أسبوع المياه العربي

Towards Smart & Agile Water Utilities | نحو مرافق مياه ذكية ورشيقة

TOWARDS SMART & AGILE WATER UTILITIES

نحو مرافق مياه ذكية ورشيقة

Ministry of Water and Irrigation

ACWUA

الجمعية العربية لمرافق المياه

Arab Countries Water Utilities Association

ACWUA

Arab Countries Water Utilities Association

NEWSLETTER

17TH EDITION | **FEB, 2023**

أسبوع المياه العربي

6TH ARAB WATER WEEK | أسبوع المياه العربي السادس

5TH – 9TH MARCH 2023 | ٥ - ٩ آذار ٢٠٢٣

ST. REGIS HOTEL AMMAN - JORDAN- | عمّان - الأردن - فندق سانت ريجيس

INTRODUCTION

Welcome to our latest newsletter -the fourteenth edition, which we hope has kept you updated on our latest news, and has provided you with vital information pertaining water sector in the Arab countries.

Since its official launch in 2009 at Amman, Jordan; ACWUA has expanded its membership network to reach more than 100 utility members from 18 Arab countries, in addition to private sector companies, NGOs and academic institutions along with more than 200 individual members. Furthermore, ACWUA has also developed important partnerships with several international organizations and donors, thus introducing potential opportunities to its members.

In order to sustain knowledge sharing with our esteemed members and partners, we trust this newsletter may be useful to you and your organization in comprehensively projecting the latest regional and international developments in water sector.

Sincerely Yours

ACWUA Secretary General
Eng. Khaldon H. Khashman

CONTENTS

أسبوع المياه العربي

POLICY

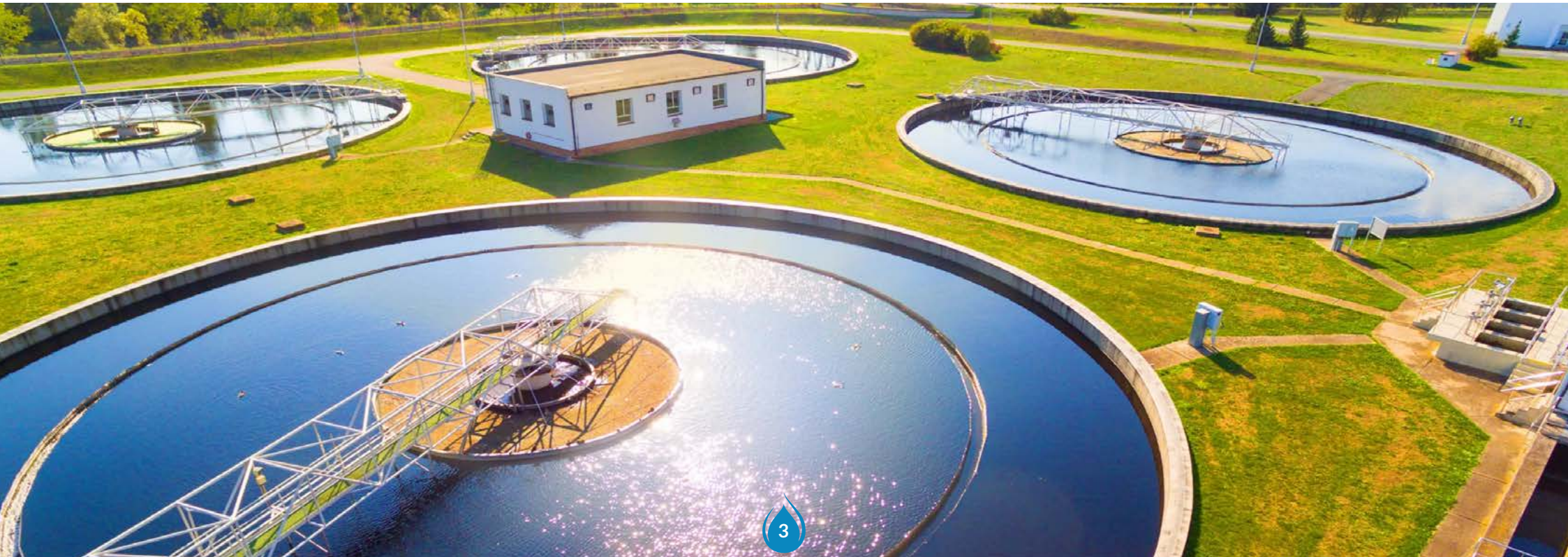
ACWUA, as a global center of excellence, will work in partnership with water and wastewater utilities in the Arab countries, on instituting best practices and on building capacities within a high-quality level.

ACWUA is committed to provide all services with high quality, provide safe and healthy working conditions and to protect the environment, which will be achieved through the following:

- Conform with the quality requirements and specifications in all ACWUA matters.
- Provide health and safe working conditions.
- Apply pro-active actions and procedures to eliminate hazards and reduce OHS risks to prevent injury and ill health.
- Commitment to consultation and participation of employees regarding their health and safety.
- Reduction of energy and water consumption.
- Protect the environment and reduce the pollution resulted from ACWUA activities.

In addition, ACWUA is committed to meet all applicable legal and other requirements relevant to Quality, Health, Safety, and Environment.

ACWUA commitment will be achieved through continual improvement by planning and implementing specified and measurable QHSE objectives and to enhance members and other interested parties' satisfaction.



MISSION

In partnership with the Arab water and wastewater utilities, ACWUA will provide the necessary knowledge and tools for utilities to be a trusted, efficient and effective in providing safe, affordable water and wastewater services.

VISION

A global center of excellence for water and wastewater management and knowhow.

ACWUA

الجمعية العربية لمرافق المياه

Arab Countries Water Utilities Association

GLOBAL CENTER OF EXCELLENCE

YOUR GATE TO THE WORLD

STRATEGIC OBJECTIVE

This section list key strategic objectives planned by ACWUA for the period 2019-2023, while the next section detail action plan and targeted indicators for each objective:

EXPAND ACWUA MEMBERS' KNOWLEDGE EXCHANGE

- Improve knowledge exchange with members through consulting activities for members or through partnerships with them using available knowledge/ know-how ACWUA Tools (Non-Revenue Water, Technical Sustainable Management (TSM), Wastewater Treatment and Reuse, Energy Efficiency, Water Safety Plan, Benchmarking, comprehensive customer survey and any additional requirements for the members during the life of this Strategic Plan) and pool of experts working with/for at least 5 members by the year 2023.

- Build members' capacity by preparing an annual training plan starting year 2020 (scheduled training) based on needs assessment outcomes and responding to new members' training requests where funding is available using certified programs and training material, to be implemented through both E-learning and conventional training programs working with at least 7 members by the year 2023.

- Share outcomes with members through annual report, conferences reports (bi-annual), guidelines/manuals (at least 3 by the year 2023), operation members and outcomes of large projects implemented by ACWUA or members (at least 3 by the year 2023-if eligible projects available).

IMPROVE MEMBERS' COMMUNICATION

- Update the assessment of members needs annually from the year 2020 to accommodate their internal and external factors changes.

- Continue the implementation of the ACWUA approved "Marketing Strategy & Communication Plan" to improve ACWUA marketing and members' promotion by the year 2023.

- Expand members base by at least 20%with more focus on individuals and private sector in cooperation with member utilities.

- Continuous networking through bi-annualArab Water Week, and partnership with members interested in organizing a thematic conference by sharing knowledge and experience.

- Respond to members' utilities requests (or suggest) at least 3 twinning/ match making activities by the year 2023 subject to funds availability.

- Build an internal mechanism to connect ACWUA members from the private sector and utilities to transfer the knowledge and new business opportunities by the year 2021 Improve ACWUA Efficiency and Effectiveness.

IMPROVE ACWUA EFFICIENCY AND EFFECTIVENESS

- Update the organizational structure to accommodate current and future needs of ACWUA and its members in the year 2019.

-Achieve cost recovery (Net Income adjusted for depreciation) by the year 2023 with a maximum of 10% variance (calculated based on net revenue) to assure sustainability.


Water is life

تحت رعاية
صاحب السمو الملكي الأمير الحسن بن طلال المعظم
مؤتمر ومعرض أسبوع المياه العربي السادس
والمؤتمر العربي الثاني لتنفيذ المشاريع بدون حفر
نحو مرافق مياه ذكية ورشيقة
5 - 7 آذار 2023

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Sponsored by:

Platinum

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Coffee Break

Knowledge Partners:

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أسبوع المياه العربي

هل تعلم أن أعداد المشاركين في أسبوع المياه العربي السادس ٢٠٢٣ هي كالتالي:

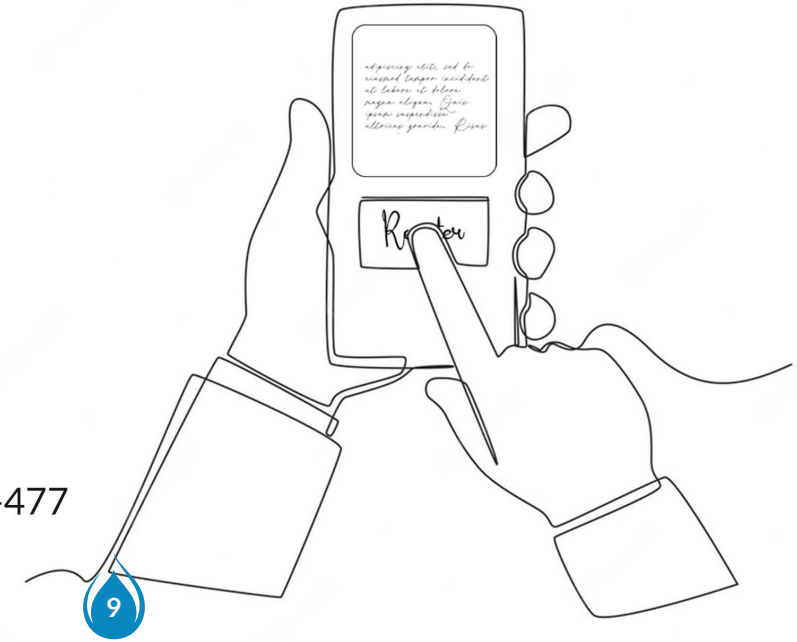
20 شركة عارضة
144 متحدث ومتحدثة
510 خبير وخبيرة مشاركين
34 دولة حول العالم

أهلاً بكم في مؤتمر ومعرض أسبوع المياه العربي السادس، و المؤتمر العربي الثاني لتنفيذ المشاريع بدون حفر.

Did you know that the numbers of the participants in the 6th AWW were as follows:

20 Exhibitors
150 Speakers
460 Participants
30 Countries

Welcome to the 6th Arab Water Week and 2nd Trenchless Arabia Conference and Exhibition.



Reach Us at:

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Tel: +962-6-5161-700

Mob: +962-798-519-514 | +962-799-177-477

www.arabwaterweek.com


ACWUA | Registration Desk
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6TH ARAB WATER WEEK | أسبوع المياه العربي السادس
5TH – 7TH MARCH 2023 | 2023 آذار 7-5
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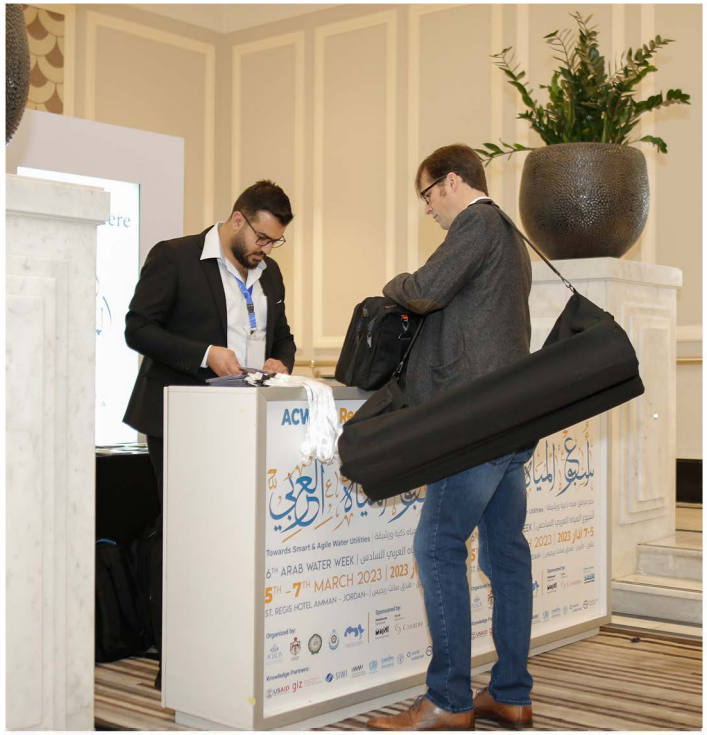
Register Here
ACWUA | Regis
Water Utilities


ACWUA | Registration Desk


Register Here


أسبوع المياه العربي
Towards Smart & Agile Water Utilities
6TH ARAB WATER WEEK | 2023
5TH – 7TH MARCH 2023
ST. REGIS HOTEL AMMAN - JORDAN-


مرافق مياه ذكية ورشيقة
٥ - ٧ آذار ٢٠٢٣
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Organizer:


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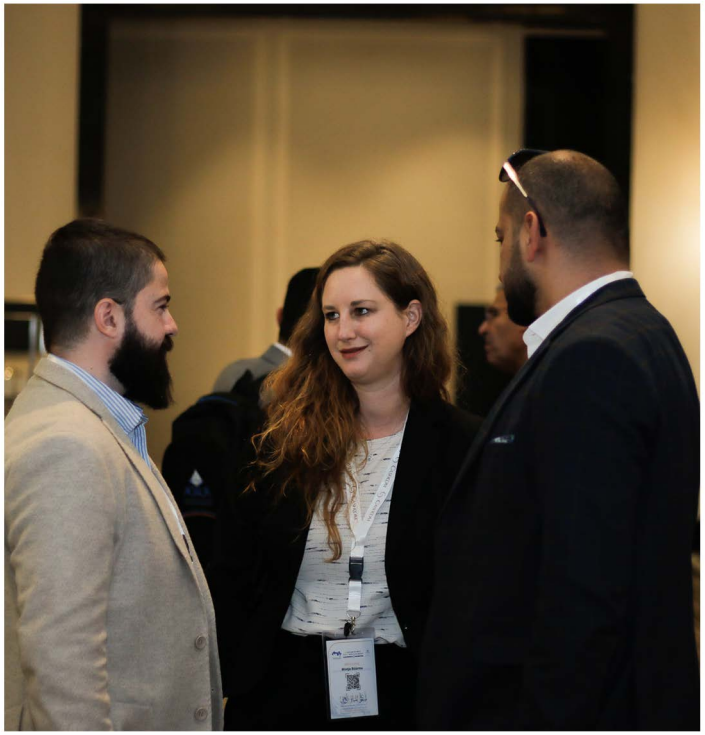
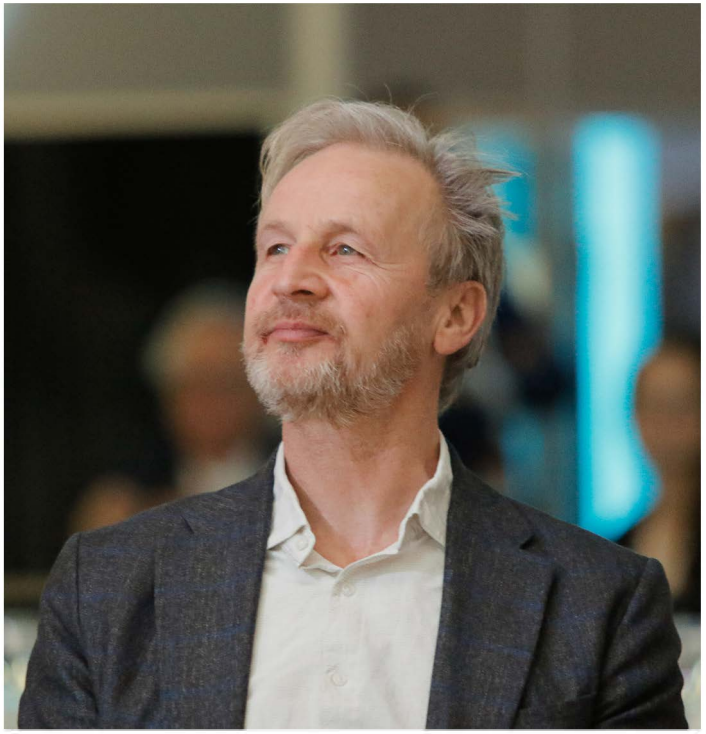
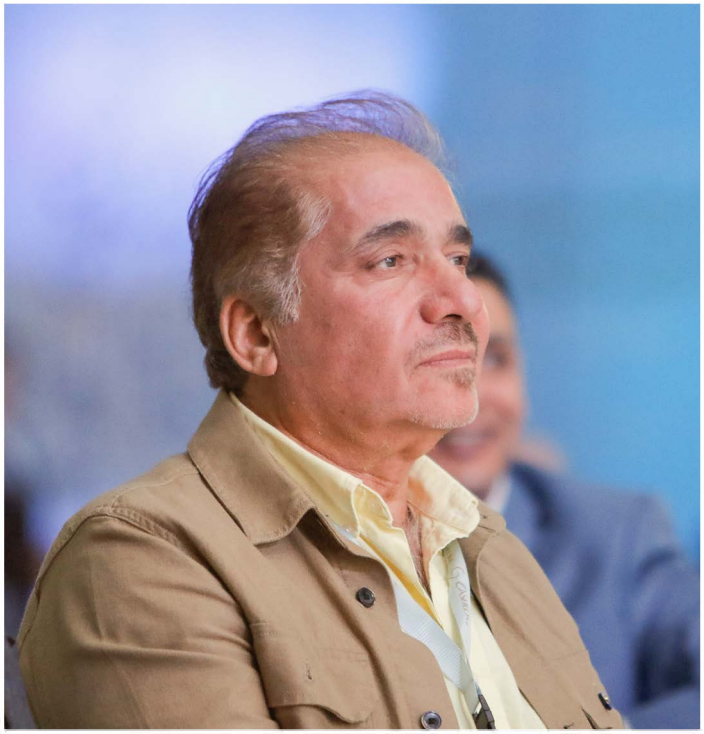
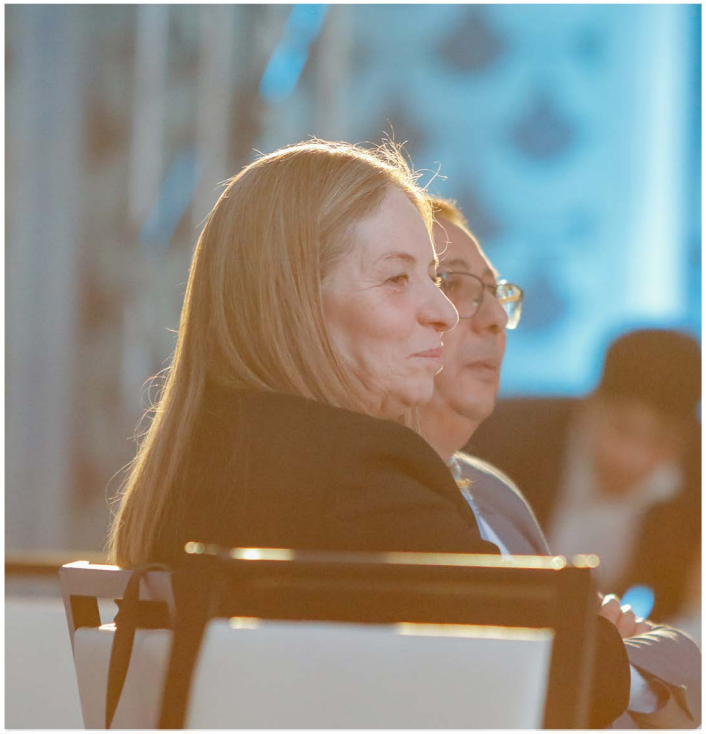
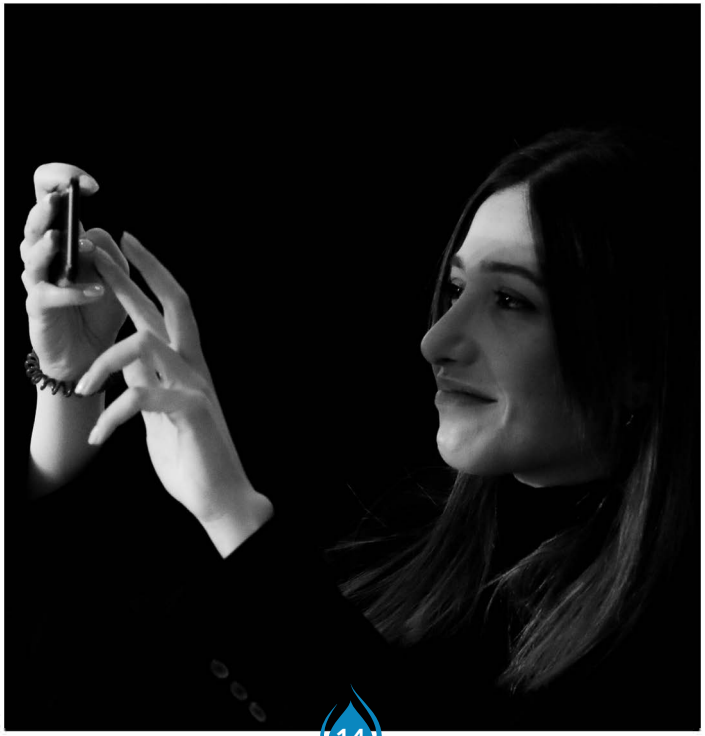



TRACTO


6th
ARAB WATER WEEK
AND 2nd TRENCHLESS ARABIA




Mohammad Al Hmaidi
Ahmad Al-Azzam

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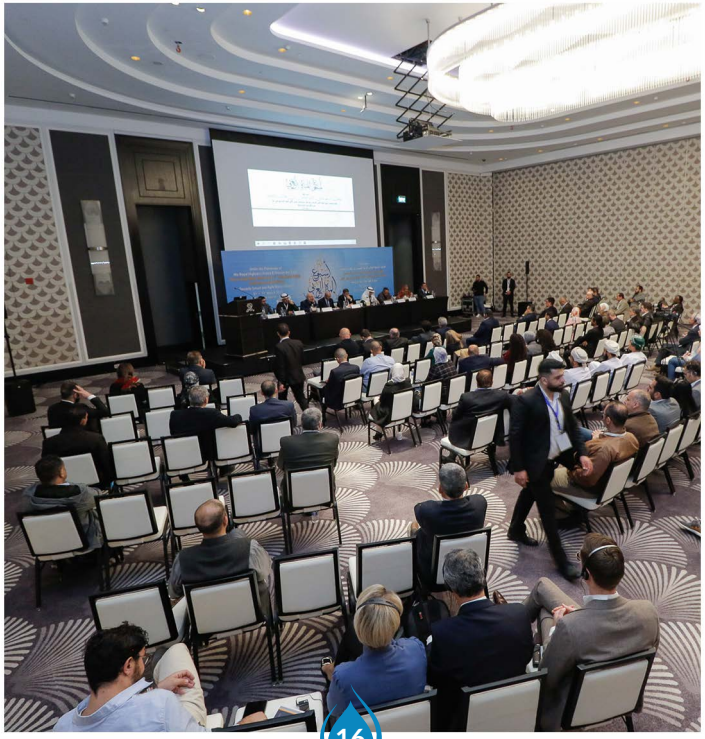
ؤتمر العربي الثاني لتنفيذ المشاريع بدون حفر
نحو مرافق مياه ذكية ور
7 آذار 2023
فندق سانت ريجس
Van Der Lugt Kees
Duaa Matar

Hammam Soliman

Walid Abderrahman

mart & Agile Water Utilities


أسبوع المياه العربي
H.E. Eng. Khaldon Khashman
Prof. Walid Abderrahman

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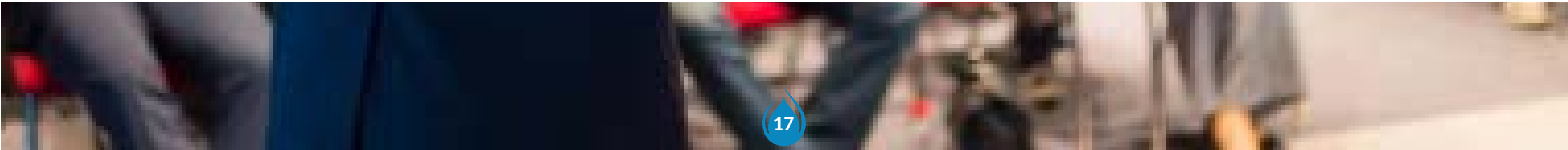
5 - 7 آذار 2023

CONFERENCES & SEMINARS



UN 2023 WATER CONFERENCE - FIRST ONLINE STAKEHOLDER BRIEFING

UN DESA Division for Sustainable Development Goals in collaboration with the Netherlands and Tajikistan, UN 2023 Water Conference Co-Hosts, organized the UN 2023 Water Conference - First Online Stakeholder Briefing on 15 June 2022. Arab Countries Water Utilities Association (**ACWUA**) participated in this meeting, where the meeting was open for all stakeholders and aimed at sharing information about the Conference, including opportunities for engagement and expected outcomes.

SECOND SCIENCE- POLICY DIALOGUE ON "INNOVATIVE SOLUTIONS AND SUCCESS STORIES FOR WASTEWATER REUSE IN MENA REGION

Arab Countries Water Utilities Association (**ACWUA**) participated in the Second Science- Policy Dialogue, where the conference activities were launched under the slogan (Innovative Solutions and Success Stories for Wastewater Reuse in MENA Region). The conference took place in Cairo, Egypt on 5-6 July 2022. The objectives of the conference were summarized in: promoting and facilitating the implementation of actionable solutions to remove the key barriers for more and safe water reuse across the MENA region, through creating policy change.

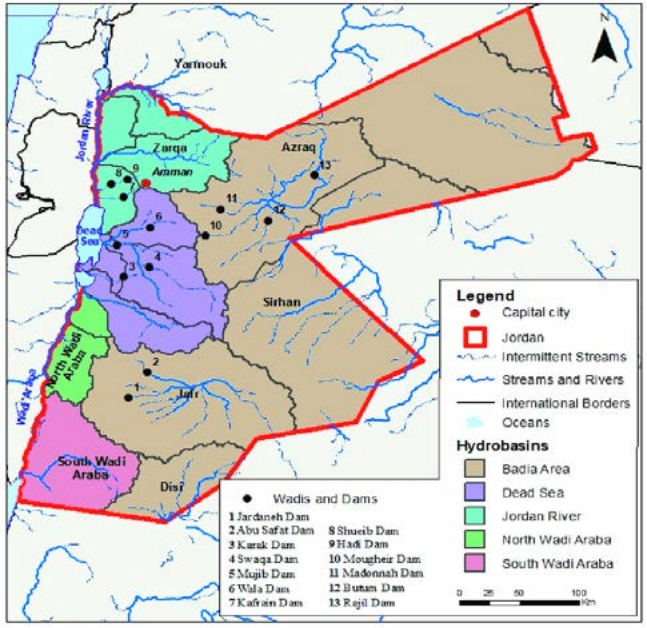
OCCUPATIONAL STANDARDS FOR CONTROL SYSTEMS WORKSHOP

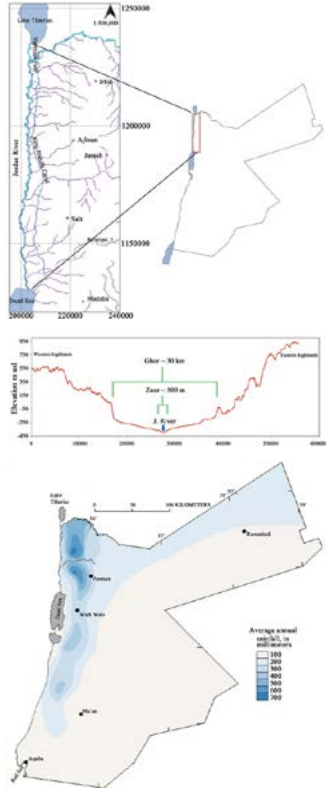
The Secretary General of ACWUA, Eng. Khaldon Khashman participated in workshop on occupational standards for control systems which took place in Amman, Jordan on 6-7 September 2022. The workshop aimed to develop occupational standards for control systems in various sectors, where The outcomes of this workshop would be a step forward for the development process of occupational standards.

MEWAC-FEMAR WORKSHOP: POTENTIAL OF MANAGED AQUIFER RECHARGE IN JORDAN

Eng. Khaldon Khashman represented ACWUA in MEWAC-FEMAR Workshop: Potential of Managed Aquifer Recharge in Jordan. Where the event took place in Amman, Jordan on 12 September 2022. The main goal of the workshop was to support the secure water supply in the Middle East through Managed Aquifer Recharge (MAR)

MEWAC
Middle East Regional Water Research Cooperation Program





WEBINAR ON THE UN 2023 WATER CONFERENCE AND THE USE OF NATIONAL DATA

On 14 September 2022, the UN-Water Integrated Monitoring Initiative for SDG 6 (IMI-SDG6) hosted a webinar on the UN 2023 Water Conference and the use of national data. For effective and efficient water policies and investments, including priority setting, it is important to have timely and credible data to guide our actions, and this is true also for the UN 2023 Water Conference and the Water Action Agenda.

UN 2023 WATER CONFERENCE

WEBINAR OF THE WASH FINANCE STRATEGY GUIDE

The new goals have required a significant increase in WASH sector performance to make better use of existing funding and to attract new investments. In 2022, many countries are off-track to meet their national WASH goals. A national WASH finance strategy is therefore one key element for accelerating progress towards targets.

On 15 September 2022, UNICEF in collaboration with Sanitation and Water for All (SWA), Agence Française de Développement (AFD) and IRC Water and Sanitation Centre, with key contributions from the World Health Organization (WHO), launched a new report, titled "Developing Water, Sanitation and Hygiene (WASH) Finance Strategies: A Guide", which objective is to support governments and development partners in promoting and facilitating the development of WASH finance strategies.

CLOSING WORKSHOP OF REWATER MENA PROJECT

The Secretary General of ACWUA, Eng. Khaldon Khashman participated in Closing Workshop of ReWater MENA Project that was held on 19-20 September 2022, in Cairo, Egypt. The workshop was the occasion to synthesize the key-learnings and practical outputs of the project and reflect on the next policy and science activities needed to continue supporting the expansion of water reuse in the MENA region.

8TH JORDAN INTERNATIONAL CIVIL ENGINEERING CONFERENCE (JICEC8)

The Jordan Engineers Association (JEA) convened the 8th Jordan International Civil Engineering Conference (JICEC8) under the title “Smart Civil Engineering” in Amman, Jordan, on 27-29 September 2022. **The Secretary General of ACWUA, Eng. Khaldon Khashman** participated in the conference.
The conference is intended to have wide-ranging, technical, educational, and cultural components that would be of interest and benefit to a large audience of leaders, engineers, professionals and students in the Civil Engineering profession across all disciplines and levels of experience

The Eighth Jordan International
Civil Engineering Conference
Smart Civil Engineering

(JICEC8)

المؤتمر الأردني الدولي الثامن
في الهندسة المدنية
الهندسة المدنية الذكية

27 - 29 أيلول 2022

CAIRO WATER WEEK

The Secretary General of ACWUA, Eng. Khaldon Khashman participated in Cairo Water Week that was be held on 16-19 October 2022 under the theme, 'Water at the Heart of the Climate Action.'

The event aimed to provide water actors and stockholders from around the world with a platform to present and discuss critical issues, policies, strategies, plans, and measures related to climate-water challenges.

6TH WATER LOSS FORUM AND EXHIBITION

ACWUA, participated in the 6th Water Loss Forum and Exhibition in Istanbul, Turkey from 2-3 November 2022. This event presented the most effective use of water resources, reduction of non-revenue water losses in drinking water supply, efficiency improvements, integrated water management and introduction and extension of successful example practices.

SU YÖNETİMİ ÖDÜLLERİ
WATER MANAGEMENT AWARDS
2022

ARAB MINISTERIAL COUNCIL MEETING

ACWUA participated in the Fourteenth Meeting of the Arab Ministerial Council where the meeting comprised Ministerial and technical meetings for the Housing, environment and water resources Technical Advisory Committee. This meeting was convened by Water League of Arab States, the economic sector - Department of Environment, held in Cairo, Egypt between 27 - 29 of November 2022.

EGYPT WATER, WASTE & INFRASTRUCTURE | EMPOWERING INNOVATIONS

ACWUA, participated in Egypt Water, Waste & Infrastructure- Empowering Innovations conference under the slogan "Key Take Aways of COP27 Translated into Local Agenda" which took place in Cairo, Egypt from 27 - 29 of November 2022.

The conference aimed to discuss doable solutions, challenges and opportunities for Egypt and the African continent, Adaptation, Mitigation and Finance with focus on private sector as a fast

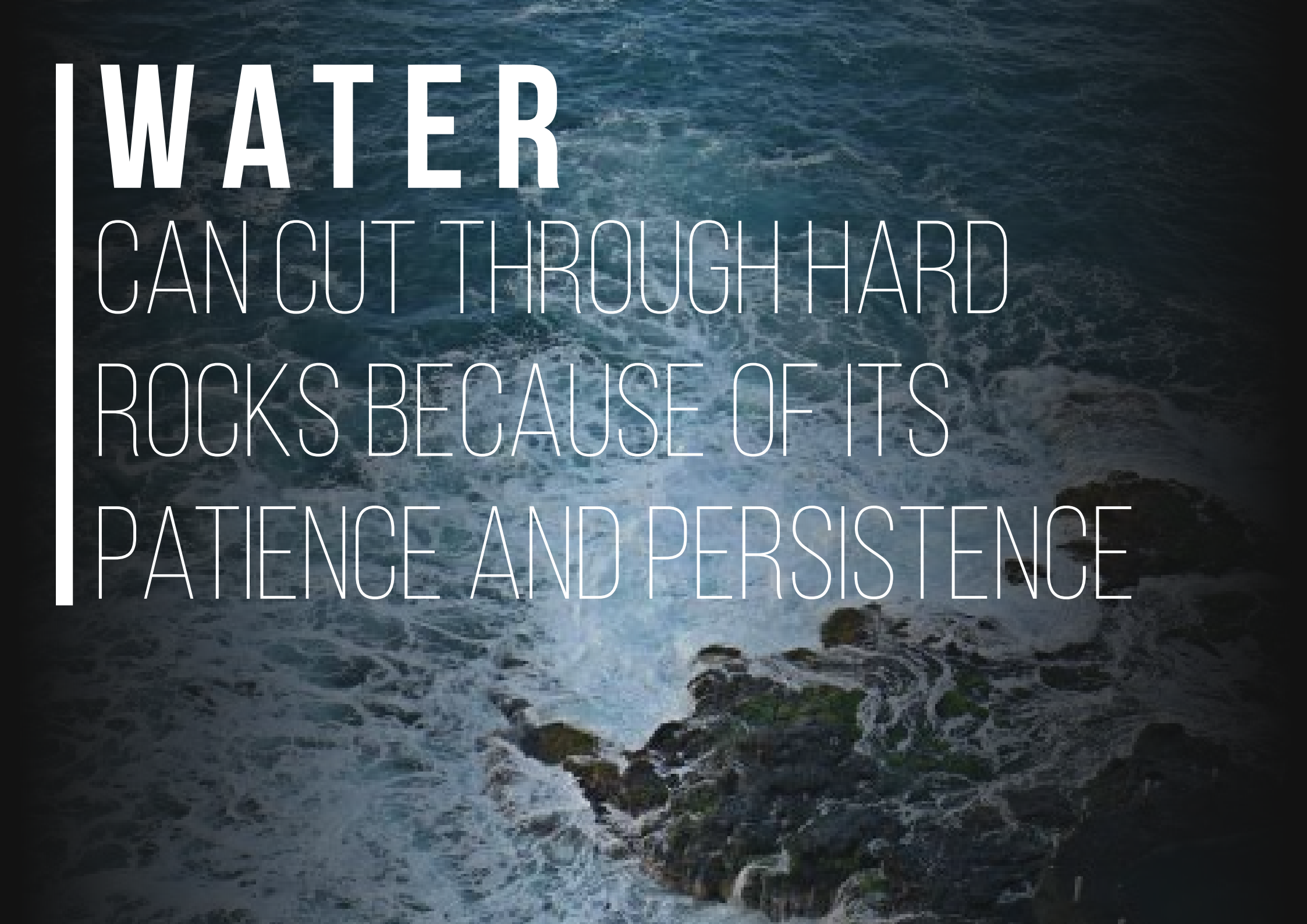
الأمـن المـائي العـربي
من أجل الحياه والتنمية والسلام

FOURTH ARAB WATER CONFERENCE

The Secretary General of ACWUA, Eng. Khaldon Khashman participated as a keynote speaker in the Fourth Arab Water Conference, which organized by the State of Palestine under the slogan "Arab Water Security for Life, Development and Peace". which took place in Cairo, Egypt from 30th November 2022 to 2nd December 2022.

MEMORANDUM OF UNDERSTANDING

Memorandum of understanding was signed on Thursday 22 December 2022 between **the Arab countries water utilities association (ACWUA) representative by Eng. Khaldon Khashman** and **Guarantee Group representative by Eng. Rami Qtaishat.** This MoU aims that guarantee company will be appointed as organizer representative in the 6th Arab Water Week which will be held in the St. Regis hotel, Amman - Jordan from 5th to 9th, March 2023.


WATER
CAN CUT THROUGH HARD
ROCKS BECAUSE OF ITS
PATIENCE AND PERSISTENCE

ACWUA 2022 TRAINING WORKSHOPS

2ND HALF

INTERNATIONAL STANDARDS

The Association of Boards of Certification

ACWUA certified programs developed within the international standards, which were technically reviewed and accredited by (Technical and Vocational Skills Development (Tvsdc) , Association of Boards of Certification (ABC), Umwelt bundesamt (UBA) and International expert (IWA and World Bank)).

Technical and Vocational Skills Development Commission

Tvsdc Vision:
Manpower with vocational and technical experience and skills, that meets the needs of the labor market, and capable to participate in entrepreneurial projects.

The Technical and Vocational Skills Development Commission (Tvsdc) was established in 2019. Tvsdc encouraging all forms of learning, skills development, and recognizing them within the educational system and the labor market, in addition to create new high- level options for TVET in line with the national qualifications' framework levels. As well as, accrediting the Training Programmes
License of vocational and technical training providers by issuance of a document (license) to practice the training, it is one of the most important quality assurance processes for TVET providers, to ensure that the training provider has the clear infrastructure, plans, owns all systems and resources before carrying out

One of ACWUA mandates is to develop resources, facilitate training programs, and advocate for Professional Certification to enable staff of utility members to perform their duties in a professional, reliable and cost-effective manner. ACWUA is providing all kinds of training programs for water and wastewater utilities in different areas, such as: institutional, managerial, technical and financial distributed on different working levels.

ACWUA has trained different levels of utilities staff at top and middle management and operational levels from water and sanitation utilities in the MENA region. Where ACWUA had initiated, developed and implemented 34 new training programs, accredited by the Association of Boards of Certification (ABC) and The Technical and Vocational Skills Development Commission (TVSDC) /Ministry of Labor – Jordan.

CERTIFIED
1229
TRAINEES

UNCERTIFIED
1783
TRAINEES

TOT
136
TRAINEES

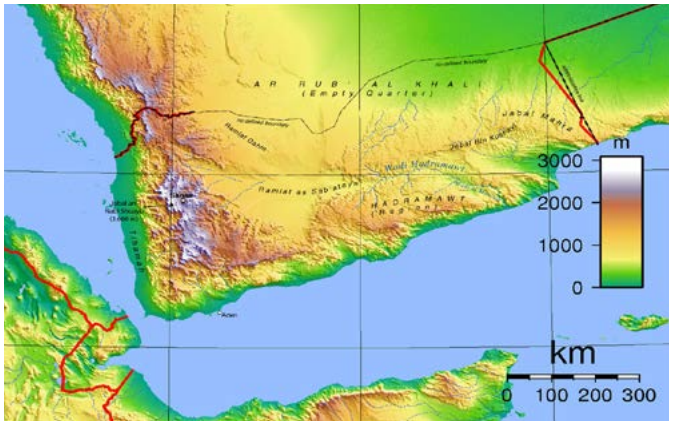
ISD
15
TRAINEES

-NUMBER SPEAKS-

BUILDING THE RESILIENCE OF CRISIS
AFFECTED PEOPLE AND INSTITUTIONS IN ADEN

Under the project "Building the resilience of crisis affected people and institutions in Aden", OXFAM – Yemen contracted ACWUA to foster local leadership and contribute to building the resilience of crises affected people and institutions in Aden.

1. Wastewater Collection for 30 participants
2. Wastewater Treatment for 30 participants
3. Water Safety Plan for 30 participants
4. Sanitation Safety Plan for 20 participants
5. Efficient Utility Management for 15 participants



CAPACITY BUILDING FOR IRAQI TECHNICAL STAFF ON WATER MANAGEMENT

UNICEF – Iraq office contracted ACWUA to build capacity for a number of trainees working with the Iraqi utilities under the program titled "Capacity building for Iraqi technical staff on Water Management" to gain knowledge in the best practices and adherence to standards and behaviors embedded in the code of conduct, ACWUA **delivered three training courses:**

1. Network Sub-zoning course
2. Water Allocation Include saline water desalination units
3. Developing NRW strategies training course

مشروع السمرا
Samra Plant Operation & Maintenance Co.Ltd.
Committed to a better environment by converting wastewater into valuable resources

ACWUA
GLOBAL CENTER OF EXCELLENCE
الجمعية العربية لمرافق المياه
Arab Countries Water Utilities Association

SAMRA PLANT OPERATION AND MAINTENANCE COMPANY

Based on the continuous cooperation between ACWUA and the water utilities in Jordan, a training program in Detection Methods for Microbial Indicators of Fecal Contamination in Water was held on the first of December 2022 for a number of laboratory technicians and operations administrators in Samra Plant Operation and Maintenance Company.


WE ARE RUNNING OUT OF WATER

MEMBERS & PARTNERS

ADVERTISEMENTS

مساحة إعلانية

على الذين يرغبون في الوصول إلى القراء والمشاركين المهتمين بشغف بقطاع المياه، الصرف الصحي، الطاقة، البيئة والتغير المناخي. يمكنكم الإعلان معنا بأسعار مذهلة للإعلانات الكاملة ونصف الصفحة في النشرة الإخبارية لـ (أكوا) ، بدءًا من 0 دولار لمعرفة المزيد ، يمكنكم التواصل عبر البريد الإلكتروني التالي acwua_secretariat@acwua.org

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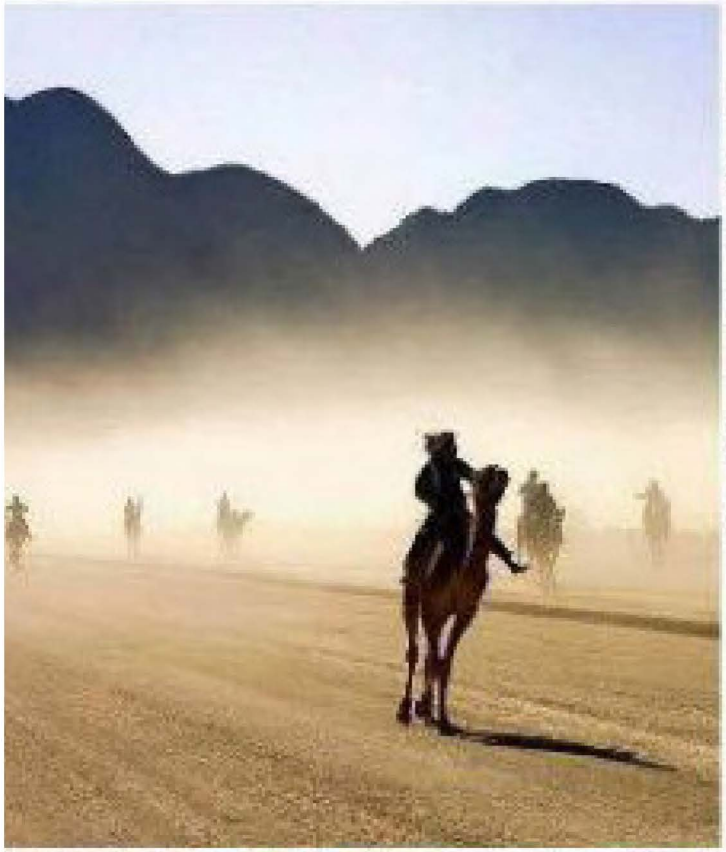
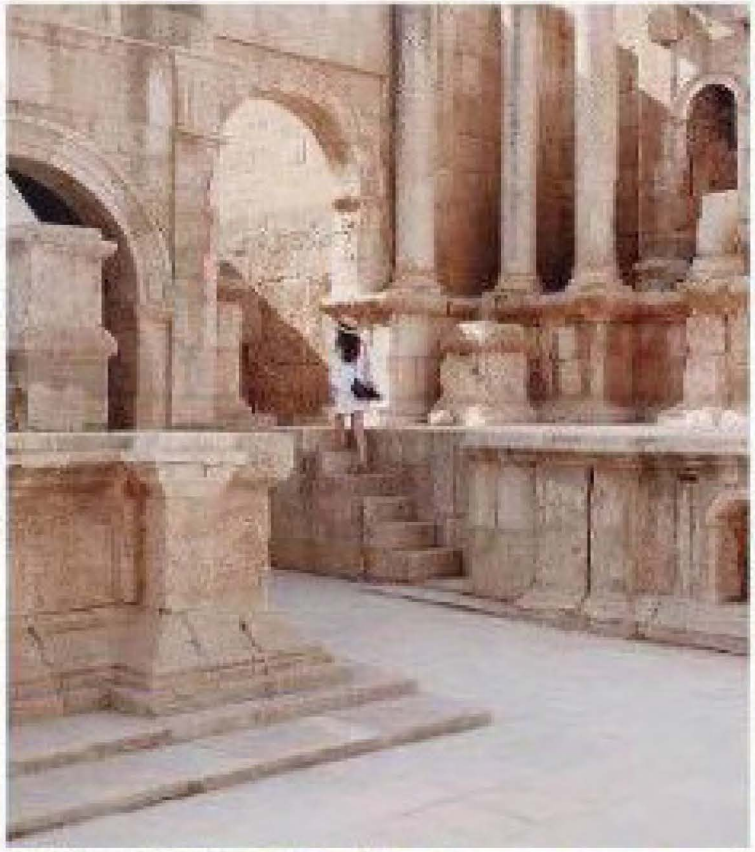
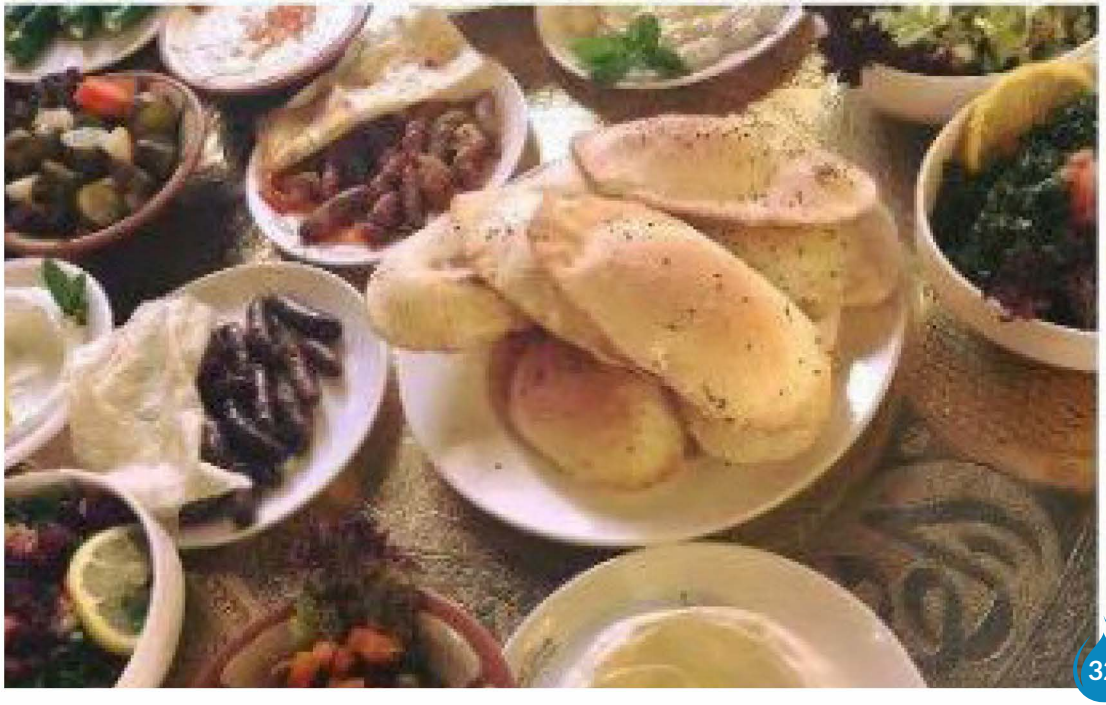
To find out more, email acwua_secretariat@acwua.org


الأردن
هيئة تنشيط السياحة






الأردن
هيئة تنشيط السياحة



کاشکوم

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info@cashcompay.com

Reduct's Utility Mapping Solutions

Inaccurate utility locational data is one of the main causes of utility strikes. In 2021, this has led to an estimated $30 billion societal cost due to delays and damages to underground utilities in the USA alone, according to The 2021 Damage Information Report Tool (DIRT) Report released in October by the nonprofit Common Ground Alliance.

Since its inception in 2001, Reduct NV (www.reduct.net) has launched a range of Gyroscopic Pipeline Mapping solutions to help reduce the risk of utility damage. The smallest system, named ABM-30 can map a 1 ¼" duct, the standard duct trade size for data cables. Standard centralized solutions such as the ABM_90 and DR-4 are available up to 40" pipe ID and when fitted with invert wheel sets, larger diameter pipes can be mapped as well.
Reduct's user-friendly gyro-mapping solutions provide not only accurate 3D well. Efficient operational procedures enable a crew of two to complete the mapping of a 1000 meter pipe segment within the hour.

Gyro-mapping Explained

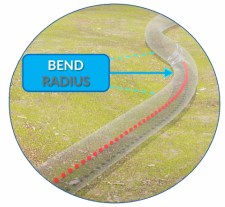
Gyroscopic pipeline mapping is a technique used within the utility pipeline construction and survey sectors to provide 3D geo-graphical information of underground utility pipes and ducts. As an autonomous Orientation Measurement Unit (OMU) is passed through a pipe or duct, a range of inertial sensors capture its change in heading, inclination, and acceleration at high frequency. The resulting 3D profile is linked to the start- and endpoint coordinates of the pipe segment and an as-built map is created which can be immediately uploaded into any GIS-platform.

Gyro Mappings Data Output

Gyroscopes, accelerometers and similar inertial sensors lie at the heart of gyroscopic pipeline mapping technology. Imagine that the probe is an arrow that is perfectly aligned with the orientation of the pipe. **One hundred times per second** the sensors record the change in the direction in which the arrow is pointing. Two integrated odometers record the distance traveled per sample, thus giving each sample a length. Place all samples in sequence and there you have it: an accurate 3D profile of the pipe segment mapped. The high rate of data points taken by the probe, may not be essential to create a line in a GIS platform, but it enables Reduct's X-View software to perform bend radius and inclination assessment calculations at any point of the mapped segment.

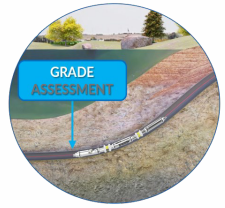
Bend Radius

Reduct's high accurate bend radius data is used to verify if the pipeline has been constructed according to the specifications mentioned in the tender. Bends that do not meet the specifications have a higher chance of rupture.



Inclination assessment

Only gyro systems provide such high resolution to identify even the smallest changes in inclination in a gravity sewer. Standard output compares the measurement results against new-build grade specifications or any known tolerance classification



Disclaimer: The information presented in this paper is a brief summary of third-party scientific research, vendor information and Reduct research and experience. Reduct does not claim ownership, warrant its correctness or completeness.

Fiber Optic Gyros (FOGs) versus Micro-Electro-Mechanical Systems (MEMS) Gyros

An evaluation for use in Underground Pipeline Mapping probes

Introduction

Over the last two decades the demand for, and availability of, underground pipeline mapping probes has witnessed a steady rise. Almost all autonomous underground mapping probes use inertial navigation technology and dead reckoning principles. Inertial navigation technology typically contains a range of gyroscope, accelerometers, magnetometers and other relevant sensors and electronics. When used in underground pipelines the probe does not have the possibility to verify its position by means of GPS or similar positioning system, so the *long-term stability* of the technology used is very important to understand.

This paper explores the two main technologies used for underground mapping probes: Fiber Optic Gyros (FOGs) and Micro-Electro-Mechanical Systems (MEMS) Gyros.

About FOGs and MEMS

The quality of measurement results, in the case of underground mapping defined as accuracy of the mapped profile, is highly dependent on the quality of the sensors used, and in particular the type and quality of gyroscope. In addition to the quality of the gyroscope used, the data-processing software is a second key element obtaining high accuracy levels, but this will not be part of the topic of this paper.

Fiber Optic Gyros (FOGs)
FOGs use the Sagnac effect, which utilizes counter-propagating optical beams and interferometry to measure rotation. FOGs have solid state, all fiber or hybrid fiber construction.

Micro-Electro-Mechanical Systems (MEMS) Gyros
MEMS gyros use the Coriolis Effect, which is based on vibrating mass deflection resulting from rotation. MEMS can be quartz or silicon based in construction.

The quality of the gyroscopes determines the *long-term stability* of the probe's measurement. The better the long-term stability, the higher the accuracy. And the higher the accuracy, the longer the length of pipe that can be measured.

Key Gyro Performance Factors:

1. **Noise or Angle Random Walk (ARW)** - The average error that occurs as a result of high frequency white noise. Major contributors to random noise are the active elements of the gyro such as the laser diode and photo diode in a FOG, and the silicon or quartz vibrating beam and detection electronics in a MEMS gyro.

2. **Bias Offset Error** - A stationary gyro can incorrectly register some rotation; this is called bias offset error. Its deviation from zero is typically given at 25°C for an ideal environment (i.e. no temperature change, vibration, shock, or magnetic field applied). The offset error must be calibrated periodically.

3. **Bias Instability** - Instability of the bias offset at any constant temperature and ideal environment. The instability scale must be calibrated periodically.

4. **Temperature Sensitivity** - Bias offset and absolute scale factor (SF) of a gyro will vary slightly with temperature changes. This can be improved with calibration.

5. **Shock and Vibration Sensitivity** - Shock and vibration can be modeled as noise and bias offset in the gyro output, causing inaccuracies too large to accommodate. These inaccuracies are not easily improved with calibration. FOGs are inherently not sensitive to vibration due to using a light source whereas MEMS use a mechanical structure and are more prone to vibration sensitivity.

Overview of GYRO FOG vs. MEMS Key Performance factors

Key Performance Indicator	Units	FOG	MEMS
Input Rate (maximum)	± °/sec	± 300	± 300
Angle Random Walk (25°C)	°/h/√Hz	≤ 3	≤ 9
Bias Offset (25°C)	± °/h	± 10	± 250
Bias Instability (constant temp)	°/h, 1σ	≤ 0.5	≤ 1
Bias Full Temp (≤ 1 °C/min)	°/h, 1σ	≤ 1	≤ 10
Bias Vibration Rectification	°/h/grms	≤ 0.5	≤ 1

Typical applications for FOGs and MEMS

FOGs offer high performance in the five key parameters vital for (underground) navigation, control, and stabilization. These are low angle random walk; small bias offset error; excellent bias instability (low drift); reduced temperature sensitivity; and reduced shock and vibration sensitivity. FOGs are solid state sensors which makes these gyros extremely robust and reliable.

MEMS gyros offer smaller size and weight and less power consumption than FOGs. MEMS are capable of withstanding high non-operating shock levels. The weaknesses of MEMS based inertial systems lie in critical performance parameters such as higher angle random walk/noise, which is an extremely important performance criterion in stabilization and positioning systems. In addition, MEMS gyros have higher bias instability, which results in a degraded (underground) navigation or stabilization/pointing solution. Thermal sensitivity of MEMS gyros and inertial systems also impacts their bias and scale factor performance; these attributes are critical in both stabilization and navigation applications.

The table below provides a general breakdown of the type of gyro best suitable for typical applications:

Gyroscope Grades Based on Bias Stability		
Performance Grade	**Bias Stability**	**Gyro Type**
Consumer grade	30-1000°/hr	MEMS (low end)
Industrial grade	1-30°/hr	MEMS (high end)
High-end Tactical	0.1-1°/hr	FOG (non-military grade)
High-end Navigation	0.01-0.1°/hr	FOG (non-military grade)
Strategic	0.0001-0.01°/hr	FOG (military grade)

Applying FOGs and MEMS in Pipeline Mapping Systems

As mentioned earlier, the overall accuracy of mapping and underground pipeline is highly dependent on the type of gyro used and the sophistication of the data-processing software. The *Angle Random Walk* and *Bias Offset* determine the accuracy (or drift) of a gyro over time.

Since FOGs score significantly better than MEMS for these key performance factors, FOG-based systems can measure significantly longer pipe segments than MEMS-based systems. Operational procedures, such as multiple measurements, may improve accuracy by applying the laws of statistics, but given the current state-of-the-art of MEMS, a maximum way-point spacing (or pipe length) of 300 meters is advisable for MEMS-based mapping systems. FOG systems, however, currently require a maximum waypoint spacing of 1,500 meters.

Regardless of which technology is used, periodic re-calibration is a very important factor for maintaining the systems' accuracy. Non-calibrated systems can *appear* to be accurate, for example by having a small spread between multiple measurements, but extensive tests have proven that the mapping result, despite the high repeatability, degrades over time.

Conclusion

The fundamental mechanical, data-processing and operating principles for FOG-based and MEMS-based pipeline mapping systems are similar so on that basis they are hardly distinguishable. Technically, however, only FOG based systems provide the accuracy required for pipe segments up to 1,500 meters in length. Both FOG and MEMS require periodic re-calibration to maintain accuracy.

WILOPARK

OUR NUMBER 1
DIGITAL LOCATION

180,000

square metres is the size of the construction project – about the same as 26 football pitches.

2,000

employees work at the Wilopark.

4,000

solar modules save 3,500 tons of CO2 every year.

166

Wilo pumps are used throughout the Wilopark.

ABOUT WILO

The Wilo Group is one of the **world's leading premium providers of pumps and pump systems** for the building services, water management and industrial sectors.
Today, Wilo has **8,200 employees** worldwide, and produces around **10 million pumps** annually.

Middle-East and North Africa

Dubai is one of the world's leading digital hubs. As such, it offers the Wilo Group an excellent opportunity to designate it as its **headquarters** for the **Middle East and North Africa Region**.
The **MENA** Region is represented by **Platforms** based in **Lebanon**, **Egypt**, **Morocco**, and the **UAE**.

Wilo Levant Platform

The **Wilo Levant Platform** was officially inaugurated in **2019**, with the **main office** and **training academy** located in **Lebanon**, and a **representative office** managing the operations of **Jordan** and **Palestine** located in **Amman, Jordan**.

"The 25 – Years history of Wilo Lebanon was the key role of the subsidiary in the international strategy of the Wilo Group. Our excellent performance throughout the years and the promising business environment in Levant area will turn the platform into a center of excellence."

Ayman Nassar
Managing Director, Wilo Levant Platform

CLIMATE LEADERSHIP

Wilo_One of **"50 Sustainability & Climate Leaders"** Worldwide

Winner of the **"German Sustainabilty Award 2020"** in the **Climate transformation** field.

HYDROGEN:

THE EMERGENCE OF A GLOBAL MARKET

From industry and transportation to heating, our society requires **green energy** in every area of life. this demands a solution that is both **Co2-free** and capable of being stored and transported: **hydrogen**. It has vast potential as the energy source of the future. And Wilo has the potential to be a global player for the generation, storage, **distribution and use of hydrogen.**

"Hydrogen technologies and systems have been defined as a value chain of strategic interest, meaning that Wilo's solutions in this area are also systemically important.
In future, our products and systems will make an essential contribution to the generation, distribution and utilisation of blue and green hydrogen."

Oliver hermes
President & CEO, Wilo Group

RELEVANT, DIGITAL, SUSTAINABLE

SMART CONNECTED WASTEWATER PUMPING SOLUTIONS
Wilo-Rexa SOLID Q with Nexos Intelligence

- Anti- Clogging detection with automatic flush sequence.
- Intelligent control function for energy efficiency optimization.
- Integrated, redundant pump control of up to units.

Nexos Intelligence

- Prevents alarm states
- Web access independent of the device
- Optimized flow rate for reduced operating costs and longer system lifespan
- System access at all times
- Back-up function in event of communcation breakdown
- Encrypted data technology

Wilo-Rexa SOLID Q

NEXOS INTELLIGENCE

Intelligent Anti Clogging Functionality

Adjustable parameters for detection of clogging and automatic cleaning sequence designed for the specific hydraulic type.

Automatic Slave Switch Over

Automatic takeover of the master functionality by any pump in case of a malfuntion.

Intergrated Frequency Controller

Automatic parameterization & comfortable control of the Frequency converter by the web server

Integrated Multi Pump Controller

Control of up to 4 pumps included, no further control device required

Intelligent Energy Efficiency Optomization

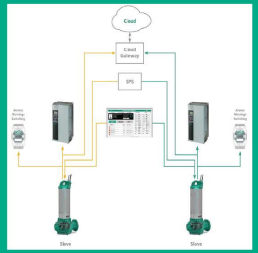
Automatic detection of the system's optimal speed with dynamic adjustment to variable

Technical View

Sensors: Packages with DDI

- Vibration monitoring temperature sensor DDI
- Bearing temperature monitoring
- Winding temperature monitoring
- Leaking chamber monitoring Sealing chamber monitoring

Concept



Advantages

Smart, Sustainable, Reliable, Energy Efficient

20% reduction of energy cost.

20.7% reduction of CO2 emissions.

per year per pump

OPTIMIZED WATER SOLUTIONS

JORDAN

As climate change accelerates, **wastewater reuse** is becoming more necessary.
Wilo Levant Platform was awarded the **equipment's supply** for the **rehabilitation of 3 wastewater treatment plants in Jordan**, a project contributing towards the mitigation of climate change in the wastewater sector and improving environmental circumtances in the plant area; hence, **supporting Jordan's Vision 2025** for achieving water security in the Kingdom.
We were part of **upgrading the sludges lines** and **optimizing energy consumption** that will lead to an **improved quality** of the treated effluent to **enable water reuse** and **increase** the availability of **water irrigation** in the area.
Irbid station alone will **cut green house emisions** by **6,600 metric tons** annually.

Our Solution consited of:

86 Wilo-EMU FA (customized submersible pumps)
11 Wilo-Rexa PRO (configurable submersible pumps)
10 Wilo-Rexa Block (dry sewage non-clog pumps)
10 Wilo- medium to low speed Mixers
4 Wilo-VeroLine-IPL & DL (heat recovery and circulation)
8 Wilo-EMU RZP (internal recirculation pumps)

"Wilo Levant Platform business activities in the Levant region aim to optimize synergy and energy efficiency in the water sector. Jordan's challenges and limited water resources are key for extensive care about the country's integration and adaption into more efficient, reliable, and digital solutions for a sustainable development."

Mohammad Abushanab
Country Manager, Wilo Rep Office Jordan, Wilo Levant Platform

ASK ABOUT OUR SERVICE PACKAGES

Your Needs, Our Tailor-Made Solutions

Three different contract models of WiloCare:

-> Basic Model
-> Comfort Model
-> Premium Mode

Depending on your requirements, all risks and costs of maintenance, call-outs and/or spare parts can be covered.

-> We maintain your equipment on a regular base
-> We take over the operation and service of your pump/system
-> We control your equipment remotely

VIVAVIS

Secure and automated processes for water utilities and waste water management

VIVAVIS provides comprehensive and holistic solutions for the entire water network in cities and their surrounding regions. Solutions from VIVAVIS enable operators to monitor and manage their water networks across a whole range of processes – from water sources to consumers.

Apart from offering solutions in plant automation, telecontrol, IoT, SCADA and advanced network management platforms, the combined solution from VIVAVIS become even smarter thanks to the artificial intelligence (AI) solution from our expert brand eoda. The processes in water networks are automated, monitored and controlled, but thanks to the new AI technology, the water networks are now converted into intelligent networks. Whether you are dealing with demographic or geographic data, water data (flow rate, pressure, water levels, water quality, energy, consumption, leakages etc) or network data (pipelines, installations etc.): to ensure reliable forecasts, we combine different sources of information and analyse them by means of modern machine learning methods. With this approach we provide our customers with added value in various areas of water management.

Our solutions for you

In the field of intelligent water networks, we offer you consultancy services and solutions for the following tasks:

- Monitoring of water resources (dams, rivers, wells etc.)
- Monitoring of water transmission networks
- Monitoring of supply and distribution networks and installations (reservoirs, pump stations, chambers etc.)
- Monitoring of the water quality (chlorine, turbidity etc.)
- DMA – District Metered Area management
- Energy management
- Management of leakages and water losses
- Smart metering
- Advanced Network Management

We provide full-scale and comprehensive support, from data management and analysis to the presentation of data via an intuitive dashboard.

Parts of this solution

Our solutions are based on the following well-proven and powerful tools and components:

- HIGH-LEIT SCADA system
- RTUs from the ACOS telecontrol series
- Protocol Converter/Gateway
- Asset Management – 360° AM
- Data Science automation platform – YUNA
- Advanced Network Management – NPM
- Smart Metering platform – IDSpecto.DAYOS
- IoT Gateway device – enQube
- LoRa®*,MQTT, NB-IoT, LTE450 Gateway (CU71A), IoT Hub

** The LoRa® Mark is a trademark of Semtech Corporation or its subsidiaries.*

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www.vivavis.com

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Digital, networked measurement technology solutions for water, sewage and environmental technology

nivus sensors

Our sensors measure flow, level, water quality or particle concentration

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We provide seminars, training and further education on all relevant topics and tasks

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Complete metering services as an all-in-one package from a single source

nivus connect

Plug & Play transmitters, mobile data loggers and IoT gateways

nivus sphere

measure analyse optimise

nivus services

From project planning and application-specific design to control cabinet construction, commissioning and regular maintenance

nivus data portal

Platform solutions for the visualisation, processing and forwarding of generated data

nivus data analysis

With this service, we ensure that you receive resilient data with our solutions





We are one of the technology leaders in the flow measurement; a worldwide developer, producer and supplier of measurement equipment for water industry. Our product portfolio includes accurate systems for flow measurement, flow velocity detection, level measurement, pressure measurement and the measurement of water quality.
We also provide software for acquisition and logging of data and for the analysis of measurement results. A comprehensive process control system completes our program. Contact us to find out more on how we can help you with our solutions to your applications. **www.nivus.com**

measure analyse optimise

nivus®

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UV TECHNOLOGY

RELINE
UV TECHNOLOGY

THE NEW ERA OF TRENCHLESS SEWER REHABILITATION

العصر الجديد لإعادة تأهيل المجاري بدون حفر

WE ARE THERE FOR YOU!
نحن هنا من أجلك

RelineEurope GmbH
Große Ahlmühle 31
76865 Rohrbach | Germany

Tel.: +49 6349 93934-0
info@relineeurope.com
www.relineeurope.com

RELINE | Press Release November 2022

RECORDSETTING REHABILITATION PROJECT IN FINLAND

Rohrbach (DE) / Turku (FI), November 2022 : Finland's oldest city became the stage for a new record setting trenchless pipeline rehabilitation project: 1,000 metres of old pipe were successfully rehabilitated in just 40 days using 10 Alphaliner1800H with a total weight of 212 tonnes.

The sewer rehabilitation company EEROLA OY is well established on the Finnish market since almost four decades. With more than forty employees, the family-owned company rehabilitates over 40 kilometres of old pipe annually, and yet the project in Finland's former capital, Turku, was a special case in their history. Not only the meticulous planning was a challenge. In particular, a reliable partner had to be found who could not only produce and deliver GRP liners with the appropriate requirements, but also provide and operate the respective equipment for installation.

Complex projects require trusting and reliable partnerships

"We knew that if we were going to do this complex job, it would only work with a partner who had experience in both fields. Producing large-diameter GRP liners in the shortest possible time and also being able to supply the equipment that is 100% compatible with these," says Petteri Eerola of Putkistosaneeraus (PSE) EEROLA. "With RELINE as our supplier, we knew that they were capable of providing us with meticulous and expert support in all the planning and preparations. This is the only way to implement a project of this complexity."

212 tonnes of GRP liner installed in the shortest time ever

Turko, former Finnish capital and today a pioneer of sustainable and ecological urban development, was the scene of this equally sustainable and environmentally friendly recordsetting project, which started at the beginning of October 2022. A total of 10 Alphaliners with a total length of 1,000 metres were installed in the south-western Finnish metropolis. Particularly remarkable were the dimensions, lengths and weights of the GRP liners, which were deliberately ordered with peroxide-free resin: 10 Alphaliner1800H with a total weight of 212 tonnes were produced, loaded and installed within 40 days. The DN 1600/ WT 18.4 and DN1800/ WT 20.5 Alphaliners were delivered safely and on time to the site 2,000 km away in variable, reusable, timber-clad metal racks.

"In each week of the project, around 35 tonnes of Alphaliner1800H were produced and loaded at our factory in Rohrbach - and that without affecting further deliveries to our other global customers. We attach great importance to this!", says Philipp Bergman, Area Sales Manager of RelineEurope GmbH. "It is important in such extraordinary projects that we are involved in the preparations of the installing companies and can also provide advice and offer implementable solutions from here as well as on site - practically as 'construction site consulting'." Another successful element of this project is, of course, the use of our UV technology, which is specially adapted to our GRP liners. There, every piece of the puzzle is individually matched."

First stage of project successfully completed in 40 days

In addition to the folding packer from RELINE, an in-house developed conveyor belt with folding device and the REE4000 UV curing system were used on site. This allowed a curing speed of 25 cm/min to be achieved for the Alphaliners with a diameter of DN1600 and a wall thickness of 18.4 mm, and the first stage of the project in Turko was successfully completed within the specified time frame.

Facilitated insertion of the Alphaliner1800H DN 1800 by using a conveyor belt with folding device.

Facilitated insertion of the Alphaliner1800H DN 1800 by using a conveyor belt with folding device.

As far as the eye can see: a total of 1,000 metres of old pipe rehabilitated.

Press Contact

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RelineEurope GmbH

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76865 Rohrbach, Germany

marketing@relineeurope.com

www.relineeurope.com

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UV TECHNOLOGY

UWM
ULTRASONIC WATER METER

for residential applications

DESIGNED FOR
Smart Water Metering

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MEMBERSHIP BENEFITS & ANNUAL FEE SYSTEM

WATER UTILITIES (TREATMENT **AND** DISTRIBUTION) ANNUAL MEMBERSHIP FEE

Indicative Population Size Band (Up to 100,000)	Indicative Population Size Band (100,000 to 500,000)	Indicative Population Size Band (500,000 to 1000,000)	Indicative Population Size Band (Above 1000,000)
$ 750	$ 1500	$ 2500	$ 4000
Having new Business Opportunities	Having new Business Opportunities	Having new Business Opportunities	Having new Business Opportunities
Free advertisement on ACWUA website and newsletter	Free advertisement on ACWUA website and newsletter	Free advertisement on ACWUA website and newsletter	Free advertisement on ACWUA website and newsletter
Create your profile on ACWUA website	Create your profile on ACWUA website	Create your profile on ACWUA website	Create your profile on ACWUA website
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Become part of ACWUA consultation and implementation projects	Become part of ACWUA consultation and implementation projects	Become part of ACWUA consultation and implementation projects	Become part of ACWUA consultation and implementation projects
Building new partnership with international agencies in water and sanitation sector	Building new partnership with international agencies in water and sanitation sector	Building new partnership with international agencies in water and sanitation sector	Building new partnership with international agencies in water and sanitation sector
Access to publication and scientific materials	Access to publication and scientific materials	Access to publication and scientific materials	Access to publication and scientific materials
Become part of ACWUA Technical working groups	Become part of ACWUA Technical working groups	Become part of ACWUA Technical working groups	Become part of ACWUA Technical working groups
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Register	Register	Register	Register

WATER UTILITIES (TREATMENT **OR** DISTRIBUTION) ANNUAL MEMBERSHIP FEE

Indicative Population Size Band (Up to 100,000)	Indicative Population Size Band (100,000 to 500,000)	Indicative Population Size Band (500,000 to 1000,000)	Indicative Population Size Band (Above 1000,000)
$ 560	$ 1125	$ 1875	$ 3000
Having new Business Opportunities	Having new Business Opportunities	Having new Business Opportunities	Having new Business Opportunities
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Having (20%) discount for ACWUA certifications programs	Having (20%) discount for ACWUA certifications programs	Having (20%) discount for ACWUA certifications programs	Having (20%) discount for ACWUA certifications programs
Register	Register	Register	Register

PRIVATE SECTOR COMPANIES ANNUAL MEMBERSHIP FEE

Company Size (Up to 50)

$ 900

- Having new Business Opportunities
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- Let your logo appear on home page for ACWUA website
- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (20%) discount on ACWUA events and exhibition
- Having (20%) discount for ACWUA certifications programs

Register

Company Size (51 to 500)

$ 1800

- Having new Business Opportunities
- Free advertisement on ACWUA website and newsletter
- Create your profile on ACWUA website
- Let your logo appear on home page for ACWUA website
- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (20%) discount on ACWUA events and exhibition
- Having (20%) discount for ACWUA certifications programs

Register

Company Size (Over 500)

$ 3600

- Having new Business Opportunities
- Free advertisement on ACWUA website and newsletter
- Create your profile on ACWUA website
- Let your logo appear on home page for ACWUA website
- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (20%) discount on ACWUA events and exhibition
- Having (20%) discount for ACWUA certifications programs

Register

ASSOCIATES (NGOS AND ACADEMIA) & INDIVIDUALS ANNUAL MEMBERSHIP FEE

NGO's

$ 500

- Having new Business Opportunities
- Free advertisement on ACWUA website and newsletter
- Create your profile on ACWUA website
- Let your logo appear on home page for ACWUA website
- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (15%) discount on ACWUA events and exhibition
- Having (15%) discount for ACWUA certifications programs

Register

Academic

$ 500

- Having new Business Opportunities
- Free advertisement on ACWUA website and newsletter
- Create your profile on ACWUA website
- Let your logo appear on home page for ACWUA website
- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (15%) discount on ACWUA events and exhibition
- Having (15%) discount for ACWUA certifications programs

Register

Regulators Annual Membership Fee

$ 500

- Having new Business Opportunities
- Free advertisement on ACWUA website and newsletter
- Create your profile on ACWUA website
- Let your logo appear on home page for ACWUA website
- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (15%) discount on ACWUA events and exhibition
- Having (20%) discount for ACWUA certifications programs

Register

Friends of ACWUA (Students Incentives)

$ 25

- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (10%) discount for ACWUA certifications programs

Register

Freelance Professionals

$ 100

- Become part of ACWUA consultation and implementation projects
- Building new partnership with international agencies in water and sanitation sector
- Access to publication and scientific materials
- Become part of ACWUA Technical working groups
- Having (10%) discount for ACWUA certifications programs

Register

THANK YOU TO
OUR MEMBERS & PARTNERS
FOR YOUR SUPPORT

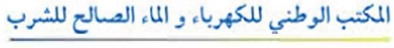
WE ARE GLAD TO

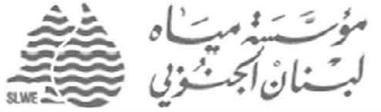
Welcome

OUR NEW MEMBERS

REDUCT

MINISTRY OF
WATER AND IRRIGATION








شركة مياه الشرب
والصرف الصحي بالدقهلية


الشركة القابضة
لمياه الشرب والصرف الصحي

شركة مياه الشرب
والصرف الصحي بدمياط


شركة مياه الشرب
والصرف الصحي بالأقصر

شركة مياه الشرب
والصرف الصحي بالبحيرة




شركة الصرف الصحي بالاسكندرية

شركة مياه الشرب
بالقاهرة الكبرى

شركة مياه الشرب
والصرف الصحي بأسيوط
والوادي الجديد

شركة مياه الشرب
والصرف الصحي بالمنيا

شركة مياه الشرب
والصرف الصحي بأسوان

شركة مياه الشرب
والصرف الصحي بالجيزة

شركة مياه الشرب
والصرف الصحي بمطروح

وجعلنا من الماء كل شيء حي
سلطة المياه
WATER AUTHORITY


شركة مياه الشرب
بالقاهرة الكبرى

شركة الصرف الصحي
للقاهرة الكبرى

شركة مياه الشرب
والصرف الصحي بالمنوفية


شركة مياه الشرب
والصرف الصحي بالشرقية

شركة مياه الشرب
بالأسكندرية

حياة
للمياه
Haya
water


SPS

nivus

Reetaj
Technology & Technical Services

RUQN AL HANDASA
CONSULTING ENGINEERS

wilo

IDA
International Desalination Association

مجموعة الجهود
المشتركة
ALJHOOD

GHD

HYDROCONTROL
CONSULTANTS

Miahona
مياهنا

TIG | Group
Total Site Solutions

Galmudug Foundation
For Water
Development
(Gfwd)

REDUCT

ACWUA

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