκη της Μονής και κελιά που φιλοξενούν μοναχούς προσκυνητές.

(athosnews, Παρασκευή 08 Αυγούστου 2014, Φωτογραφίες Θεολόγος μοναχός, http://romfea.gr/agioreitika-nea/25832-2014-08-08-08-12-38)

(σ.σ. Προφανώς δεν έφταιγε η νεροποντή αλλά η παντελής έλλειψη αντιστήριξης κατακόρυφου πρανούς εκσκαφής, ύψους 5 m περίπου με μεγάλα φορτία ακριβώς πάνω στο χείλος του πρανούς. Ενδεχομένως να μην αστόχησε το φυσικό πρανές, αλλά η θεμελίωση του κτιρίου, όπως φαίνεται στις φωτογραφίες. Είναι ορατή η παραμόρφωση που έχει υποστή ολόκληρο το οικοδόμημα στον διαμήκη άξονα).

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Antarctic icequakes triggered by the 2010 Maule earthquake in Chile

Zhigang Peng, Jacob I. Walter, Richard C. Aster, Andrew Nyblade, Douglas A. Wiens &Sridhar Anandakrishnan

Seismic waves from distant, large earthquakes can almost instantaneously trigger shallow micro-earthquakes and deep tectonic tremor as they pass through Earth's crust (Peng, Z. & Gomberg, J. An integrative perspective of coupled seismic and aseismic slow slip phenomena. *Nature Geosci.* **3**, 599–607 (2010)). Such remotely triggered seismic activity mostly occurs in tectonically active regions. Triggered seismicity is generally considered to reflect shear failure on critically stressed fault planes and is thought to be driven by dynamic stress perturbations from both Love and Rayleigh types of surface seismic wave (Hill, D. P. & Prejean, S. in *Earthquake Seismology* (eds Beroza, G. & Kanamori, H.) Ch. 78,1–32 (Treatise on Geophysics Series 2nd edn, Vol. 4, in the press, 2014)). Here we analyse seismic data from Antarctica in the six hours leading up to and following the 2010 M_w 8.8 Maule earthquake in Chile. We identify many high-frequency seismic signals during the passage of the Rayleigh waves generated by the Maule earthquake, and interpret them as small icequakes triggered by the Rayleigh waves. The source locations of these triggered icequakes are difficult to determine owing to sparse seismic network coverage, but the triggered events generate surface waves, so are probably formed by near-surface sources. Our observations are consistent with tensile fracturing of near-surface ice or other brittle fracture events caused by changes in volumetric strain as the high-amplitude Rayleigh waves passed through. We conclude that cryospheric systems can be sensitive to large distant earthquakes.

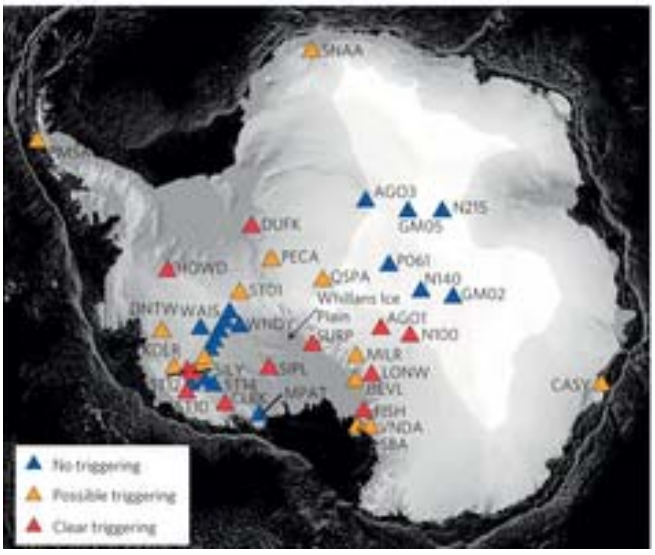


Figure 1: The study region in Antarctica and station HOWD, which exhibited the clearest triggering signal (seismic stations where triggering clearly occurs - red, some signals may be present but status is ambiguous - orange, and no triggering observed – blue during the passage of the Rayleigh waves generated by the Maule 2010 earthquake)

(Nature Geoscience Letter (2014), 10 August 2014, http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo2212.html)

Giant Crack Appears in Earth in Mexico

An earthquake or a leaking levee may be behind the appearance of a kilometre-long trench near Hermosillo.

Video footage has emerged of a kilometre-long crack thought to have been triggered by an underground stream in northwest Mexico.

The eight-metre (26ft) deep trench opened up last week and severed Highway 26 between Hermosillo and the coast.

Captured by Hermosillo Desde El Cielo**,** the footage was shot by a drone flying along the length of the trench, which is up to five metres (16ft) across.

The crack is up to 8m deep in places. Pic: Hermosillo Desde El Cielo

Farm workers and vehicles have been forced to go around the area due to the unstable ground. Another crack was reported to have opened near Highway 4 in the same area.

Geological investigations are under way into the cause of the crack, according to El Imparcial newspaper.

An earthquake last Sunday may have triggered the crack

The civil protection unit said the fissure could have been triggered by an earthquake last Sunday.

The newspaper added that an investigation found that farmers in the area had built up a levee to contain rain-water which had begun to leak, causing an underground stream which undermined the earth above it until it col-lapsed.

(Video: Kilometre-Long Trench Appears In Mexicosky NEWS, Thursday 21 August 2014, http://news.sky.com/story/1322555/giant-crack-appears-in-earth-in-mexico)

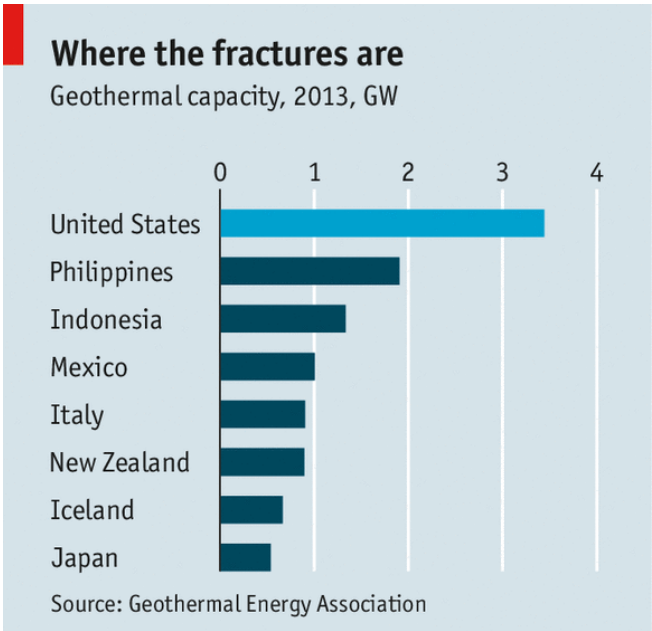
ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Geothermal energy
Hot rocks
Why geothermal is the new fracking

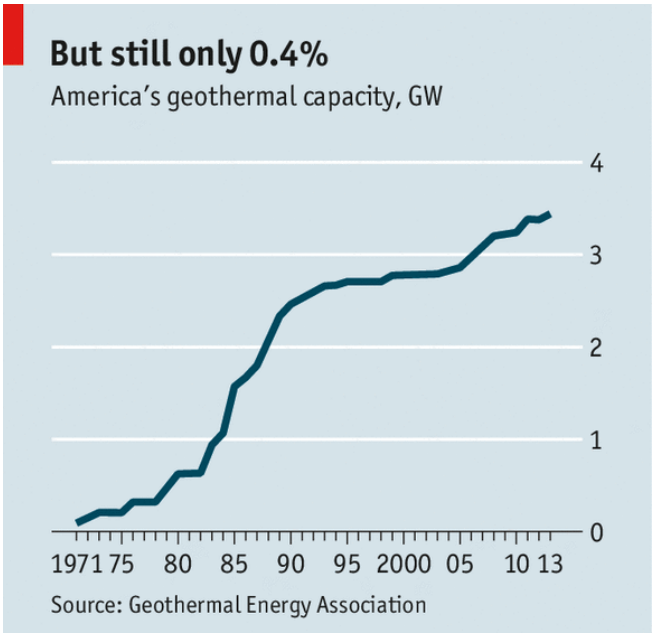
DEPENDING on your point of view, hydraulic fracturing—or "fracking"—is either the future of clean, natural gas or an environmental apocalypse. Fracking liberates gas trapped underground by drilling sideways from vertical well-shafts into horizontal layers of shale rock. Millions of gallons of a cocktail of water, sand and chemicals are injected into the horizontal wells at high pressure, fracturing the shale, releasing the gas—and causing violent protests in Europe and parts of America.

Geothermal energy, by contrast, has yet to stir much controversy. Most geothermal plants are located where water has seeped down into the Earth's crust, been heated and forced back up through permeable rock. Drill a well to between 3,000 and 12,000 feet, and the searing water and steam can be released to drive generators.

Geothermal is a minnow among power sources. America has the world's highest installed capacity of geothermal generating plants—3.4 gigawatts' worth at last count (see first chart)—but they generate only 0.4% of its electricity (see second chart). New "enhanced geothermal systems" (EGS), however, look set to make geothermal a bigger contributor—and potentially as controversial as shale.



The industry may dislike the comparison, but EGS is geothermal fracking. Millions of gallons of water and chemicals are injected into mostly vertical wells at relatively high pressure, and the combination of cold-meets-hot, pressure and chemistry shears the deep, hot rock. This creates new "fracture networks" through which water can be pumped, heated and sent back to the surface to generate power. Conventional geothermal wells cost at least $5m to develop, and about half fail. The new technique can reduce the failure rate and extend the size and life of existing geothermal fields. In time, think EGS fans, it will allow geothermal fields to be established wherever there is suitable hot rock.



Doug Hollett, who oversees geothermal policy at the US Department of Energy, is one such fan. He points to a project the department worked on with Ormat, a leading geothermal firm, in Desert Peak, Nevada, where EGS boosted the productivity of an existing field by 38%; it also became the first EGS project to supply America's power grid. Mr Hollett calculates that EGS adds capacity to existing fields at a cost of 2-5 cents per kilowatt-hour; for low-cost natural gas the equivalent is 6-7 cents. The department reckons that with EGS techniques, geothermal could eventually meet 10% of America's electricity needs.

Investors are intrigued but wary. AltaRock Energy, a Seattle-based company partly financed by Khosla Ventures, a venture-capital firm, has built a demonstration project in Oregon which it claims can extract six to ten times as much power from a field as older EGS techniques.

The sticking-point, says Susan Petty, AltaRock's founder, is commercialisation. Geothermal is a steady source of energy (unlike windpower), has very high capacity-utilisation rates, zero fuel costs and near-zero greenhouse-gas emissions. The trouble is that successful existing geothermal plants do not need EGS, and for many failed wells it is uneconomic to introduce it. So with the help of an as-yet unnamed partner, AltaRock plans to buy up existing fields that it thinks it could make profitable using its version of EGS. That way it will avoid the costs of new infrastructure while demonstrating its technology's viability.

The energy department reckons that EGS techniques could be commercially viable as soon as next year, at which point more private investors and perhaps utilities might pile in. It is not alone in its optimism: Germany, France and Britain have state research programmes for EGS.

All this has environmentalists gearing up for another fight. EGS can trigger earthquakes. Most are minuscule but an early project on a seismic fault in Basel, Switzerland was scrapped after several not-so-small quakes. It is also possible that water used for EGS may leak, contaminating surface waters or soil. America has rules to ensure EGS's safety, and every project is surrounded by seismometers. Whether this will prevent protests or prohibitions is open to hot debate.

(The Economist, Aug 16th 2014 - from the print edition, http://www.economist.com/news/business/21612193-why-geothermal-new-fracking-hot-rocks)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Ancient Infrastructure Discovered in Italy

Catherine A. Cardno, Ph.D.

Archaeologists working in Ostia, Italy, have discovered a new part of an extensive Roman infrastructure system. Previously, archaeologists thought Ostia lay only to the south of the River Tiber, where ruins still exist, lower right. The new discoveries were made to the north of the river, left. Simon Keay/Portus Project

Archaeologists have discovered an extension of the Roman infrastructure system—believed to date back to the second century A.D.—in the town of Ostia, Italy.

May 13, 2014— Archaeologists working in Ostia, Italy, have discovered a new portion of the extensive infrastructure system that formed part of the ancient Roman transportation system that was used to transport food and goods to Rome from coastal ports. Using geophysical surveying methods, the archaeologists located a previously unknown section of Ostia's town walls, parts of three large warehouses, and a large building of unknown function, which indicate that the port town occupied land both north and south of the River Tiber, approximately 30 km from Rome. The town has been the site of antiquarian and archaeological exploration for the past 500 years and is visited by thousands of tourists every year. The recent discovery redefines existing knowledge of its boundaries, its relationship to the nearby maritime port of Portus, and the development of large-scale transportation infrastructure serving the preindustrial city of Rome.

Ostia has been studied and mapped for centuries, but focused analytic work in Ostia did not begin until the 19th century. Over the last few centuries, however, it has been shown to be "one of the most important Roman sites in the Mediterranean," because of its status as the river port of Rome, according to Simon Keay, Ph.D., a professor of archaeology and the associate dean of research and enterprise at the University of Southampton.

The discoveries are part of the Portus Project, an archaeological project funded by the Arts and Humanities Research Council of the United Kingdom. It is led by Keay and the University of Southampton, in collaboration with the British School at Rome; Martin Millett, Ph.D., a professor of archaeology at the University of Cambridge; and Paola Germoni and Angelo Pellegrino of the Soprintendenza Speciale per I Beni Archeologici di Roma, the governmental body responsible for managing the archaeological heritage of Rome, Ostia, and Portus. The detailed survey and analysis were undertaken by Kristian Strutt, a geophysicist at the University of Southampton.

Prior to the recent discovery, it was thought that Ostia had developed only to the south of the River Tiber, along the coastline of the Tyrrhenian Sea. The town of Ostia, along with the nearby maritime port of Portus, formed part of a crucial transportation link for food and supplies heading from the sea to Rome. A 2 km piece of land, known as the Isola Sacra, separates Ostia and Portus. It is here that the new discoveries were made.

From the beginning, "Ostia initially played a very important role as the river port of Rome," Keay says. "And through until the early first century A.D., it had played a role as a conduit through which supplies from across the Mediterranean came to Rome." Large ships offloaded cargoes at Puteoli, on the bay of Naples, and then transferred them onto smaller ships that sailed up the coast to Ostia, whereupon the cargo was stored in warehouses until smaller ships carried it up the river to Rome, according to Keay.

"The population of Rome at this time was about 800,000 to a million people, and the indications are that as you move into the first and second centuries A.D., the population in Rome probably got even bigger and the state needed to provide for more and more foodstuffs to ensure that people were fed," Keay says. "So the Roman state had to undertake major infrastructure development." This is known to have included the establishment of Portus by Emperor Claudius as well the development of canals linking it to the River Tiber.

"I personally think—although I can't prove it yet—I think that these warehouses were built probably in the early second century A.D. and are part of a big boom of building warehouses that happened at Ostia," Keay says. "And this is a time that coincides with an enlargement of Portus by the Emperor Trajan."

Using magnetometry to scan the earth for variations in magnetic signatures, the archaeologists discovered parts of three large warehouses, a large building of unknown function, and a previously unknown section of Ostia's town walls that included the footprint of tower sections measuring 6 m by 8 m, all shown in red. Digital Globe, Inc.

With the recent discovery that the Ostia town wall and three warehouses were located to the north of the River Tiber, "we now have to rethink the overall plan of the city [of Ostia]: It's much bigger than we thought, and the provision for storage is much greater," Keay explains. "The River Tiber runs through the middle of it rather than bordering its northern side. And that's actually a big deal in a major classical city like this."

Rather than Ostia being a growing town, which expanded across the river when it became necessary, "all the indications are that the wall was put up around the whole town at the same time, which means that the Romans themselves from quite an early time—the mid-first century B.C.— saw the urban area as including the southern part of the Isola Sacra."

"So much scholarship over the last 80 years now has to be rewritten in terms of what this actually means in terms of the development of the town," Keay says. "We're now just beginning to understand the complexity of this [warehousing infrastructure], and trying to understand how a complex system like this actually succeeded in feeding well over a million people for over 400 years in a preindustrial society."

The discovery was made without excavations; instead, archaeologists used magnetometry to measure localized variations in the earth's magnetic field, according to Keay. "The magnetometer is a sensitive enough instrument that it can pick up the very, very minor differences between the altered, buried structure and the surrounding earth's magnetic field within the soil overlying an archaeological site," Keay says.

While magnetometry is a method that has been used in archaeology for the last two or three decades, in the last 10 years it has become a preferred technique "because it's very, very quick," Keay says. "It also has radically transformed the way we study and understand archaeological sites and their surrounding landscapes."

Although the technique is noninvasive, it is limited, he notes. It measures only magnetic anomalies up to approximately 1.2 m below the ground's surface, and the more open a field, the easier it is to take readings, he notes. Overgrowth or recently plowed fields can affect the ability of the operator to take readings and the readings themselves.

To map an area, a precise grid—typically measuring 30 m—is laid out so that multiple passes can be made by magnetic measurements, Keay explains. Archaeologists then systematically traverse the grid taking readings approximately every 25 cm as they walk strips of the grid measuring approximately 0.5 m wide.

"Once [the raw data] has been downloaded…you get a very crude image of magnetic anomalies of different strengths," Keay says. The raw data are then run through a series of filters to compensate for any temperature variations during the survey, and for any "spikes" that might have been caused by pieces of metal or other material in the ground where the readings were taken. "Eventually you come out with relatively clean images…rather like a map," he says.

"Everything up until that point is relatively straightforward in the sense that the final results are the result of a clear and objective procedure," he says. "Then the difficult part comes in: interpretation."

Because of existing ruins at Ostia—including portions of the town wall and warehouses of similar shape and size to the south of the River Tiber—interpretation of the results to the north of the River Tiber was "very straightforward" in this instance, Keay says. This is certainly not always the case, particularly in areas that have been built, and overbuilt, over the centuries.

"At Ostia it looks to me as if before the construction of the warehouses, there was probably little there, and to be honest, there was very little there subsequently, so it was quite simple" to pick out the characteristic shape of the warehouses, Keay says.

The readings that have been interpreted as indicating the presence of the town wall were "an unmistakably high magnetic anomaly," Keay says, which extended in a straight line for approximately 540 m with a series of massive 6 m by 8 m tower projections picked up by the magnetometer. With that kind of signature, "What else could it be?" he asks. "It's too big for an aqueduct…[and] it's not a road, [because] roads don't give that kind of signature."

Recognizing what has been picked up by the magnetometer is a combination of experience and analysis of the location and surrounding artifacts, Keay says. When the readings are so clear, however, "it hits you like a bolt out of the blue," he says. "It can't be anything else."

http://www.asce.org/CEMagazine/Article.aspx?id=23622330844#.U3O5NNJ_t6E

Γέφυρα Ρίου – Αντιρρίου

https://www.youtube.com/watch?v=dmwIjpjcPv0

Ορυχεία αλατιού της Αικατερινούπολης

Με έργα τέχνη μοιάζουν τα τοιχώματα στα εγκαταλελειμμένα ορυχεία αλατιού της Αικατερινούπολης!!!

Η ρωσική πόλη Αικατερίνεμπουργκ ή αλλιώς Αικατερινούπολη έγινε γνωστή σε ολόκληρο τον κόσμο, όταν κατά τη ρωσική επανάσταση, στις 17 Ιουλίου 1918, ο τσάρος Νικόλαος Β' της Ρωσίας και η οικογένειά του εκτελέστηκαν σε ένα από τα σπίτια της πόλης.

Αυτό που δεν είναι γνωστό στο ευρύ κοινό είναι τα εγκαταλελειμμένα ορυχεία που βρίσκονται κάτω από την πόλη και σε βάθος σχεδόν 200 μέτρων...

Τα ορυχεία αλατιού, που ήταν άλλοτε ενεργός πόρος της Ρωσίας, έχουν σταματήσει να λειτουργούν εδώ και χρόνια και πλέον έχουν γίνει πόλος έλξης για τα... ψυχεδελικά σχέδια που έχουν αποτυπωθεί στους τοίχους!

Τα εντυπωσιακά σχέδια, που μοιάζουν με έργα τέχνης και που καλύπτουν ολόκληρο το παλιό ορυχείο, έχουν δημιουργηθεί από την ύπαρξη του ορυκτού καρναλίτη, ενός ορυκτού του μαγνήσιου που χρησιμοποιείται στη βιομηχανία λιπασμάτων, που έχει χρωματίσει τους βράχους.

Μόνο ένα μικρό μέρος του ορυχείου λειτουργεί ακόμα, ενώ η είσοδος στο λαβύρινθο των στοών που επεκτείνονται για χιλιόμετρα κάτω από το έδαφος δεν είναι προσβάσιμος στο κοινό και η είσοδος σε αυτά επιτρέπεται μόνο με ειδική άδεια από τις ρωσικές αρχές.

The road repairs backlog is growing, despite the industries effors to 'do more for less'

Cat compaction control uses in-cab electronics to tell the operator when an area is fully compacted

Will the future of highways maintenance involve robots more than people? Contractors and plant manufacturers have been working on innovations to improve the road repairs process – and the most futuristic example of late is Amey's 'robot'.

As first reported in April, the firm has invested £500,000 on two road patchers (which it claims can fix potholes in two minutes) plus a high-speed sweeper, for its maintenance contracts. The machines are currently working on Amey's asset support contracts for the Highways Agency in East Anglia and eastern England.

The road patcher machines, which were custom-built for Amey, can be fully controlled from the cab. The driver op-

erates a robotic arm which extends from the cab over the pothole and fills it with material to fix the hole.

The Brodd Europa high-speed sweeper, which sweeps at 20km/h, is also new to the UK.

However, Amey is not alone. Skanska is also trying to bring Swedish thinking to the UK with another cab-controlled patching machine.

Skanska's patcher uses hot bituminous emulsion, which binds well with the existing road. There is also a flame heater at the front for use on colder days to provide extra heat. Skanska has been trialling the machine on four of its road maintenance contracts and is now evaluating the results.

"The trial went very well," says Gregor Craig, Skanska's infrastructure services managing director. "Speed is the main advantage - it takes two minutes per hole. The machine is best used in a preventative approach - dealing with small damaged areas before they become proper potholes. "It is much safer as there is no need for a gang on the road. The process is controlled entirely by just one operator in the cab." Craig says Skanska is "working out the economics" of bringing more machines over to the UK, but adds he "would be very surprised if we don't start using them more widely."

Another Swedish creation which has helped highways maintenance crews in Scandinavia – though is less common in the UK – is the tiltrotator excavator attachment. This allows greater scope of movement without the need to move the base machine thus making tricky utilities excavating work quicker, more efficient and safer. Jobs that might normally be done by hand can be performed from the cab. Pat Bulcock, UK managing director of manufacturer Engcon, says: "Based on tiltrotator usage in Sweden, experienced excavator drivers estimate the productivity increase to be somewhere between 10% and 25%."

Another innovation is JCB's new 'Potholemaster', based on its backhoe loader. Equipped with a planing attachment at the rear, the machine grinds away the surface of the pothole and surrounding road and then drives backwards and forwards, sweeping up the loose material before repairing the hole with blacktop.

Caterpillar's UK dealer Finning believes greater technological sophistication will improve the efficiency of the highways maintenance process further. Robert Doble, paving product manager at Finning, says: "We have historically relied heavily on the skills of the operators of compaction and asphalt equipment. But it has traditionally been very difficult to gauge whether the right level of compaction has been achieved without manual testing. More often than not an additional pass is done just in case, generally for peace of mind.

"Through the launch of the latest models - compactors in particular – we can deliver relevant performance information to the operator. This has been made possible thanks to key advances in telemetry and onboard systems connected to sophisticated sensors."

Caterpillar's answer is 'Cat compaction control' which allows the operator to see when an area has been fully compacted and when to stop working. "From field tests carried out on motorway-style roads in America, this technology allowed the operator to reach the required compaction level in 75% less time than it took using previous methods," Doble says.

(Will Mann / The Construction Index, 31 July 2014, http://www.theconstructionindex.co.uk/news/view/robot-revolution)

11 of the Most Groundbreaking Structures of the Year

Every year the Institution of Structural Engineers picks out the most interesting pieces of structural engineering out there, highlighting an aspect of design that tends to get overlooked. Today, it announced its picks for 2014 — and one is in Melbourne.

Keep in mind, this is just the shortlist; the final winners will be announced later this year. But in a way the shortlist is more fun, since we get to see more projects. Check out a few of the ridiculously cool structures below.

The Apple Store in Zorlu
engineered by Eckersley O'Callaghan

It's no surprise that an Apple store made it onto the list this year, since the company has always focused on using unusual structural details in its stores (for example: glass staircases). This store in Istanbul uses some of the biggest, strongest plate glass around, with absolutely no fixings:

Clear glazed single panel walls with no connections to distract the eye, 10m long by 3m high on four sides, provide an efficient structural form capable of resisting seismic loads, while providing total transparency and architectural purity. The lightweight ultra-thin roof made of CFRP panels (carbon fibre reinforced plastic) seamlessly joined on site, provides a completely smooth uniform soffit while also improving the seismic performance of the whole structure. In such a minimalist project the detailing required particular attention, the result being a total absence of fixings, with the five panels being held together by structural silicone.

Lowther Castle
engineered by Ramboll UK

This country home was designed in the 1800s, but was crumbling by the 1950s. Now, it's being converted and infilled to its former glory:

The castle walls were stabilised and the stables converted for visitor centre, café, shop, and holiday flats. Ramboll replaced unsightly external steelwork propping the castle walls with neatly hidden internal strengthening. Considerable structural alterations were needed to accommodate the new uses, all carried out with exemplary care, preserving the 19th century appearance. A good piece of careful conservation.

Forth Bridge
engineered by Pell Frischmann

Painting a complex, historic bridge isn't just about aesthetics — it's also vital for the structure itself. And figuring out how to do it has been a two decade-long process:

Twenty years ago Pell Frischmann were asked to find a solution. They carried out condition surveys, often by rope access, and analysed the degrees and rates of corrosion. Complex computer programmes proved, fortunately, that the bridge was strong enough. Repairs and paint systems were researched and specified, and carried out in weatherproof enclosures whose loads on the structure had to be checked. Finally it is finished and the bridge has a coating that should last for 25 years.

Wilhelma Zoo Stuttgart's Enclosure for African Apes
engineered by Weischede, Herrmann und Partner

A ridge-like tensile netting and a faceted concrete viewing structure create an interesting, cave-like setting for viewing apes:

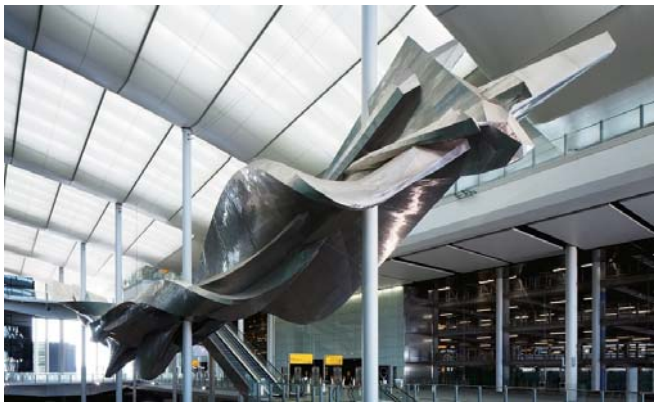
The internal accommodation of the new enclosure for African apes takes the form of an artificial ridge. This reinforced concrete spine building follows and S-shape on plan between groves of trees integrated into the zoo landscaping: with its thermal mass contributing passively to the internal climate control. Its solidity sits in contrast to the lightweight stainless steel mesh of the 2200m2 external bonobo enclosure supported on 13 pylons which also serve as climbing frames for the apes.

Melbourne Star Observation Wheel Rectification Design engineered by Arup

Melbourne's observation wheel opened more than six years ago, but engineers realised that design defects made it dangerous. The process of fixing it fell to Arup:

Following the original opening of the Southern Star Observation Wheel's operations in December 2008, defects manifested themselves which resulted in the closure of the Wheel in January 2009.

Slipstream, Heathrow Terminal 2, London, engineered by Price & Myers

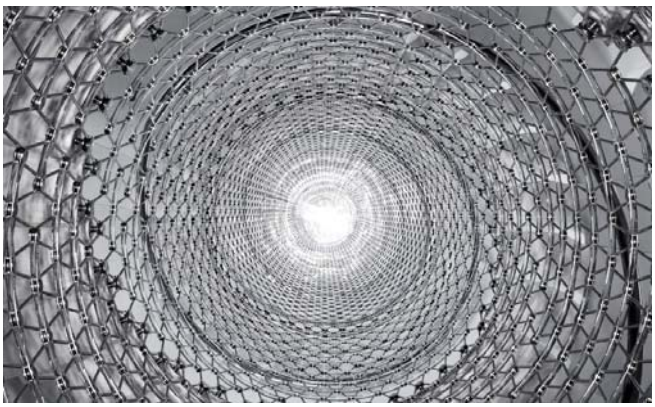


Getting this huge sculpture to hang from Terminal 2 of Heathrow was no small feat:

Nearly 78m long, and weighing 77 tonnes, this is the longest permanent sculpture in Europe, made from around 32,000 unique, digitally fabricated aluminium, plywood and steel parts. Construction was pre-fabricated throughout with 23 pre-made cassettes, each weighing between 3-4 tonnes, brought to site for installation.

The Miles Stair at Somerset House engineered by Techniker

The core of this cantilevered staircase is woven from thin steel string:



The design includes an unusual lightweight central core of fine steel strands and beautifully sculpted cantilever treads using ultra-high-performance concrete. The stair connects four levels of the historic building, incorporating 104 treads. The design is based on a traditional stone stair but arranged to spring not from a surrounding wall, but on the central steel mesh tower. It is designed to last for 120 years.

Kai Tak Cruise Terminal Building
engineered by AECOM Asia

Hong Kong is a major stopping point for the world's cruise ships, and this terminal was designed to show off the city to newcomers:

The 3-storey structure is 850m long with a floor area of 150,000m2, and is designed using innovative concrete bridge construction methods. The prestressed structures are designed to meet the aesthetic requirements with minimal finishes. In-situ and precast concrete is used throughout with a series of long-span box beams that form the structure and the service corridors.

Footbridge over the Bow
engineered by Fast + Epp

Banff is already so beautiful, it's hard for any particular man-made structure to compete. This footbridge is understated visually, but lovely from a structural point of view:

This 80 m clear span footbridge over the Bow River is a new icon for the picturesque and historical Rocky Mountain town of Banff, Canada, that fulfils a one-hundred-year-old plan for a second crossing, while also carrying much needed drainage systems to replace ageing ones below the river in this pristine national park. Achieving the minimal slender form in timber was made possible by controlling vibrations with a pair of unique tuned mass dampers that address both walking and jogging frequencies.

S-House
engineered by Structured Environment

The multi-leveled home is like no house you've ever seen: It has no continuous floor plates, first of all, and no internal columns:

The S-House is a two storey private house in Omiya, Japan on a site just under 90m2. The floors are arranged as quartered area on either side of the central stair core. The interconnection of the floors at the core provides the principal lateral load resisting system for the building. This allows the corner columns to be designed for axial load only and kept to a minimum dimension (44.6mm in diameter).

Lower Hatea River Crossing
designed by Knight Architects

This 265m bridge in New Zealand isn't just a sculptural landmark, it's also an operating lift bridge:

(Kelsey Campbell-Dollaghan / GIZMODO, 2 August 2014, http://www.gizmodo.com.au/2014/08/11-of-the-most-groundbreaking-structures-of-the-year)

How Five of The World's Coolest New Bridges Stay Upright

Last week, we looked at the Institution of Structural Engineers' picks for the best structures of the year. But its annual Structural Awards also has a bridge-only category, the shortlist of which is a great survey of the state of the art in bridge design.

In some ways, bridge design is far more experimental than any other. The race to build further, faster, for less is still driving incredible innovations in the field, just like it did at the dawn of the suspension bridge in the 19th century. Below, take a look at five of the nominees for the highway and railway bridge category and the designs that help them defy gravity.

The Second Penang Bridge

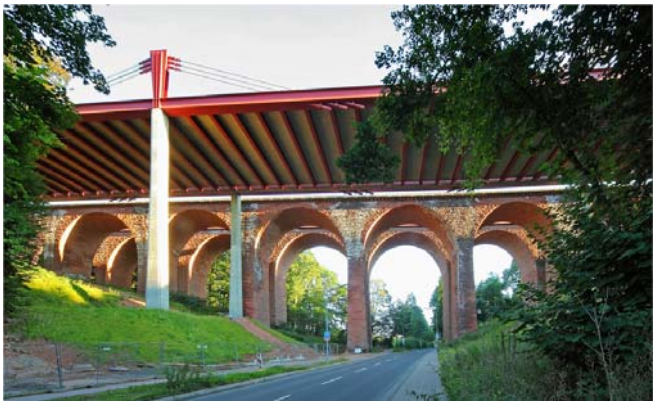
Building the longest sea crossing in Southeast Asia — 24km! — required some pretty unusual engineering. The China Highway Planning and Design Institute designed a system that required boring piles more than 90m into the bedrock below the ocean floor. Those piles, as you might expect, are heavy duty. In the deepest sections of water, they can grow up to more than 1.5m in diameter of tubular steel, and some of them end up being over 127m long.

Baakenhafen Bridge

The unusual edges of this bridge in Hamburg, designed by Buro Happold and architects Wilkinson Eyre, are actually cantilevered over the rest of the bridge, adding extra space for bikes and foot traffic. The bridge itself uses something called an "orthotropic deck," which means the deck of the bridge itself is stiff enough to actually play a roll in the structural profile of the bridge and support vertical weight — a feature that's becoming more and more common in bridges.

But maybe the coolest part? At the very middle of the bridge, there's a 30m wide chunk that can actually be removed. It's not a draw bridge — no, this piece is made to be removable in case there's ever an especially tall ship that needs to pass in the future. Talk about good planning.

Waschmühl Valley Bridge



This bridge was actually an addition to a historic brick arch that carries a highway. To give it more strength, Leonhardt, Andrä und Partner played Dr. Frankenstein to the original arch structure. On top of the simple structure, they created a steel deck bolstered by the cables you see above.

This is called an "extradosed" bridge, a type of structure that's gotten more and more common over the past two decades. Extradosed bridges are hybrids: They use both a box girder (in essence, a column that supports from the ground) and cables, which means that the bridge will often use less material and require less work to keep afloat. In this case, extradosed was a perfect choice for aesthetic reasons: The lower, simpler cable-stayed elements and the thin box girder perfectly underscore the original bridge.

Elbebridge Schönebeck

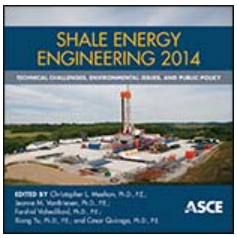
This 3,700-foot long bridge over the Elber River, engineered by Leonhardt, Andrä und Partner, is an exercise in simplicity. Rather than a symphony of systems that work together, it relies on a single, efficient structure: A tall, steel and concrete tower that anchors the cables that keep the deck itself in place. According to the jury, the sheer simplicity of it makes it beautiful. It's "thoughtfully detailed to fit perfectly into the surrounding landscape whilst, at the same time, creating a landmark structure."

Shenyang Hun River Ribbon Bridge

This bridge in Shenyang, China, is interesting because unless you're driving or walking across it, it's hard to see the structural acrobatics going on along its length. See those looping arches on its edges? These are steel arches that actually tilt inward at a crazily steep 17 degrees. What's more, only one of them, at nearly 400 feet wide, connects at the center for extra support. They're supposed to resemble "streamers dancing gracefully and dynamically above the water," according to the jury.

(Kelsey Campbell-Dollaghan / GIZMODO, 5 August 2014, http://www.gizmodo.com.au/2014/08/how-five-of-the-worlds-coolest-new-bridges-stay-upright)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Shale Energy Engineering 2014: Technical Challenges, Environmental Issues, and Public Policy

Edited by C. L. Meehan, J. M. VanBriesen, F. Vahedifard, X. Yu and C. Quiroga

Proceedings of the Shale Energy Engineering 2014 conference, held in Pittsburgh, Pennsylvania, July 21-23, 2014. Sponsored by the Energy Division of ASCE

This collection contains 73 peer-reviewed papers on the technical challenges associated with shale oil and gas development from a civil and environmental engineering perspective.

Topics include: water resources and groundwater management and treatment; environmental issues in water disposal; geotechnical and geological aspects of shale oil and gas; hydraulic fracturing characterization and monitoring; environmental effects and practices in hydraulic fracturing; environmental regulations, risk management, and mitigation; public policy issues related to shale oil and gas; infrastructure development, roadway management, and site development; and pipeline detection, mapping, and monitoring.

These papers will be of interest to both researchers and practitioners in all areas of shale energy engineering.

(ASCE Press, 2014)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ

Geotechnical Research

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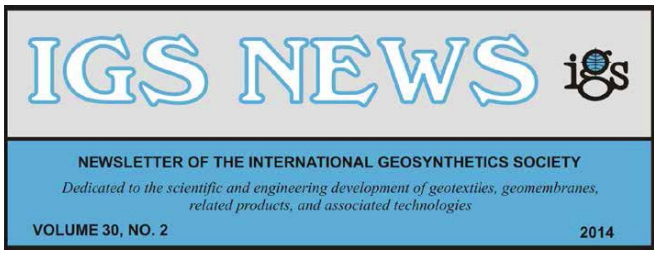
(από το μέλος μας Παύλο Τυρολόγου)

International Society for Soil Mechanics and Geotechnical Engineering

http://www.issmge.org/en/resources/issmge-bulletin/668-vol-8-issue-4-august-2014

Κυκλοφόρησε το Τεύχος 4 του 8ου Τόμου του ISSMGE Bulletin (Αυγούστου 2014) με τα παρακάτω περιεχόμενα:

- Messages from the President and the new Editor-in-Chief.
- REPORTS FROM MEMBER SOCIETIES
  - Austrian Member Society
    50th Anniversary of Danube-European Conferences on Geotechnical Engineering, Vienna 2014, and other activities of the Austrian Member Society of ISSMGE
  - Report from Malaysian Geotechnical Society (MGS)
    Inaugural 1-Day Short Course on "Soil-Structure Interaction in Geotechnical Design" for the new MGS
  - Report from Geotechnical Society of Singapore (GeoSS)
    Education Trip to Kuala Lumpur on 18th/19th April 2014
- REPORTS FROM BOARD-LEVEL COMMITTEES
  - AWAC – ISSMGE Awards
  - Young Member Presidential Group (YMPG)
  - Research Highlights : Cambridge University
  - Regional Report from Australasia
- MAJOR PROJECT
  1st Runner up of the ISSMGE's Outstanding Geotecnical Project Award - Hong Kong Geotechnical Engineering Office
- CONFERENCE REPORT
  2nd International Conference on Information Technology in Geo-Engineering, (ICITG 2014), Durham, UK, 21–22 July 2014
- NEWS
  - Obituary – Professor Charles C. Ladd
  - NEWS from ICE Publishing:
    Issue 2 of open access journal Geotechnical Research - free to ALL to read online now
  - NEWS from TC 203:
    Call for nominations sought for 2014 Young Researcher Award
  - Event Diary
  - Corporate Associates
  - News from Corporate Associates
    Golder Associates Launches Foundation
  - Foundation Donors
  - ISSMGE's International Journal of Geoengineering Case Histories
  - Call for Papers



http://origin.library.constantcontact.com/download/get/file/1111082143825-129/2014-07-igs-news-f2-small.pdf

Κυκλοφόρησε το Τεύχος 2 του 30ου Τόμου των IGS NEWS με τα παρακάτω περιεχόμενα:

- President's Corner - Wrapping Up a Four-Year Plan of Continued Growth
- General Information for IGS Members
  - IGS Election Update
  - Invitation to the 2014 IGS General Assembly, Awards Presentation & Reception
  - Summary of 2013 IGS Chapter Activities
- Conference Reports

- Announcements of Conferences of IGS
- Announcements of Conferences under the Auspices of IGS
- News from the IGS Chapters and the Membership
- List of IGS Chapters
- Official Journals of the IGS
- Corporate Membership – Case Studies
- IGS News Publisher, Editor and Chapter Correspondents
- IGS Council
- IGS Officers
- IGS Membership Application
- Calendar of Events

www.geoengineer.org

Κυκλοφόρησε το Τεύχος #114 του **Newsletter του Geoengineer.org** (Αύγουστος 2014) με πολλές χρήσιμες πληροφορίες για όλα τα θέματα της γεωμηχανικής. Υπενθυμίζεται ότι το Newsletter εκδίδεται από τον συνάδελφο και μέλος της ΕΕΕΕΓΜ Δημήτρη Ζέκκο (secretariat@geoengineer.org).

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