

COMPUTATIONAL GEOMECHANICS RESEARCH GROUP

CAIRO UNIVERSITY - FACULTY OF ENGINEERING

Proper Education + Common Sense = Realistic Modeling

- sherif.akl@cu.edu.eg
- saakl@alum.mit.edu

Sherif A. Y. Akl Professor of Geotechnical Engineering and Foundations Cairo University

CONTACT

Building 36 Soil Mechanics and
Foundations Research Laboratory
Faculty of Engineering
Cairo University
1 Elgamaa Street
Giza 12316

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Mobile: +(2010)6138-8880
Email: sherif.akl@cu.edu.eg
saakl@alum.mit.edu

POSITION

Cairo University, Faculty of Engineering, Public Works Department
Professor of Geotechnical Engineering and Foundations

09/22– present

Research Interests: Computational Geomechanics, Soil Structure
Interaction, Reservoir Geomechanics, Deep
Foundations

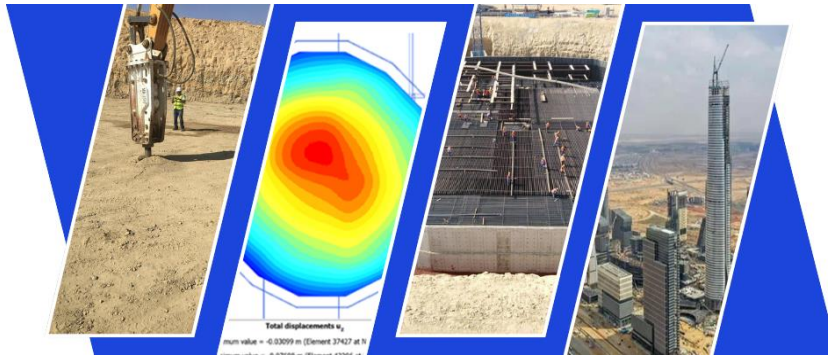
Teaching Interests: Numerical Methods in Geotechnical Engineering,
Foundation Design, Soil Modeling.

EDUCATION

MIT, Department of Civil and Environmental Engineering
Ph.D. 02/11 with Prof Andrew Whittle

Cairo University, Public Works Department
M.Sc. 08/05

Cairo University, Civil Engineering Department
B.Sc. 08/03



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CONSULTING& EMPLOYMENT RECORD

Cairo University

- **Development Research and Technological Planning Center**

2025-present Director

Work Includes:

- Managing the workflow to enable faculty members to perform consulting working and contribute to the market.
- Initiating new programs such as: Project Governance, Computational Mechanics, Consulting for the newly formed **Cairo University Holding Company.**

- **Quality Assurance Unit – Faculty of Engineering**

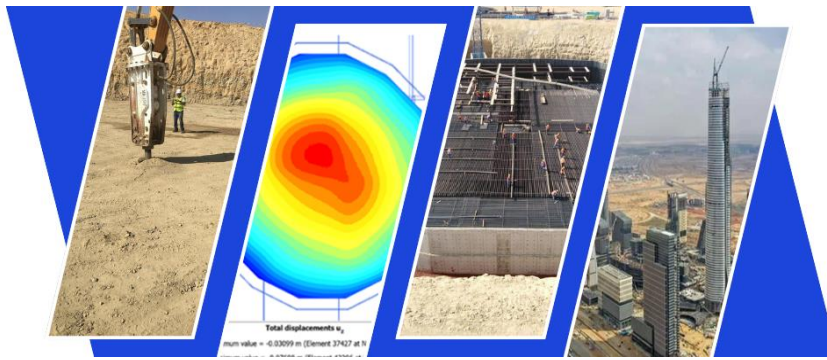
2024-present Head of Unit

Work Includes:

- Managing workflow to enable the institute and its programs to apply for accreditation from the National Authority of Quality Assurance and Accreditation of Education.
- Monitoring the execution of the faculty **strategic plan for development.**

- **Soil Mechanics and Foundations Research Laboratory – Public Works Department**

2022-present Professor of Geotechnical Engineering and Foundations



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2017-2022 Associate Professor of Geotechnical Engineering and Foundations

2012-2017 Assistant Professor of Geotechnical Engineering and Foundations

Work Includes:

- Soil Investigation and Structural Integrity Analysis of more than 700 locations all over Egypt. Work included issuing reports and recommendations of foundation types for new residential and educational buildings; and the structural analysis and recommendations for retrofitting existing structures.
- Design and Shop Drawings for Side Support Systems in several Excavation Sites in Giza Governorate. This work is done in cooperation with the **Civil Engineering Research and Studies Center** in Cairo University.
- Numerical modeling and structural assessment of the Spillway for the **High Dam in Aswan**. This work is done in cooperation with the Center of Studies and Designs for Water Projects in Cairo University.

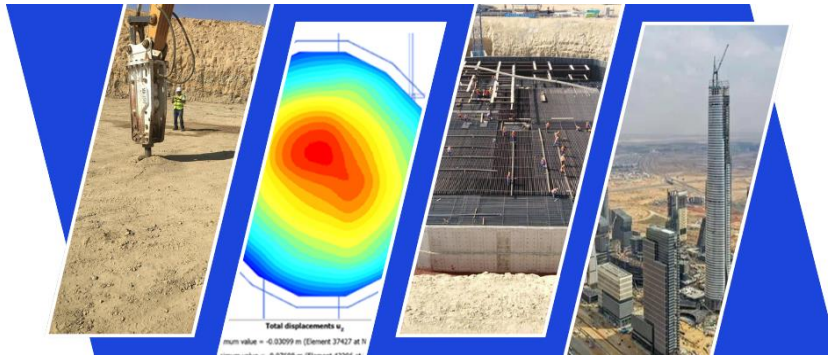
Dar Alhandasa (Shair and Partners)

2017-2020 Senior Geotechnical Engineer (Part Time)

2016-2017 Senior Groundwater Engineer (Part Time)

Work included:

- Numerical Analysis and Liner Design of several tunnels in Mecca, Saudi Arabia. The works include intersections at the **Mashaer-Jamarat tunnels** and the First Ring Road tunnels.
- Numerical Analysis and Site Characterization for the Foundation Systems for the Central Business District in the New Administrative City. The District Includes **the Iconic Tower** (420 m High Rise).



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- Numerical Analysis and Slope Stability Designs for Dike 19 for the **Arab Potash Company in Jordan**.

- Groundwater Modeling and Assessment, **Al Maktoum Airport**, Dubai, United Arab Emirates.

- Groundwater Assessment, Doha Port Redevelopment, Doha, **Qatar**.

- Groundwater Control, Jumeirah Park, Dubai, **United Arab Emirates**.

Nile Consult

2022- present **Senior Geotechnical Engineer/ Engineering Consultant**

2012- 2022 **Freelance Geotechnical Engineer**

Work includes:

- Site investigation and structural integrity assessment of the of the Al-Mataana Royal Guest House, Esna, Luxor, Egypt.

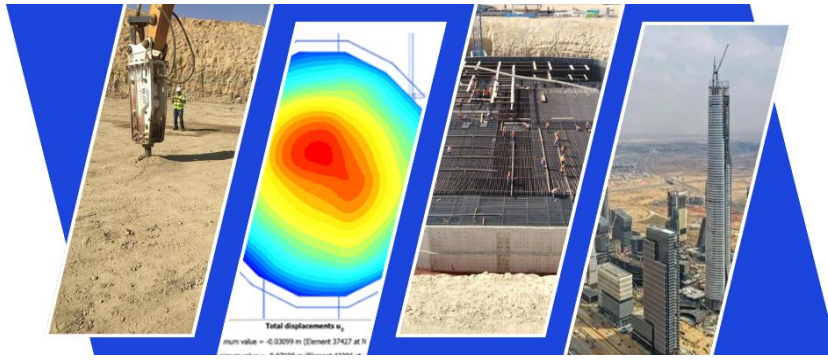
- Geotechnical Analysis and Site Investigation for the Exhibition Platform for the **Khnoum Temple**, Esna, Luxor, Egypt.

- Geotechnical analysis and site investigation of the CPC industrial complex in the Sadat-Shebeen Elkom highway. Work included 20 boreholes and the analysis of field and laboratory experiments.

- Geotechnical and Geophysical Site Investigation to assess the structural integrity and provide recommendations for retrofitting the **Gawhara Palace in the Saladin Citadel**.

- Numerical Modeling and Structural Assessment of the interaction between planned and existing **Al Maqtaa Bridges in Abu Dhabi**, United Arab Emirates.

- Numerical Modeling and Structural Assessment of the interaction between planned residential building and existing Metro Station in Shoubra, Cairo, Egypt.



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- Site Investigation and Structural Assessment of Takiyyat Ibrahim Al Ghulshani in Cairo, Egypt.

- Site Investigation and Structural Assessment of Maridany Mosque in Cairo, Egypt.

Shell International Exploration and Production

Houston, Texas, USA.

2011-2012 Research Geomechanicist

Work included:

- Application of advanced Plasticity Models to assess the effect of reservoir depletion on wellbore stability.

MIT

Cambridge, Massachusetts, USA.

2006-2010 Research Assistant

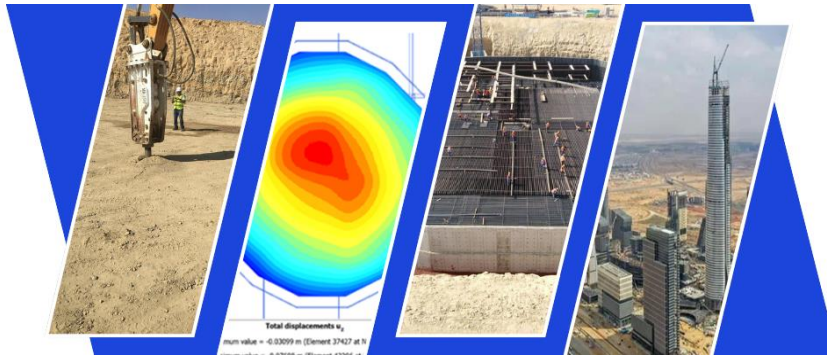
Work included:

- Numerical Analysis of Wellbore Instability Mechanisms (funded by BP Global)
- Implementation of the MIT-E3 constitutive model in PLAXIS© Finite Elements Software.

PROFESSIONAL SERVICES

Certified Consulting Engineer from the Syndicate of Egyptian Engineers, consultant number 0106908

Certified Value Methodology Associate from SAVE International, Certification Number: 202410018.



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Certified Valuation Expert from The Egyptian Financial Regulation Authority, Expert No. 233, also certified by the Central Bank of Egypt.

Project Program Portfolio Governance Professional from the Project Program Portfolio Governance Qualification Authority (Certification No. PPC04250000421).

Project Reviewer Reviewer for several consulting offices

Misr Consulting Group: Deep Excavation of Banque Misr branch in helmeyet alzaytoun (Egypt), Solar farm construction in Sukari Gold Mines (Egypt).

Dorsche Gruppe: Biotopia Hills, Dubai (UAE).

Arab Consulting Engineers (ACE): Rolling Stock Plant, East Port Said (Egypt).

Chemonics: Wastewater treatment plant, Metobas, Kafr Alsheikh (Egypt).

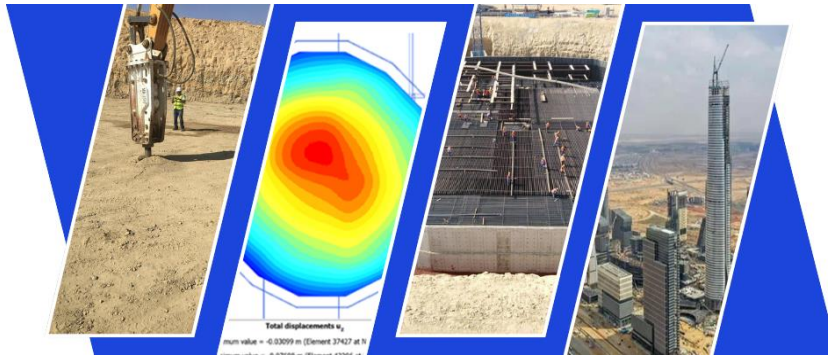
Reviewer for Journals International Journal of Numerical and Analytical Methods in Geomechanics, Geotechnical Case Histories, Geotechnical and Geological Engineering, Geotechnical and Geoenvironmental Engineering.

Chair Conference Sessions Petroleum Related Rock Mechanics (ARMA 2013, ARMA2015)
Depletion Induced Land Subsidence (ARMA 2016, ARMA 2017)

Visiting Professor **Tufts University**, Advanced Geomaterials Laboratory (2016)

Visiting Professor **MIT**, Computational Geomechanics Group (2015)

Committee Member of Egyptian Code of Practice for Geotechnical Engineering
Committee No. 4, Deep foundations; and Committee No.7, Side Supporting Structures.



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Committee Member of Egyptian Code of Practice for High Rise Buildings
Foundations Committee

Committee Member of Egyptian Code for Water Resources and Irrigation Works,
Specifications for Earthquake Load Considerations.

AWARDS

2013	American Rock Mechanics Association (ARMA) Future Leader
2013	International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) Presidential Group Member
2005	MIT Presidential Fellowship
2004	Cairo University, Faculty of Engineering, Best TA Award
2003	Cairo University, Faculty of Engineering, Distinction Award
2002	Soil Mechanics and Foundations Laboratory Excellence Award

SOCIETY MEMBERSHIPS

Egyptian Tunneling Society (Secretary)

Geotechnical Institute, Aff. Member of ASCE

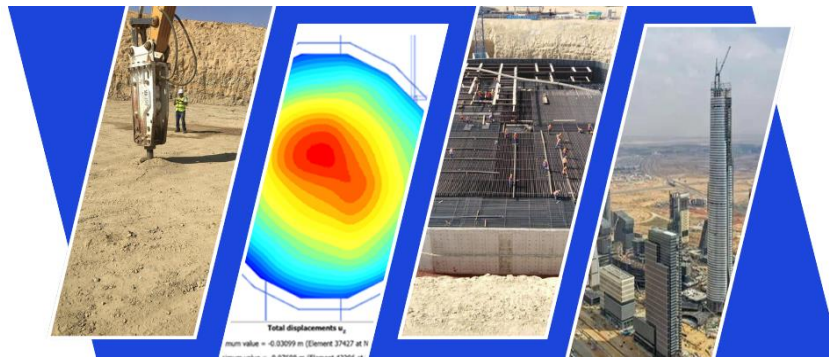
Giza Toastmasters Club (Charter Member, President 2024-2025)

SAVE International (Value Methodology Associate)

Project Program Portfolio Governance Qualification Authority (P3GP)

MIT Alumni in Egypt (Member of Educational Council)

Egyptian Engineering Syndicate (Geotechnical Engineering Consultant)



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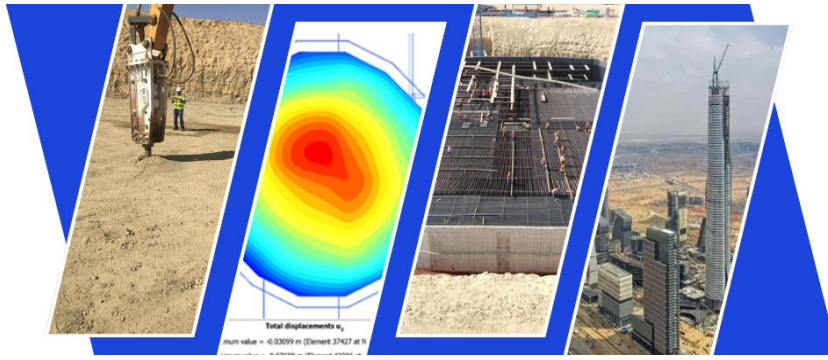
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RESEARCH PROJECTS

- | | |
|------|---|
| 2015 | Experimental Investigation of Cohesive Nile Sediments Anisotropy.
Science and Technology Development Fund. |
| 2016 | Using PNEUSOL 'Tire-Soil' in Construction Applications as a Low
Cost Material.
Scientific Research Developing Unit in Beni-Suef University. |

PUBLICATIONS

- | | |
|------|---|
| 2025 | Tawfik, Doaa A., et al. "Incorporating the Rock Mass Properties in the Interface Estimation for Bored Concrete Piles Socketed into Rocks." <i>Indian Geotechnical Journal</i> (2025): 1-18. |
| 2024 | Soliman, N. N., Akl, S. A. Y., Rahman, A. H. A., & Mourad, S. A. Arching mechanism for large span flexible culverts with shallow soil covers. <i>Journal of Engineering and Applied Science</i> , 71(1), 46. |
| 2023 | Akl, S. A., Ismail, A. N., Abdelmoghni, M., & Hegazy, Y. A. Numerical analysis of laterally loaded barrettes performance in cohesionless soils. <i>Journal of Engineering and Applied Science</i> , 70(1), 51. |
| 2023 | Jaher, A. A., Mashhour, I. M., Akl, S. A., & Amer, M. Stability Improvement Against Toppling Failure in the Upper Plateau of Gebel Mokattam. <i>Geotechnical and Geological Engineering</i>, 41(7), 4153-4168. |
| 2023 | Zablocki, M., Akl, S. A., Germaine, J. T., & Galaa, A. M. Stress-Dependent Shear Strength of Resedimented Nile Silty Clay. <i>International Journal of Geomechanics</i>, 23(5), 06023007. |
| 2023 | Whittle, A. J., El-Naggar, H. M., Akl, S. A., & Galaa, A. M. Closure to "Stability Analysis of Upstream Tailings Dam Using Numerical Limit Analyses". <i>Journal of Geotechnical and Geoenvironmental Engineering</i> , 149(3), 07023002. |



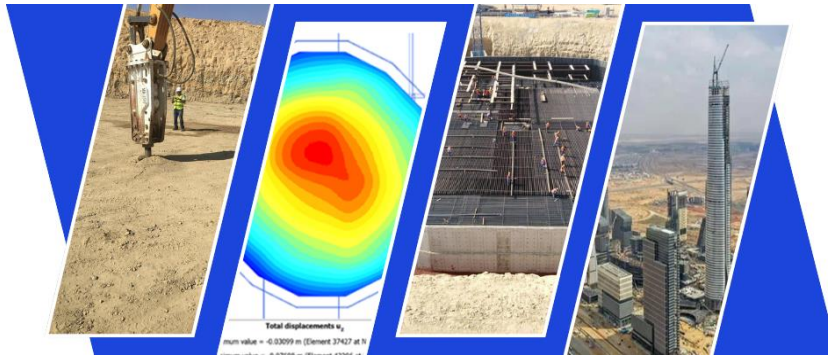
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- 2023 **Jawad, H. S. A., Mashhour, I. M., Akl, S. A., & Abu-keifa, M. A. Effectiveness of concrete rigid inclusions for coastal reclaimed liquefiable soils. Ain Shams Engineering Journal, 14(2), 101857.**
- 2022 **Akl, S. A. Y., Kohail, A., Shazly, M., & Abukiefa, M. Testing and modeling clay behavior subjected to high strain rate loading in a tunneling problem. Ain Shams Engineering Journal, 13(6), 101764.**
- 2022 **Whittle, A. J., El-Naggar, H. M., Akl, S. A., & Galaa, A. M. Stability Analysis of Upstream Tailings Dam Using Numerical Limit Analyses. Journal of Geotechnical and Geoenvironmental Engineering, 148(6), 04022035.**
- 2021 Zaid, H. A., Akl, S., El Ela, M. A., El-Banbi, A., & Sayyoub, M. H. Development of an analytical model to predict oil reservoirs performance using mechanical waves propagation. Journal of Engineering Research.
- 2021 Abdelrazek, A. G. D., & Akl, S. A. Y. ESTIMATING LIQUEFACTION RESISTANCE IMPROVEMENT DUE TO STONE COLUMNS FROM QUALITY CONTROL TESTS. GEOMATE Journal, 21(86), 147-158.
- 2021 Abdelmoghni, M., & Akl, S. A. An Undrained Friction Angle for Embankment Design on Soft Clays. Design Engineering, 2004-2020.
- 2021 Zaid, H. A., Akl, S., El Ela, M. A., El-Banbi, A., & Sayyoub, M. H. Development of an analytical model to predict oil reservoirs performance using mechanical waves propagation. Journal of Engineering Research.
- 2021 Akl, S. A., Zidan, A. F., & Metwally, K. G. NUMERICAL AND EXPERIMENTAL INVESTIGATION OF LOOSE SAND-SCRAP TIRES MIXTURE STIFFNESS. International Journal of GEOMATE, 20(80), 1-8.
- 2021 **Akl, S. A. Y., & Mossaad, M. E. Detecting Piston Effect on Drilled Shafts Side Resistance Using Instrumented Pile Load Tests. KSCE Journal of Civil Engineering, 1-11.**
- 2020 Adel, H. M., Akl, S. A., & Hegazy, Y. A. COST BENEFIT ANALYSIS FOR ROCK-SIDE SLOPE FAILURE PREVENTION USING



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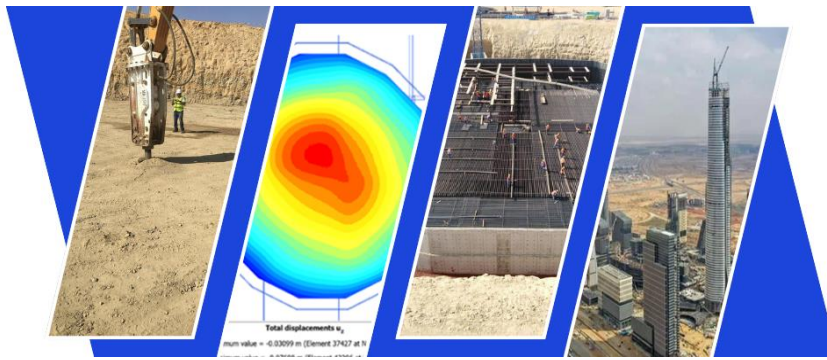
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RELIABILITY BASED DESIGN. Journal of Engineering and Applied Science, 67(8), pp. 2245-2264.

- 2020 **Abdelmoneim, D., El-Taher, M., Akl, S. A., & El-Mamlouk, H. H. Modelling of expansive clay interaction with skeleton structures considering the effect of replacement permeability. Ain Shams Engineering Journal.**
- 2020 Akl, S. A. Y., Mohaisen, H. I., & El-Khouly, M. A. Undrained Shear Behavior of Resedimented Nile Silty Clay. In 54th US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2020 **Arab, M. G., Abdelmoghni, M., Akl, S. A., & Dif, A. Numerical modeling of unfavorable CFA pile drilling conditions. Geotechnical and Geological Engineering, 38(6), 6869-6889.**
- 2019 Abdelmoghni, M., Arab, M. G., Dif, A., & Akl, S. A. Numerical Modeling of Unfavorable CFA Pile Drilling. Al-Azhar University Civil Engineering Research Magazine, 41(4).
- 2019 Akl, S. A., Salaheldin, K. M., & Lotfi, H. A. Investigating the Yield Anisotropy of Resedimented Nile Silty Clay. In Geo-Congress 2019: Engineering Geology, Site Characterization, and Geophysics (pp. 280-288). ASCE Geotechnical Special Publication No. 311.
- 2019 Ezz, I. M., Akl, S. A., & El-Kholy M. A. A Numerical Investigation of SSCB Analysis and the Possibility of Applying Arching Inducement Techniques. In Geo-Congress 2019: Soil Erosion, Underground Engineering, and Risk Assessment (pp. 297-305). ASCE Geotechnical Special Publication No. 313.
- 2018 Soliman, M. H., Akl, S. A., & Amer, M. Effect of Yield Criterion on Predicting the Arching Action Around Existing Tunnels Subjected to Surface Loading. In International Congress and Exhibition " Sustainable Civil Infrastructures: Innovative Infrastructure Geotechnology" (pp. 191-198). Springer, Cham.
- 2018 Abdelmawla, A. M., Hegazy, Y. A., Al-ashaal, A. A., Akl, S. A., & Ameen, H. K. Uniaxial GEOGRID Pullout Mechanism Characterization from Calcareous Sand Backfill. In International Congress and



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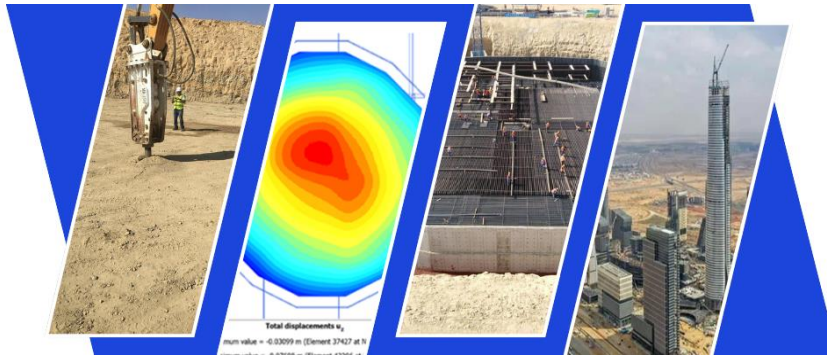
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Exhibition" Sustainable Civil Infrastructures: Innovative Infrastructure Geotechnology" (pp. 248-257). Springer, Cham.

- 2018 Akl, S. A. Y., Abd-El-Samea, A. M., & Hussein, A. K. Application of Undrained Strength Analysis to Deep Excavation Design. In 52nd US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2018 El-Naggar, H. M. & Akl, S. A. An Investigation of Grouted Pile Capacity Using Instrumented Pile Load Tests. Proceedings of the 43rd Annual Conference on Deep Foundations, Anaheim, CA, USA, (DFI)
- 2018 Abdelmoneim, D., Akl, S., Mamlouk, H., & El-Taher, M. EFFECT OF SOIL WATER CHARACTERISTIC CURVE (SWCC) SHAPE OF EXPANSIVE SOILS. Journal of Al-Azhar University Engineering Sector, 13(48), 850-863.
- 2018 Abdelmoneim, D., Mamlouk, H., El-Taher, M., & Akl, S. ANALYSIS OF REPLACEMENT LAYER PROPERTIES AND ITS EFFECTS ON A TYPICAL BUILDING ON SWELLING CLAY. Journal of Al-Azhar University Engineering Sector, 13(48), 834-849.
- 2017 Galaa, A. M., Akl, S. A. Y., & Al-Mahallawy, M. Compression Characteristics of Resedimented Nile Silty Clay. In 51st US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2017 Akl, S. A., Elhami, O. M., & Abu-keifa, M. Investigation of the Mobilized Strain Wedge by Laterally Loaded Helical Piles. Journal of Engineering and Applied Sciences (Faculty of Engineering – Cairo University)
- 2017 Akl, S. A., & Whittle, A. J. Validation of soil models for wellbore stability in ductile formations using laboratory TWC tests. Journal of Geotechnical and Geoenvironmental Engineering, 143(2).
- 2017 Akl, S. A., & Metwally, K. G. Optimizing arching creation for Abou Muharik Tunnel in Egypt using numerical analysis. KSCE Journal of Civil Engineering, 21(1), 160-167.



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- 2016 **Akl, S. A., & Whittle, A. J. Stability analyses for deviated wellbores in unconsolidated cross-anisotropic formations. Canadian Geotechnical Journal, 53(9): 1450-1459.**
- 2016 Akl, S. A., Elhami, O. M., & Abu-keifa, M. A. Lateral Performance of Helical Piles as Foundations for Offshore Wind Farms. In Geo-Chicago 2016 (pp. 449-458). ASCE Geotechnical Special Publication No. 270.
- 2016 Akl, S. A. Y., & Sone, H. Using Ellipsoidal Inclusion Model to Study Shale Gas Mechanical Anisotropy. In 50th US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2015 Akl, S. A. Redistribution of Stresses due to Drilling and Depletion Using Different Plasticity Models. In 49th US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2015 Rabie, N. A., Akl, S. A., & Hussein, A. K. Effect of Parameter Uncertainty on Factor of Safety Calculations in a Slope Stability Problem. In IFCEE 2015 (pp. 1842-1849). ASCE Geotechnical Special Publication No. 256
- 2014 Akl, S. A. Effect of Carbon Sequestration on the State of Stresses in Ductile Formations. In 48th US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2013 Akl, S. A., & Louis, L. Using Asymmetric Yield Surfaces to Model Material Anisotropy. In 47th US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
- 2012 Akl, S. A., & Whittle, A. J. (2012, Analysis of Horizontal Wellbore Stability in Clay Shale. In 46th US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.