



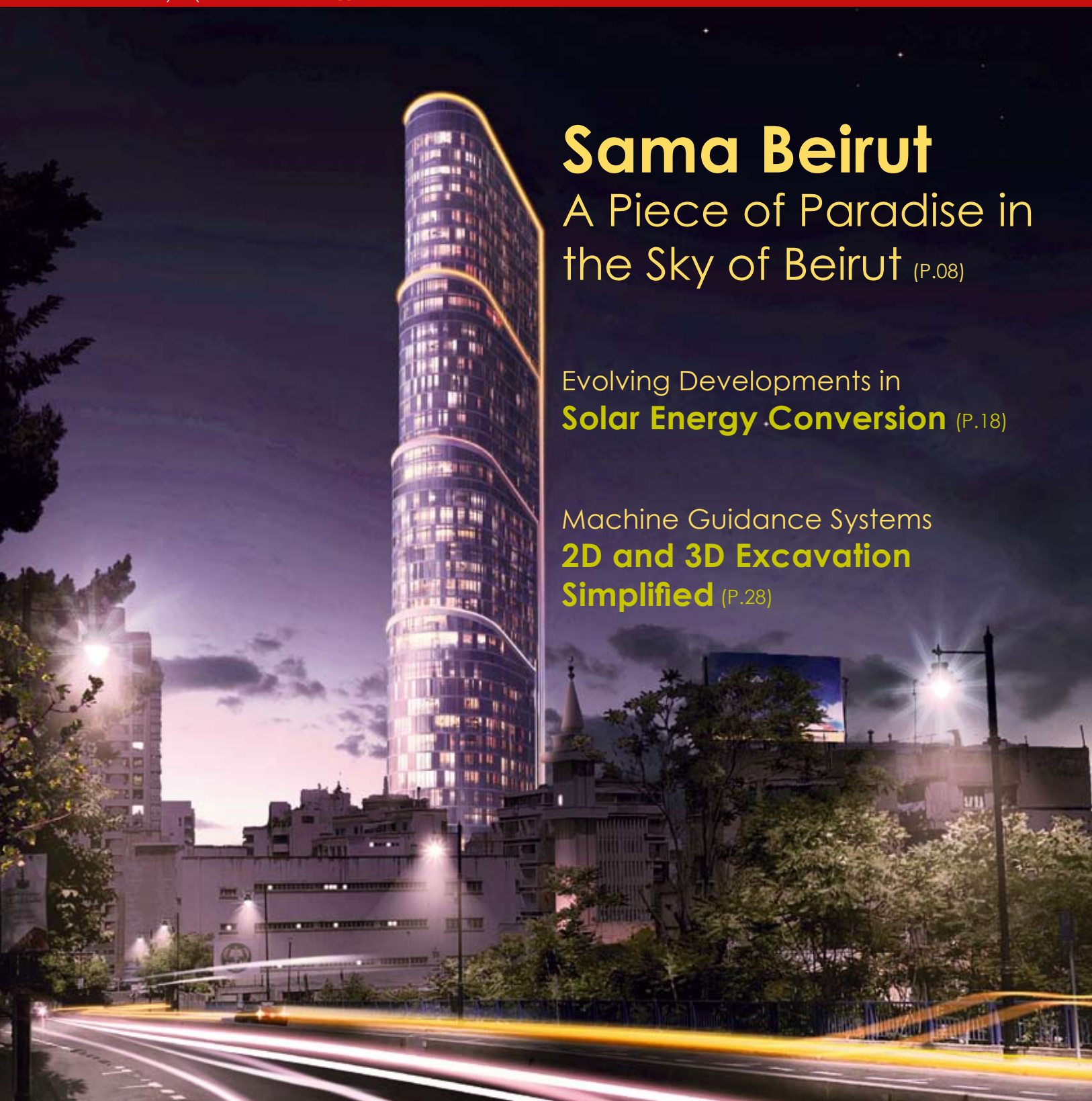
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Arab Construction World

عالم الإنشاءات العربي

October 2009 / Vol. XXVII - Issue 10
10 - 27 2009 ()

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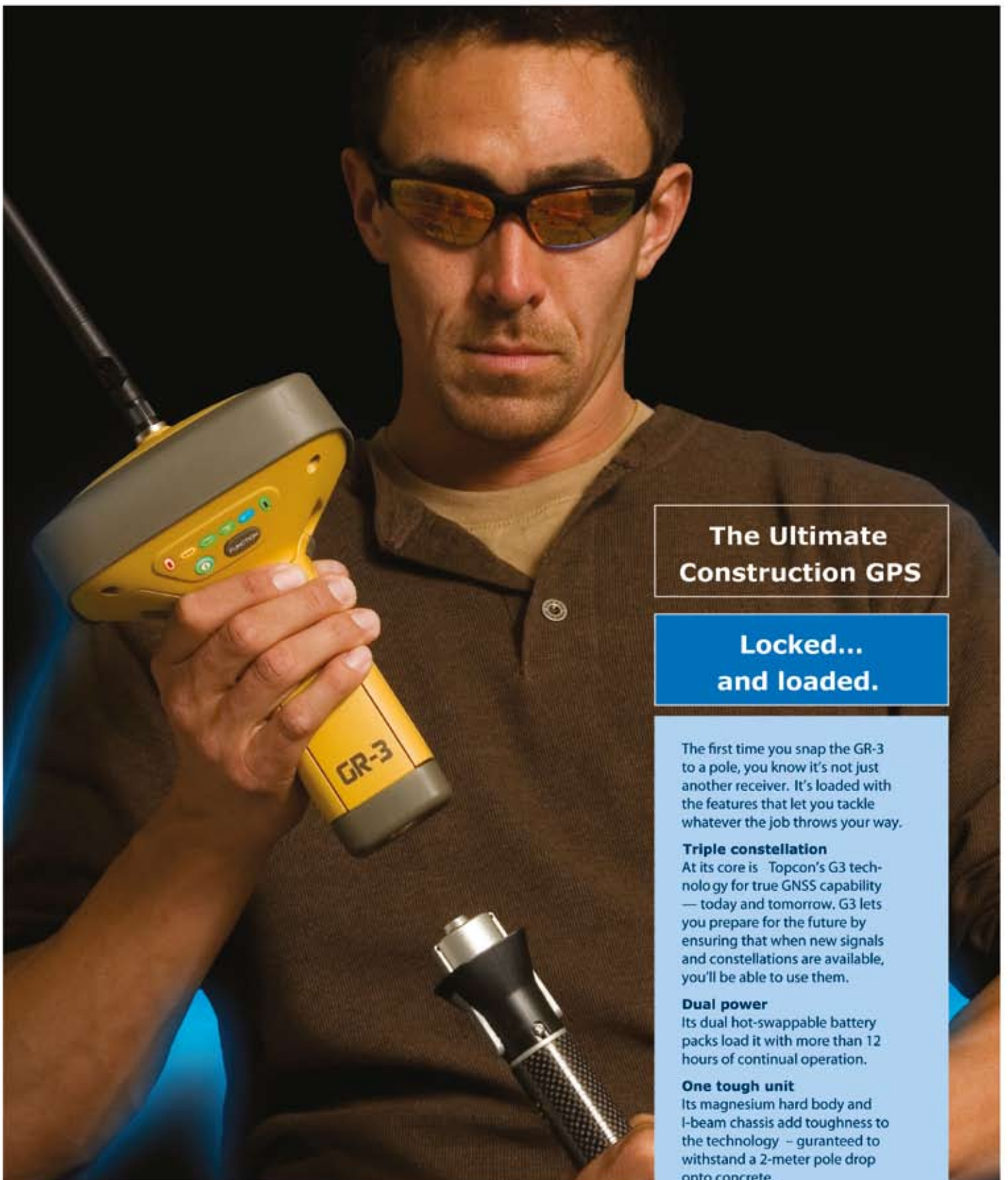
Sama Beirut

A Piece of Paradise in
the Sky of Beirut (P.08)

Evolving Developments in
Solar Energy Conversion (P.18)

Machine Guidance Systems
**2D and 3D Excavation
Simplified** (P.28)





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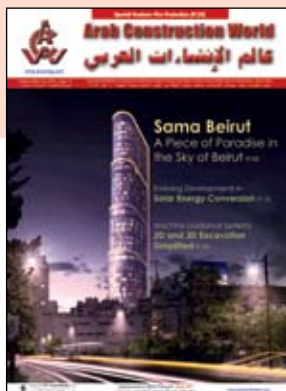
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**CPH World Media s.a.r.l.
Team**

Founders

Mr. Fathi Chatila
Mrs. Mona Chatila (1944 - 2006)

Management

President & CEO

Mohamad Rabih Chatila (B.Arch) /
mr.chatila@cphworldmedia.com

Administrative Manager

Abdul Rahman Hallak /
ar.hallak@cphworldmedia.com

Administrative Assistant

Rana Said / r.said@cphworldmedia.com

Editorial & Research / Content Writing

Editor-in-Chief

Mohamad Rabih Chatila (B.Arch) /
mr.chatila@cphworldmedia.com

Editorial & Research Manager /

Production Manager

Rodrigue El Balaa /
r.elbalaa@cphworldmedia.com

Editor & Researcher /

Content Writing Manager

Amer El Haddad /
a.elhaddad@cphworldmedia.com

Circulation & Marketing

Circulation & Marketing Manager

Jad Aboulhosn /
j.aboulhosn@cph.com.lb

Information Technology

IT Operations Manager

Rana Said / r.said@cphworldmedia.com

Advanced IT Operators

Ali Zaraket / a.zaraket@cphworldmedia.com
Mazen Bou Diab / m.boudiab@cphworldmedia.com

Mail & Services

Mail & Service Manager

Abdul Rahman Hallak /
ar.hallak@cphworldmedia.com

Mail & Service Officer

Ali Zaraket / a.zaraket@cphworldmedia.com

Graphic & Web Design

Acting Design Director

Samer Manasf / s.manasf@cphworldmedia.com

Honorary Editorial Consultants (HEC)

• **Eng. Hatem F. El-Banna** - B.Sc. Civ.Eng.-Egypt

• **Dr. Ramiz Kameel** - PhD Mech. Eng - Egypt

• **Prof. Dr. Essam E. Khalil** - Prof. of Mech. Eng. -
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Assistant Professor of Civil Eng.,
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Industry links: The section announces international and regional manufacturers and suppliers of particular equipment and products.

Agents and distributors available in the MENA: This section carries the contact details of agents and distributors as well as companies active in a certain sector in the Middle East and North Africa.

Representatives seekers: Service that provides companies seeking representation in the MENA food market with the opportunity to be out there. Complete contact details are listed as well as region(s) of interest.

Buyers' Guide: This section features a 9 x 6 cm space where every company can include its logo, contact details and over 50 words introducing its products & services.

E-mail: businesslinks@cphservices.net



Career Center:

Career builder: Area opening up doors before employees and employers to find the right candidate to occupy the right job.

E-mail: careercenter@cphservices.net



Coming Events:

The Coming Events service offers a comprehensive listing of construction events, conferences, seminars, and workshops. It enables interested users to set their calendars ahead. Information includes name of exhibition, venue, date, organizers' complete details and addresses.

E-mail: comingevents@cphservices.net



Project Monitor:

This section highlights the latest news about major projects in the MENA. It is divided into four subsections:

- Tenders announcements, requesting interested companies to make proposals, noting the deadline to do so;
- Biddings presented by the different interested parties;
- Awarded contracts with info about the company; and
- Latest updates about the projects status along with work progress.

E-mail: projectmonitor@cphservices.net

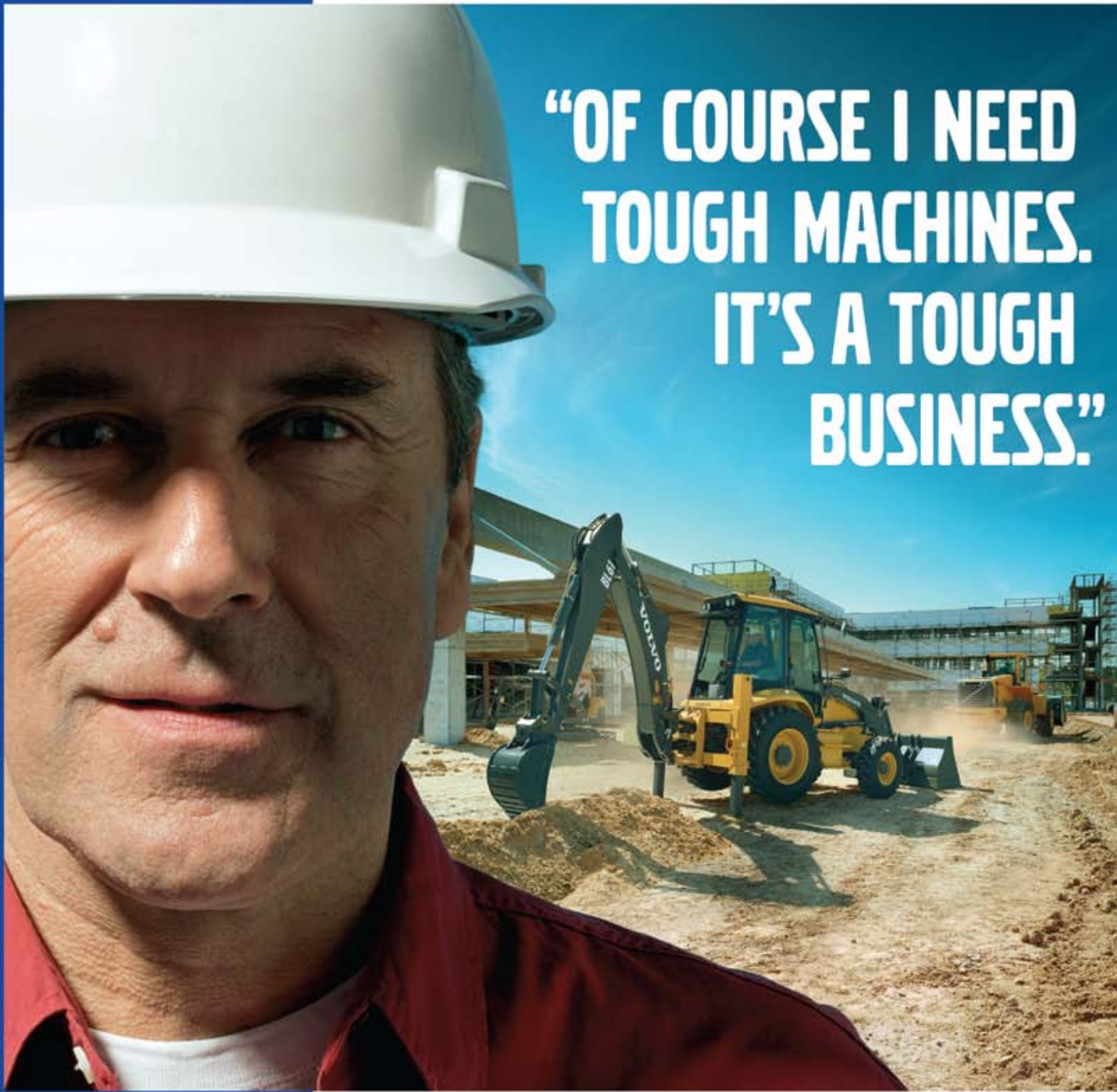


Promo Shots:

Promo Shots is a new service serving to promote a company's products and/or services through direct e-mail. A mail merge is sent to a vast number of regional and international decision-makers found in ACW's database.

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A.A. Bin Hindi B.S.C (c)
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Tel: +973 17 70 3076/1247
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Al Futtain Auto & Machinery Co
UAE
Tel: +971 2 502 9100, +971 4 213 5100
E-mail: arif.reshid@alfuttain.ae

Al-Zabin International Group Co.
For Heavy Equipment
KUWAIT
Tel: +965 483 4721/9017
E-mail: alazabin@alzabinkuwait.com

C&M PlantPlus Ltd.
CYPRUS
Tel: +357 26 913 050
E-mail: info@plantplus.net

General Engineering Services Est (GENSERV)
OMAN
Tel: +966 244 90 755
E-mail: sales@genserv-oman.com

Nassib Saad Est. Trading & Import
SYRIA
Tel: +963 11 222 5432
E-mail: saadnt@scs-net.org

Volvo Otomotiv Türk Ltd. Şİ.
TURKEY
Tel: +90 212 482 4040
E-mail: ugurbasturk@volvo.com

Abdelmassih Trading Company - Amtrac
LEBANON
Tel: +961 1 68 75 60 / 61
E-mail: michel@amtrac-lb.com

Al Rehab Equipment and Machinery Co. Ltd.
SAUDI ARABIA
Tel: +966 2 680 4444
E-mail: info@alrehab-lsa.com

Arabian Agencies Company WLL
QATAR
Tel: +974 4 500 925
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Parsian Pishro Sanat
IRAN
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Tel: +92 42 111 666 000
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MENA Construction Digest

BAHRAIN

Developers to Help Save Homes in Bahrain

Developers seeking permission for new projects could soon be forced to help renovate homes for needy Bahrainis. The aim is to ensure that the local community benefits from private developments - at the same time as easing the burden on the national budget.

Investors seeking to develop projects in the Northern Governorate will be told they must contribute a percentage of the outlay towards renovating poor families' homes. The Northern Municipal Council has voted to launch a new fund and the money generated would be added to an annual BD500,000 (US\$1,326,000) allocated by the Municipalities and Agriculture Affairs Ministry.

The ministry provides BD2.5 million (US\$6.631 million) a year, to be shared between the five governorates on housing renovation schemes. Council services and public utilities committee chairman Yousif Rabea'a said the project could help take pressure off the government. "I don't think a company willing to spend millions and millions won't spend thousands to help us cover the costs of renovating and re-modelling homes," he said. The four other municipal councils, Muharraq, Manama, Central and Southern, have reportedly dismissed the idea.

JORDAN

Amman Intersections Work to Be Over in 1 Year

Work on the JD22 million (\$31 million) Al Shmeisani intersection project in Amman, which started at the beginning of this year, will be completed by October next year, said the Mayor of Amman, Omar Maani. Maani reaffirmed that the project will play an important role in easing traffic congestion in Amman, as this project is estimated to have an absorptive capacity of 20,000 cars. Additionally, the mayor explained that the problem of traffic detours would be solved by next September, after the second phase of the project is completed and the old tunnel is open to public use. He added that any new detours would be limited to the project adjacent area. Maani predicted that the entire project should be completed by October 2010, coinciding with the completion of the Jabal 'Arafat intersection project.

The Greater Amman Municipality (GAM) recently completed first stage concrete works on Al Shmeisani intersection, which included establishing a tunnel that branches off the existing tunnel (Al Mukhabarat Tunnel) in the direction of Al Ameen Street and the Ministry of Industry and Trade Street. According to the deputy city manager for Public Works, Fawzi Mas'ad, 20 percent of the project was completed, and work is currently underway on the second phase of the project at a cost of JD3.6 million (US\$5.092 million) which is expected

Phase II of the project's infrastructure within 18 months. Phase II of the infrastructure work includes the construction of roads, sewage network, water systems, main irrigation system including a connecting network for fire fighting, according to a report in our sister newspaper Gulf Daily News. HBK will also be establishing the electrical work such as road lighting as well as the construction of six bridges over the water canal and implementing a traffic system. "We are pleased to award a reputable national company the infrastructural work,"



to be completed by the end of next September.

QATAR

Qatar Entertainment City Awards \$27m Contract

Abu Dhabi Investment House's (ADIH) Qatar Entertainment City project has awarded a 100 million Qatari riyal (US\$27.4 million) contract to HBK Contracting to complete

said Qatar Entertainment City (QEC) general manager Yousef Darwish. The completion on time is one of our top priorities as other phases are dependent on this. HBK are known for their professional and high-standard workmanship and we are confident that the result will be a very positive one for QEC."

"We are delighted to get this assignment and help create what will help position Qatar as a tourist destination within the region," said HBK chairman Shaikh Ali bin Hamad Al Thani.

ملخص الإنشاءات في الشرق الأوسط وشمال أفريقيا

SAUDI ARABIA Housing Market in Saudi Faces Mid-Income Unit Shortfall



Pressure on Saudi Arabia's housing sector continues to grow as demand for low-income housing rises unabated. Luxury housing projects in the capital Riyadh,

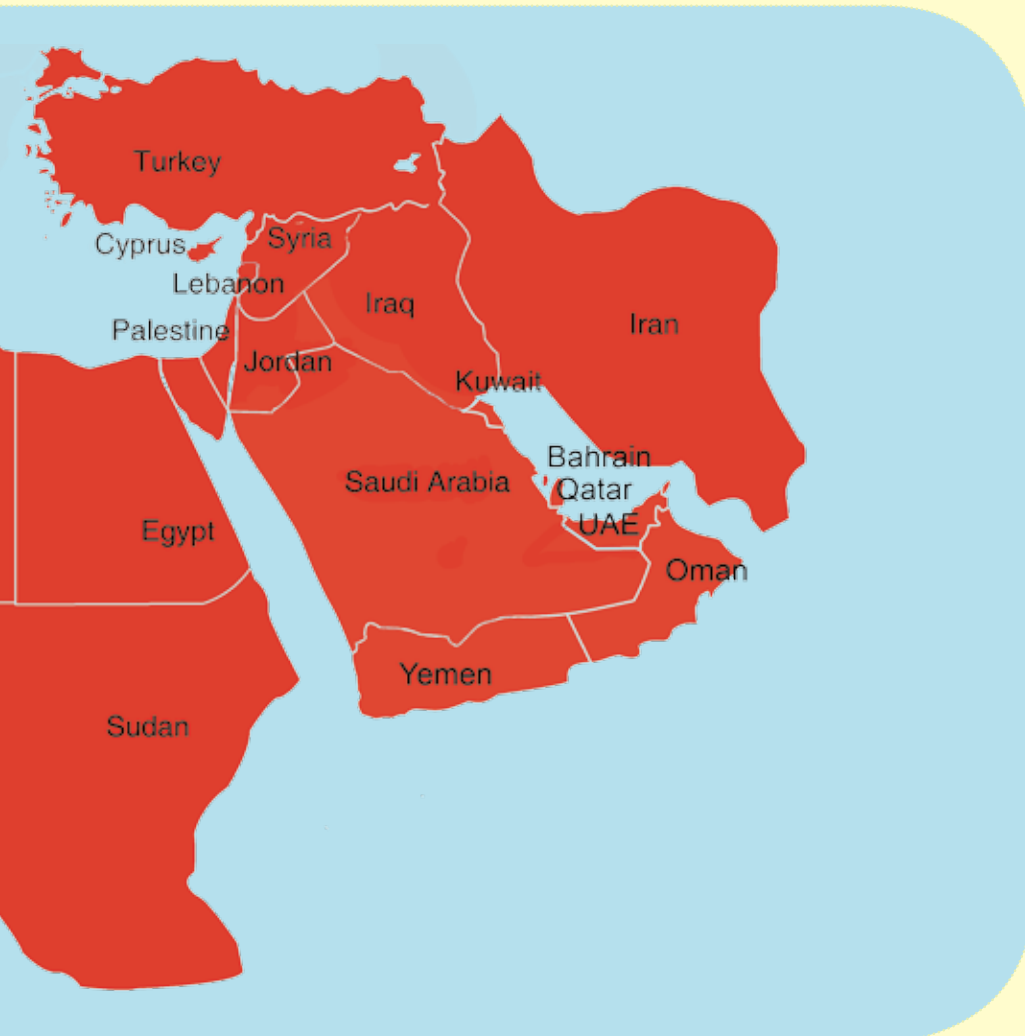
In Riyadh, the figures show 16,170 extra apartments or self-contained apartments within a villa will be needed this year, compared with 8,396 single family occupancy villas. The Eastern Province figures reveal a similar story, with demand for 4,812 apartments forecast, compared to 2,907 villas.

Figures from the Economy and Planning Ministry show that 65% of the Saudi population are of working age - between 15 and 64 - while those under 15 years of age comprise 32%. Just 3% of the popu-

The International property portal Overseas Property Mall has ranked Tunisia among the world's "Top 5 International Real Estate Investment Gambles". The portal writes that "Tunisia is also one of the fastest growing emerging market economies, based mainly on massive growth in the agricultural sector, and more recently stable growth in the construction industry."

It adds that "property in Tunisia represents the opportunity to buy property at the low prices you'd expect to find in an emerging market, within the developed internal housing market, you'd expect to find in an established market. A great combo for the long term investor".

Overseas Property Mall ranks Tunisia 4th on the list after Albania, Panama and Brazil, the Philippines are in 5th place. To be selected for the list, "each destination has to have a growing economy, a stable investment environment and be a great place to vacation" it writes.



Jeddah, Mecca and the Eastern Province ostensibly point to a vibrant housing market. But the reality is that the target population; affluent, cash-rich Saudi's that can afford significant properties, is very much in the minority.

The majority of the population is looking at a more serious shortfall, one which demographically must be addressed before a major housing shortage is realized. The governments' housing demand forecast for 2009 shows that apartments, or one floor in a villa, is double that anticipated for whole villas.

lation are over 64. Population estimates from the Ministry forecast that the current population of 27.5 million will reach 33 million by 2020.

TUNISIA Tunisia Ranked Among Top 5 Real Estate Investment Sites



UAE



Abu Dhabi Okays 2 TDIC Projects

The Abu Dhabi Executive Committee has approved two construction project proposals presented by the Tourism Development & Investment Company (TDIC). The proposals included construction of a conference centre and a diving and water sports centre at Sir Bani Yas Island near the Desert Islands Resort. The projects are in line with TDIC's development plan to transform the island into an international tourist attraction.

Also approved was a memorandum presented by TDIC pertaining to the construction of a canal at Al Qurm Eastern Island. Another memorandum was presented by the Abu Dhabi Urban Planning Council (UPC) concerning Phase II for the development of Abu Dhabi Corniche's public beach to allow more space for national occasions in addition to developing public pathways and facilities.

The Executive Committee also discussed a number of important topics and memoranda presented by the emirate's government departments listed on its agenda and related to the implementation of plans and projects.

Safety and Security in the Construction Industry



There has been an increasing awareness of the role of preventive measures for safety purposes within the construction industry. Applying special architectural modifications and adopting customized building approaches guarantee a safe and comfortable environment for building occupants in which they can live, work and play, such as clean air, protection from noise pollution, and fire safety.

Let's take fire safety as an example. When a fire occurs in a building, smoke and fire can spread quickly, and the amount of time it takes to spread depends on structural openings which feed the fire with oxygen and allow it to travel from room to room and floor to floor. A structure is made up of floors, walls and ceilings; at intersections where they meet, there are voids or joints. Filling these joints with a firestop or fireblock sealant will help create a "compartment". In one-room structures, the fire will be sealed within the room - no outside air will fuel the fire and there are no joints for the fire to escape. On the same note, after floors, walls and ceilings are constructed, pipes, wires, cables, ducts, and other components can be installed. Unfortunately, when a hole is cut it is not the exact size of the penetrating item to be installed, which results in an annular space. This space, which can give fire momentum, can also be filled with a firestop or fireblock sealant to prevent the passage of flame and smoke and restrict the flow of oxygen from one compartment to the next. You can read more about firestop and fireblock sealants on page 24.

Security, on the other hand, as a state or condition is resistance to harm. From an objective perspective, it is a structure's actual degree of resistance to harm. That condition derives from the structure's relationship to threats in its environment. The structure can be a building, a piece of equipment, physical and material assets, electronic data, etc. In the corporate world, various aspects of security were historically addressed separately. Let's take the secure and safe management of vehicle and construction plant assets as an example. For customers not only in the Middle East but in many other world markets, new advanced internet-based GPS tracking systems are providing a rapidly expanding range of features in the field. The GPS-based systems can be used on any vehicle and all types of site equipment from excavators, compressors and dumpers to generators, forklift trucks, traffic light sets and powered access platforms. You can read more about these advanced GPS tracking systems on page 38.

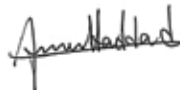
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Enjoy reading the October issue of ACW magazine.

Amer Elias El-Haddad

Editor & Researcher / Content Writing Manager



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IN ADV



REFER TO RIM 03 ON PAGE 82

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Sama Beirut

A Piece of Paradise in the Sky of Beirut



'Sama Beirut' project, in the heart of Lebanon's capital, constitutes a milestone in 21st Century development, with a skyscraper that will grace the skies of Beirut. Launched under the patronage of Lebanese Minister of Interior, *Ziad Baroud*, in August, the 50-storey project will be a landmark in Lebanon, a fully Lebanese investment, from the people to the people. Present at the event were key political and social figures, such as Lebanese Minister of Tourism, *Elie Marouni*, along with the general manager of the Ministry of Tourism *Nada Sardouk*. Also present was head of the Municipality of Beirut, *Abdelminhim Aris*, along with other members of the Municipality and Muhafaza of Beirut.

Sama Beirut's prime location in the Sodeco area, in Ashrafieh, is currently attracting large masses. 'Sama Beirut's' proximity to Downtown Beirut, makes it the perfect address for potential investors. It will include shops, offices and apartments.

The view from the tower promises to be wonderful, as the surrounding areas are filled with green trees and esthetically designed gardens. The tower itself will bring real estate

development in Lebanon to a new level, especially as this project is the first of its kind in the country and is a big leap forward in the field of urban development. The project has been injected with the best equipment and materials, rising to 200 meters tall in the heart of the city.

This project will put Lebanon in the spotlight again, after the country emerged from the global financial crisis, attesting to the invincible Lebanese spirit. It will also raise the country to an equal footing with neighboring countries that own similar massive architectural developments.



'Sama Beirut' tower redefines the parameters of the region. It is conveniently located in Sodeco, which will contribute to the prosperity and revitalization of that area. It will also serve as a unique aesthetic construction with its sophisticated revolutionary conception and modern equipment, bringing back charm to the region and to a large part of Beirut, whether through its modern private health club, or through its external space or luxurious commercial shops.

Lebanese Minister of Interior, Ziad Baroud expressed his pride in such a venture, adding that he hopes all future projects follow the same environmentally-friendly guidelines that 'Sama Beirut' was founded upon, as well as have generous space dedicated to gardens, as is the case with 'Sama Beirut'.

The residential section of the tower, which can be accessed through Elias Sarkis Avenue, offers its residents a private entrance. The apartments vary in size, ranging between 300 and 1500m². In addition to the residential units, the tower will have six commercial shops to be held by luxury brands. As for the office spaces, they will welcome blossoming busi-



nesses, conveniently located in the vicinity of all facilities and services that may be eventually required.

Architects *Elie and Randa Gebrayel* of **Erga Group** designed both the exterior and interior spaces of the project in a unique way, with the tower façade made entirely of advanced composed curtain wall, and a revolutionary non-coordinated form rising in levels to reach the top of the tower at an altitude of 200 meters.

The main adviser to the project, **Prime Consult**, a company that provides real estate consultancy, was behind the creation of the concept and the purchase of land, after undertaking financial and market studies for 'Sama Beirut'. The company, headed by *Massaad Fares*, is handling marketing and sales, in addition to financial and administrative management of the project.

Fadi Antonios, head of **Antonios Projects** and the Developer of 'Sama Beirut' project, expressed his pride in this groundbreaking development by saying, "The basic idea does not reside in the construction of the building, but in it being a landmark in Lebanon." Sama Beirut is owned by Antonios Projects. The tower, which is expected to be fully operational in 2014, will be a great milestone, paving the way for many new huge projects of this type.

The price of apartments range depending on the size. For example, the simplexes which range from

Developer: Antonios Projects S.A.L.

Architects: Erga Group - Elie & Randa Gebrayel

Adviser: Prime Consult

Interior Design: Gatsereia Design

Project Manager: DG Jones

Legal Counsel: Tyan & Zgheib

Advertising Agency: Impact BBDO

Public Relations Agency and Press Office: Impact Porter Novelli

300m² to 900m², have an average price of \$6,000/m². The same price range applies to the duplexes which are 1,400m². The prices are higher as you go up the floors.

As for the offices, they range from 260m² to 780m² and their average price is \$4,250/m². The commercial space, which includes space for 6 shops including a basement, Ground Floor and Mezzanine range from 400m² to 700m² and their average price is \$11,000/m².

The total area of land taken up by the tower is 5,200m². It will not only include a building, but will be surrounded with lush landscaped gardens (around 4,000m². The tower will only take up 20% of this total plot of land). Seeing that this is the first project of its kind in Lebanon, there were several studies conducted to test the feasibility and impact of it. For starters, the impact of such a large project on the area is absolutely great and positive since Sama Beirut comprises 4,000m² of green areas which will certainly embellish the neighborhood. It also livens up and revamps the area with its commercial space and state-of-the-art health club. What

they did was, instead of developing 6 building or blocks of concrete on the land, they decided to go sky-high and make use of the extensive plot of land. Sama Beirut will put on the spotlight the surrounding buildings and will give them additional value due to their proximity to the Capital's Landmark.

As for the traffic impact, the team behind Sama Beirut used their land to enlarge the streets around us. Traffic will not be impacted, and in actual fact, it will decrease. There are a total of 59 apartments in the tower. Whereas had they developed 6 buildings, then they would have had 250 apartments. So they are definitely saving traffic.

Sama Beirut is paving the way for a new trend in the capital. Towers or buildings are definitely popular in the city and in its suburbs due to the lack of space. Buildings are positioned close together, and this in turn, can negatively impact the city and make it appear too crowded. However, with this tower, space is created all around. Sama Beirut will definitely create a trend for developing more towers. ■

REFER TO RIN 04 ON PAGE 82

Expanded Shale, Clay and Slate

Lightweight Aggregate Contributes to Sustainable Development

The expanded shale, clay and slate (ESCS) structural lightweight aggregate (LWA) has been successfully used for well over two millennia, with a particularly widespread use in the past eighty years. This track record of proven performance has demonstrated how ESCS contributes to sustainable development by conserving energy, lowering transportation requirements, maximizing structural efficiency and increasing the service life of structural concrete, concrete masonry, and asphalt chip seal. The use of lightweight aggregate in site development assists designers in addressing the important issue of storm water management by making on-site treatment a viable option. ESCS can help to reduce heat island effects by amending soil to improve landscaping and making the use of "green roofs" not only desirable, but economically feasible. Expanded shale, clay and slate aggregate, as manufactured by the rotary kiln process (originally developed in 1908 and patented in 1918 as Haydite), is available throughout the world.

The Material

Expanded shale, clay and slate lightweight aggregate has a long track record of quality and performance. Since its development in the early nineteen hundreds, LWA produced by the rotary kiln process has been used extensively in asphalt road surfaces, concrete bridge decks, high-rise buildings, concrete precast/prestressed elements, concrete masonry and geotechnical applications.

LWA has been effectively used to solve geotechnical engineering problems and to convert unstable soil into usable land. Lightweight aggregate can reduce the weight of compacted geotechnical fills by up to one-half. Where thermal stability is required, LWA provides significantly greater thermal resistance when compared to soil, sand or gravel fill. It affords permanent economical insulation around water lines, steam lines and any other thermally sensitive vessel.

The quality of LWA results from a carefully controlled manufacturing process. In a rotary kiln, selectively mined shale, clay or slate is fired in excess of 1093°C. The LWA material is then processed to precise gradations. The result is a high quality, environmentally "friendly", and lightweight aggregate that is inert, durable, tough, stable, highly insulative, and free-draining, ready to meet stringent structural specifications.

The Holistic Picture

ESCS structural lightweight aggregate is an environmentally friendly product that saves material, labor and transportation cost, as well as improves the performance and service life of concrete and other products made with it. Additionally, using lightweight aggregate will lower the overall energy consumption of structures thereby reducing the associated life cycle costs throughout the



structure's useful life. These benefits support sustainable development and contribute to projects becoming LEED (Leadership in Energy and Environmental Design) certified.

When viewed from an overall perspective, the utilization of ESCS lightweight aggregate is a significant and important step forward. The lightweight aggregate industry acknowledges that for the successful achievement of truly sustainable development, a fundamental shift in attitudes, beliefs and conscious behavior must take place. Considering the fact that architecture (building performance) accounts for a major part of total energy consumption, initial cost should no longer be the sole determining criteria when evaluating the usefulness of a product or structure.

All construction materials must be evaluated from a total life cycle assessment. This is the only way to determine the total impact of a product or structure. To develop a sustainable world we must shift from our current short-term ways and attitudes, and embrace a long-term, holistic mind-set that recognizes performance and the interdependence of all life.

SmartWall® Concrete Masonry

SmartWall concrete masonry units are up to 40% lighter than traditional masonry units. This lighter weight results in increased mason productivity, lower construction costs and reduced injuries.

SmartWall masonry provides superior insulation by combining high R-values with thermal mass and low thermal bridging, and offers superior fire resistance, effective sound absorption, excellent seismic performance, low shrinkage and high strain capacity.

Asphalt Pavement

When bonded to asphalt, ESCS creates an advanced road surface that is safer, more economical and longer lasting than conventional aggregate surfaces. Wet or dry, road surfaces of ESCS aggregate provide superior skid resistance that is maintained throughout the surface life, because ESCS does not polish as it wears. Because it is lightweight, ESCS affords shipping and handling cost advantages to the contractor. Also, damage to windshields, headlights and paint caused by "flying" stones is virtually eliminated with ESCS, thus avoid-



ing costly insurance claims and motorist complaints.

Structural Concrete

ESCS structural lightweight concrete solves weight and durability problems in buildings and exposed structures. ESCS concrete has strengths comparable to normal weight concrete, yet is typically 25% to 35% lighter. ESCS offers design flexibility and substantial cost savings by providing less dead-load, improved seismic structural response, longer spans, better fire rating, thinner sections, decreased story height, smaller size structural members, less reinforcing steel and lower foundation costs. Precast elements have reduced transportation and placement costs. The excellent durability performance of ESCS is a result of the ceramic nature of the aggregate, and its exceptional bond to and elastic compatibility with the cementitious matrix.

Geotechnical

ESCS compacted fills are approximately half the weight of common fills. This advantage, coupled with its high internal friction angle, can also reduce lateral forces by more than one-half. It has been effectively used to solve numerous geotechnical engineering problems and to convert unstable soil into usable land. ESCS also provides permanent insulation around water and steam line, and other thermally sensitive elements. ESCS is a reliable, economical geotechnical solution.

SOILMatrix™ Horticulture Applications

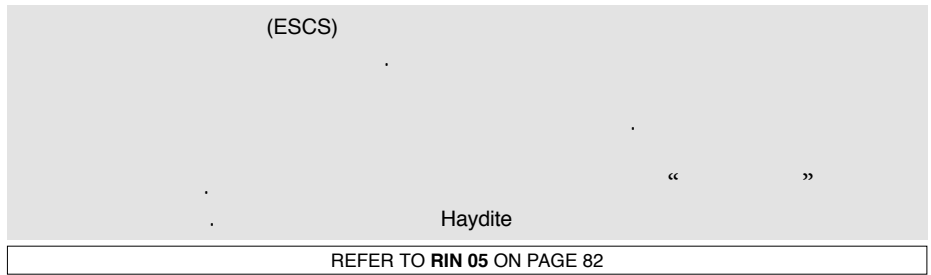
ESCS SOILMatrix is environmentally friendly. It is non-toxic, odorless, 100% inert and will not compress, degrade, decompose, or react with agricultural or horticultural chemicals. It acts as an insulator in the soil mixture and protects plants from rapid temperature extremes. SOILMatrix retains a high percentage of its weight in absorbed water and waterborne nutrients, making it an excellent buffer. SOILMatrix is user friendly because it is lightweight, inert, pH adjustable, easy to handle, economical and readily available.

Other Uses

The superior qualities of ESCS are effective and economical in many other applications. Examples include roof

tile, cement wallboard, artificial stone, bagged concrete mix, wood floor topping, refractory, traction grit, insulating fill, and medium in wastewater treatment and water filters. ■

Based on information sourced from:
Expanded Shale, Clay and Slate Institute
www.escsi.org



C.O.I.
IDROMECCANICA ITALIANA
 made for
hard rock

IDROMECCANICA ITALIANA
 Zona Industriale, Lotto A1-A2
 I-70056 MOLFETTA (BA) - ITALY
 E-Mail: info@idromeccanica.com

Telefono ++39 - 080.338.81.99
 Telefono ++39 - 080.338.82.00
 Telefax ++39 - 080.338.81.92
 Internet: www.idromeccanica.com

REFER TO RIN 06 ON PAGE 82

LYTAG Lightweight Aggregate Now Available in the Middle East



Bulk Materials International (BMI) has signed an agreement with **Lytag Ltd** for the marketing of LYTAG lightweight aggregate in the Middle East. BMI Middle East will market LYTAG lightweight aggregate in Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates and Yemen. It will also manage sales of the product and provide technical support for its use across these regions.

Dr. Vassiem Sheikh, Regional Director at Bulk Materials International (Asia/Middle East), says: "This partnering agreement is a decisive opportunity to accelerate our development strategy in Cementitious based products in the Middle East and allows us to explore new market segments with LYTAG."

Gareth Moores, Executive Chairman of Lytag Ltd, comments: "Putting this process in place is an exciting step for Lytag Ltd in our expansion throughout the Middle East. LYTAG lightweight aggregate has already been used in projects in the region such as H.H. Sheikh Rashid Al Maktoum Terminal in Dubai international Airport and The Emirates Aluminum Smelter Complex in Abu Dhabi, and this partnership agreement with BMI will facilitate a far greater availability of the material across the Middle East."

LYTAG lightweight aggregate is a secondary material that is commonly used in a range of construction applications including structural and precast concrete, floor and roof screeds, fills, green roofs, and as a drainage

medium. Its weight is approximately 50% of the weight of natural aggregate, resulting in a saving in density of around 25% over normal weight concrete, however, retaining the same structural integrity.

This characteristic offers Clients, Engineers and Architects significant advantages in terms of design flexibility, logistics and handling; add to that savings in terms of labour, time and costs.

A truly environmentally friendly material, LYTAG lightweight aggregate enhances the sustainability credentials of a construction project. Manufactured from the by-product of coal-fired power stations, its use reduces demand on quarried aggregate and also diverts waste material from landfill. ■

REFER TO RIN 07 ON PAGE 82

KSD Adds Sandvik QJ330 Jaw Crusher to its Armory



KSD has continuously worked closely with civil engineering contractors in order to provide heavy plant machinery for excavations and recycling projects. This has allowed the company to be key supplier of construction materials ranging from stone to soils. In the early years of the operation KSD company provided services to local quarries, distributing stone to construction sites, and removing and transporting construction waste.

Waste construction and demolition

materials are taken to the company's recycling facility (conveniently situated just off J9 of the M42 on the outskirts of Birmingham) where they are processed into quality recycled aggregates. These are then reused as materials within a variety of construction projects. The materials have been cleverly converted into quality recycled aggregates, which may be reutilized as alternatives to quarried material.

A large volume of materials are avail-

able all year round ranging from screened topsoil, sharp sand, 66-40mm, 20mm, 10mm stone, gravel to granular fills and crushed concrete which has a 6F2 grading. All Products are certified to industry standards, with relevant grading certification. To highlight the success of their operation KSD has successfully recycled over one million tons in the past few years, and much of the success they have enjoyed is due to the establishment of sophisticated crushing and screening operation. To this end KSD currently operates a range of **Sandvik** (formerly Extec and Fintec) tracked screens and crushers. This all encompassing product line is arguably the definitive range of mobile screening and crushing for the recycling of construction materials available today.

The latest addition to the KSD armory is the QJ330 (formerly the F-1107) Jaw Crusher. Sandvik have used all their experience gained over the last 100 years in crushing to produce their most modern and efficient crusher, which is targeted at the recycling and contractor segment of the market. ■

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Conti Group Uses Rapid Mix 400 to Produce Econocrete at JFK



The **Conti Group** of New York is currently running a Rapid Mix 400, manufactured by **Rapid International**, to perform rehabilitation work on runways at JFK Airport, New York, in order to accommodate the Airbus 380.

Increasingly used in the US, econocrete is a lean concrete that may be made with low-cost, locally available aggregates that do not meet conventional specifications. Interest in the use of econocrete has developed in the last few years due to the high cost, and dwindling supplies of high-quality virgin aggregates in some areas of the US.

In the past substantial quantities of natural aggregates, and crushed stone sources, have been discarded or rejected because of restrictive specifications or other reasons. Much of this material could be used in concrete structural elements, if proper attention were given to developing mix designs to meet the structural requirements, and environmental conditions, to which it will be exposed. This is where econocrete

comes into its own. Federal Highway Administration, together with local governmental agencies, is now supporting the movement of the econocrete concept from the laboratories into the field. The mixes are based on laboratory tests, are designed for specific strength and durability levels in accordance with their intended use. The possible applications of econocrete are as varied as the many structural elements of modern highway paving systems as it is a durable concrete, with a well distributed air void system. Water reducing admixtures are often included in the mix to improve work ability at the low slump ranges that result in higher strengths.

JFK Project

The project undertaken by The Conti Group of New York is the largest asphalt contract for JFK in 20 years. It has been developed to accommodate the new Airbus 380, which is the world's largest commercial airliner, with a wingspan of 262 foot. It is through the use of

econocrete that Conti has managed to accommodate this beast of an aircraft, and to reduce the total cost of the project. A key tool in the successful undertaking of this project has been a continuous mixing plant, which in this case is a Rapid Mix 400. The Rapid Mix 400, manufactured by Rapid International Ltd of Northern Ireland, is a totally mobile and completely self contained unit. It is capable of mixing up to 400 tons per hour, depending on the precise application. It uses a hydraulic system to change the plant from its travel mode into a fully operational plant in minutes, which is perfectly suited to a project such as the JFK airport.

The Rapid Mix 400 possesses a self-erecting silo that has a capacity of up to 50 tons. This is fitted with a twin shaft continuous mixer that enables it to be also used in applications such as soil stabilization, and dam construction.

The Conti Group are producing the econocrete at JFK by milling asphalt recovered from the demolition of old runways, screening it, and then mixing it in the Rapid Mix 400 with cement and water. Due to the fact that econocrete uses 70 to 80 percent of the material from the old runway, it provides huge economic benefits to the airport as well as being environmentally friendly.

The project is still ongoing at JFK airport, and has expanded to several other airports around the US. It is hoped that the success of econocrete, and the Rapid Mix 400, will bring its clear benefits not only to the customer, but also to the environment. This will hopefully prompt many more airports around the US to consider using the econocrete / Rapid Mix 400 team for their airport runways. ■

REFER TO RIN 09 ON PAGE 82

EZ Grout Hog Crusher Job Site Material Recycler

The new EZ Grout Hog Crusher Job Site Material Recycler is now available from **Multiquip Inc.** Easily attached to a skid steer loader or forklift, the Hog Crusher can recycle most materials — brick, block, stone, rock, asphalt, non-reinforced concrete and more — on the job site.

The Hog Crusher is able to scoop up and pulverize recyclable material in

minutes, eliminating the need to have this debris removed from the job site. The machine has a one-half yard hopper capacity, and up to ten tons of material per hour can be processed.

The Hog Crusher features replaceable carbide bits, and hardened breaker, cleaner and cheek plates for easy on-site maintenance. ■



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Warm Mix Asphalt Systems

Building Eco-Friendly Roads Efficiently

The asphalt paving industry is constantly exploring technological improvements that will enhance the material's performance, increase construction efficiency, conserve resources, and advance environmental stewardship. Current and impending regulations on greenhouse gas emissions, fumes/odors and energy conservation are making attractive the reductions in asphalt mix production and placement temperatures. The concept of warm mix asphalt (WMA) is a mean to this end. Warm mix asphalt is produced at temperatures in the range of 20 to 40°C lower than typical hot mix asphalt (HMA).

WMA at a Glance

There is a strong focus on WMA worldwide and several systems have been developed to decrease the bituminous mixture temperatures without compromising the industrial process of producing asphalt pavements. The objectives of these systems are to obtain full aggregate coating at lower mixing temperature, obtain density and still achieve equivalent or better performance than HMA at ambient temperatures. Full coating is obtained by either reducing the viscosity of the binder or by using additives that promote complete aggregate wetting at a lower mixing temperature. Warm mix asphalt systems may be divided into one or a combination of the following categories: water related techniques (foaming and emulsions), additives (organic or chemical), binder mixing technologies and synthetic binders.

The immediate benefit to producing and placing asphalt mixes at lower temperatures is the reduction in energy consumption. With the decreased production temperature come the additional benefits of reduced greenhouse gas emissions, fumes, and odors generated at the plant and the paving site. Furthermore, the technical benefits may also be substantial including reduction of short term binder hardening, reduction of mixture tenderness during compaction, possible increase of percentage of reclaimed asphalt pavement in new asphalt pavement mixes and possible extension of the construction season.

The energy gains due to the reduction in fuel consumption in the drying of material are in the magnitude of 20 % compared to the traditional hot mix manufacturing process. The reduction of greenhouse gas emissions are in the same magnitude as the energy gains. As WMA unveils new possibilities such as increased content of recycled asphalt; the environmental gains are expected to increase. Warm mix asphalt offers an opportunity for the road industry to improve performance, efficiency, and environmental stewardship to achieve global project environmental efficiencies.



WMA Systems

Until recently, technical papers related to WMA would describe each system in details. This is no longer possible as multiple systems are introduced in the market. Nonetheless, nearly all WMA systems may be divided into one or a combination of the following categories:

- Addition of a small amount of water causing foaming of the bitumen
- Bitumen emulsion
- Organic additive that reduces the viscosity of the binder
- Chemical additive that promotes coating at a lower mixing temperature
- Modification of the binder mixing process
- Low-viscosity synthetic binder

a) Foaming techniques

In the presence of hot bitumen, a small quantity of water (~ 2% by mass of bitumen) changes from liquid to vapor. The expansion ratio of water to vapor is > 1600 at normal atmospheric pressures. The rapid expansion of the water, from liquid to vapor, creates thin-film bitumen bubbles filled with water vapor referred to as foamed bitumen. In a foam state, the viscosity of the bitumen is reduced allowing full aggregate coating at lower mixing temperatures. The characteristics of foamed bitumen are described in terms of expansion ratio (volume of foam compared to volume of liquid) and the half-life of the foam which provides a description of the stability of the foam in time. Foaming characteristics of bitumen

is bitumen specific and foaming process specific.

The WMA systems that use the foaming techniques may be differentiated from one another in the manner that the water is placed in the presence of the hot bitumen. The foaming methods currently on the market include: expansion chambers, wet sand and additives trapping crystallized water. Another process such as blending an inverted emulsion with hot bitumen has been explored in France. Foaming bitumen is relatively simple and inexpensive, and it is expected that other WMA systems will be developed based on that techniques.

b) Bitumen emulsion

The bitumen emulsion technique was developed in North America and it consists of mixing a specific high residue bitumen emulsion with hot aggregate at a reduced mixing temperature. As the emulsion mixes with the hot aggregate, the water flashes off as steam. The bitumen emulsion is specifically designed for the WMA process and includes additives to improve coating, workability and adhesion. It has been reported that mixture workability remains excellent at relatively low temperatures (< 80°C), which is a specific benefit of this WMA system.

c) Organic additives

Organic additives in the form of wax have emerged successfully from an extensive program of laboratory and field trials as a bitumen modifier that enables



mixing and compaction at reduced temperatures. Organic additives are often referred to as “intelligent fillers” as they provide reduced viscosity at mixing/ placement temperatures and increased viscosity at service temperatures, which is an added benefit specific to this type of WMA system. Furthermore, these additives increase the viscosity of the binder, thus providing increase in resistance to deformation at high ambient temperatures. Technical data also indicates that performance at low ambient temperature is not adversely affected with most binders. Unfortunately, wax in bitumen is often associated with questionable binder performance. This is an overstatement that may only apply to naturally occurring macrocrystalline waxes present in bitumen in higher concentrations. The research on the beneficial/detrimental effect of waxes on the properties of bitumen revealed that it is critically dependant on the chemical structure of the waxes. Waxes used as organic additives

for WMA have been specifically selected for their higher melting point (above high service temperatures) and their fine crystalline nature (ability to mix with bitumen).

d) Chemical additives

Warm mix asphalt systems involving the use of chemical additives or surfactants are not relying on the reduction of the binder viscosity, but rather the improvement of the coating capability of the binder at a lower mixing temperature. The WMA systems using this approach are relatively new and their development is promising. Certain chemicals are added to the binder in manner similar to anti-stripping agents in a concentration as low as 0.3 % by mass of the bitumen.

e) Binder mixing process

Warm mix asphalts may be produced by modifying the binder/aggregate mixing process. Several proprietary processes have been developed, either based on

mixing the binder (in foam or liquid state) with coarse and fine aggregates sequentially or based on mixing the aggregate with two different binders (again in foam or liquid state) sequentially. These processes are relatively inexpensive, provided that plant modifications are minor.

f) Low-viscosity synthetic binder

Plant-based low-viscosity synthetic binders have been developed in Europe. Mixes produced using these binders are produced and placed at temperatures roughly 40°C lower than conventional HMA. This product qualifies as a warm mix, but it is mainly used for decorative, architectural and ornamental surfacing projects. ■

Based on excerpts from:

Jean-Martin Croteau, P.Eng., and Bernard Tessier, P.Eng., MBA – “Warm Mix Asphalt Paving Technologies: a Road Builder’s Perspective” – Paper prepared for presentation at the 8th Session of the 2008 Annual Conference of the Transportation Association of Canada. Available online at www.worksalberta.ca

40 20

(WMA)

(HMA)

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Fleet of Cat® Paving Machines Helps Restore Eiffel Tower Intersection

The beginning of the tourism season this past April in Paris didn’t stop local contractor **Linea BTP** from finding a way to reconstruct a busy intersection in the heart of the city—just several hundred meters away from one of the most famous Parisian attractions, the Eiffel Tower.

Completing any road construction project during the busy tourist season requires critical timing, and the correct machines to handle the project efficiently and within the required timeframe. As a result, Linea BTP purchased four new **Cat®** road construction machines that fit the task at hand.

The order was placed just three short weeks earlier. Machine delivery occurred on-site on the evening of the project’s start, and included a Bitelli® BB621C Track-type Paver Finisher, a Cat CB434D Asphalt Compactor, and a Cat CB24 small Vibratory Util-



ity Compactor—as well as a Cat 906 Compact Wheel Loader. According to French dealer **Bergerat Monnoyeur**,

the machines were specifically suited for the project’s extremely tight working conditions. Linea BTP CEO *Michel Cottot* agrees, “We acquired these machines because 80 percent of our work is carried out in urban areas where space is at a premium. This meant we required equipment adapted to these types of situations.”

To avoid traffic interruptions, the entire project was completed over a three-night period. It began with the removal of more than 240 tons of material utilizing two Cat cold planers—a Bitelli SF200 and SF60 Cold Planer—and ended with paving and compaction taking advantage of the productivity of Linea BTP’s newest Cat machines from start to finish.

The challenging economic environment has not stopped Linea BTP from looking toward the turnaround. “We... believe that one should prepare for the future by investing in reliable, modern and well-adapted equipment—such as the Cat machines just acquired for this type of road resurfacing work,” says Cottot. ■

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Metong to Showcase its Asphalt Machinery at BICES in China



For more than 10 years, **Metong** products have been present in most countries, including Africa, Middle East, Asia, America etc.

The company has its own technical research and development department, and most of its engineers graduated from the United States. Also, some of its advanced technology is achieved in cooperation with US Phoenix. As the leading manufacturer of asphalt distributors and asphalt plants in China, Metong has the special advanced products which priority among other manufactures, such as: Chip sealer, Rubber asphalt plant, and Slurry seal.

The Chip Sealer is a highly advanced machine used for spraying bitumen and crushed stones the same time. The machine is combined by two parts, bitumen tank and aggregate stone parts; the truck used is from the well-known brand chassis HOWO Chassis to guarantee the whole vehicle quality.

The Rubber Asphalt plant is a technology developed in cooperation with US Phoenix. The plant has been sold to the US and countries in Europe last year, in addition to it being sold domestically in China.

The Slurry seal machine gives Metong products great complementarities, so that they cover the whole range of road construction machines.

Zhejiang Metong Machinery Manufacture Co., Ltd will be participating in 10th Beijing International Construction Machinery Exhibition & Seminar in China, 3-6 November, at Jiu Hua International Exhibition Center, Changping District, Beijing. ■

REFER TO RIN 13 ON PAGE 82

Dynapac Soil Compactors Chosen for Major Dam Project in Turkey



A fleet of four new **Dynapac** single drum vibratory rollers is currently working on the massive Alkumru Dam for the Hydro Electrical Power Plant project in SE Turkey. A total of 18 million m³ of clay and rockfill is being compacted to form a finished structure with a height of 134 m from foundation level and a crest length of 909 m.

The \$500M project, which currently employs a total workforce of some 1250 people, is being undertaken by **Limak HES Yatirimlari AS**, one of the region's leading investors in the power industry.

The Alkumru Dam is one of seven adjacent dams to be constructed on Botan Brook, a tributary of the River Dicle, and once completed at the end of 2010, will transform the region into one of large lakes providing much needed electricity.

Since the project commenced in 2007, Sweden-based Dynapac, part of the **Atlas Copco Group**, has been able to demonstrate not only its ability to supply the ideal soil compaction equipment for the application but also provided the necessary follow-up expertise to ensure its correct and efficient use.

This commitment to its customers recently involved a visit to the important Alkumru project by a group of four key Dynapac and Atlas Copco personnel, including the compaction and paving research manager from the company's International High Competence Centre. During this visit a technical seminar was given to the entire site management and application team covering the latest developments in compaction technology.

The rollers chosen for this project consist of three CA512D smooth drum machines and one CA512PD padfoot version, all with a drum width of 2130 mm. The smooth drum units are being used for compacting layers of rockfill whilst the padfoot machine is working on the cohesive clay areas. ■

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Ammann Concrete Mixing Plants

Professional Solutions for the Industry

As concrete formulations grow in sophistication, mixing technology needs to mature alongside. One of the few providers in the world to be both a developer and manufacturer of core components like mixers and control systems is **Ammann**. The company's rather special blend of competencies means that every plant component has been built to work ideally with the others. That in turn ensures the top quality of the resulting concrete mix.

The semi-mobile JustWhite plant is a case in point: equipped with Ammann's AMIX2_3.00B twin-shaft paddle mixer that processes a batch of 1.5m³ at a time, and run via the Ammann as1 control system, it provides a capacity of 70m³/h. Both of these components are used in considerably larger plants as well. The JustWhite deploys them to profitably turn out all common types of concrete to the highest standards.

Now, Ammann is offering standardized integration of plant components like stone and cement silos. Customers for their part benefit from a high proportion of in-house production. The extended palette of options includes plant housings, addition of cooled process water, and more besides.

A camera eye in the mixer for visually checking the mix quality

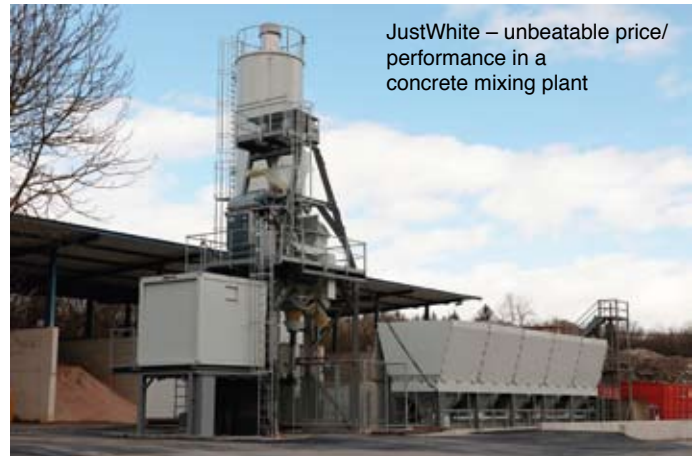
One new development by Ammann is a mixer camera, for keeping an eye on the otherwise unseen mixing process. The camera is installed within a spherical housing, which swings out of the mixing chamber during filling or cleaning operations in order to protect the lens from dirt and damage. A video monitor in the control room enables the operator to keep visual track of the mixing and emptying process. The field of vision can be adjusted within a wide area.

AMIX mixer for demanding mix jobs

Ammann's AMIX twin-shaft paddle mixer is up to any mixing job and fully meets mix quality requirements, also with self compacting concrete (SCC). For meaningful documentation of results, Amman has developed a measure of consistency based on more variables than simply the usual approach of metering power input to the drive motors.

The feeder lining, mixing arms and blades of the AMIX mixer all have wear-resistant coatings. An optimized plate design considerably prolongs service intervals and keeps operating costs low. Where the material to be mixed is especially abrasive, the mixer can also be fitted with Amdurit wear plates; these increase service intervals by a factor as high as five.

To address demand for an extremely high-capacity plant that can be relocated at modest expense, Ammann is



JustWhite – unbeatable price/performance in a concrete mixing plant



Mixer camera – for visually checking the mix quality



AMIX mixer – for demanding mix jobs

working to expand the product range with a semi-mobile plant that includes a large-volume AMIX mixer.

Ecology, safety and focus on key aspects are all topmost concerns in new product development. With its extensive vertical development and in-house manufacturing, Ammann can deliver a fast and convincing response to the needs of the market. ■

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