



(TUAUIC'26)

TANTA UNIVERSITY 2nd ARCHITECTURE and URBANISM INTERNATIONAL CONFERENCE

TECHNOLOGY of ARCHITECTURE & URBANISM
TOWARD BUILDING A MODERN EGYPT

BOOK of ABSTRACT

ORGANIZED by

- ARCHITECTURAL DEPARTMENT
- URBAN PLANNING DEPARTMENT



(18-20) APRIL 2026, SUN RISE GARDEN, HURGHADA, EGYPT



TUAUIC.TANTA.EDU.EG

”

نسعى دائما إلى البناء والتنمية
والتعمير والسلام

“

فخامة الرئيس / عبدالفتاح السيسي





UNDER THE AUSPICES OF



Prof. Abdel Aziz Konsowa

Minister of Higher Education
and Scientific Research



Prof. Mohamed Hussein

President of Tanta University



Prof. Hatem Amin

Vice President for
Postgraduate Studies
and Research



Prof. Ahmed M. Naser

Conference Chairman
Dean of Faculty of Engineering



Prof. Mahmoud Zaki

Conference Chairman



Prof. Walaa Nour

Conference Co-Chairman



Prof. Shahira Sharaf Eldin

Conference Co-Chairman



**Assoc. Prof. Marwa
Kamer Eldawlaa**

Conference Co-Chairman



ORGANIZING COMMITTEE



Prof. Mai Wahba
General Secretary



Prof. Neveen Azmy
General Secretary



A.Prof. Azza Elsakka
General Secretary



A.Prof. Mostafa Elwan
General Secretary



A.Prof. Hosny Dewer
General Secretary



A. Prof. Ahmed Abo El-Sadaat
General Secretary



Dr. Mohammed Abohelal
General Secretary



Contents

1 WELCOME NOTE

2 KEYNOTE SPEAKERS

3 THEMES

4 ABSTRACTS

5 SPONSORS





Welcome Note

The Faculty of Engineering at Tanta University, represented by the Departments of Architecture and Urban Planning, cordially invites you to attend the Tanta University 2nd Architectural and Urban International Conference (TUAUIC'26).

The conference is being held in Hurghada from April 18 to April 20, 2026. It aims to provide a dynamic platform for discussing recent advancements, innovative approaches, and emerging technologies in architecture and urbanism, as well as their impact on the modern built environment.

Furthermore, the conference offers an excellent opportunity for academics, researchers, professionals, and practitioners from Egypt, the region, and around the world to exchange knowledge, share experiences, and foster collaboration.



WELCOME NOTE



Prof. Diana María Mojica

Academic Background

- Doctor (PhD) in Natural Sciences - Applied Geoinformatics, University of Salzburg, Austria (2015)
- Master of Science in Geoinformation Science and Earth Observation (Specialization: Urban Planning and Management), University of Twente (ITC), Netherlands (2009)
- Graduate Diploma in Evaluation of Risk and Disaster Prevention, Universidad de Los Andes, Colombia (2002)
- Bachelor of Architecture, Universidad Nacional de Colombia, Colombia (2001)

Academic Career & Contributions

- Lecturer in Geospatial Science, School of Earth and Environmental Sciences, Cardiff University, UK (Since 2021)
- Research Associate, School of Engineering, Newcastle University, UK (2019–2021)
- Post-doctoral Researcher, Research Centre for Integrated Disaster Risk Management (CIGIDEN), Chile (2018–2019)
- Deputy Master Thesis Coordinator and Online Lecturer, UNIGIS Latin America, University of Salzburg, Austria (2012–2020)
- Teaching Assistant, Faculty of Arts, Universidad Nacional de Colombia (1997–2000)
- Supervisor and Advisor for numerous Doctoral, Master's, and Bachelor's dissertations in GIS, Urban Planning, and Disaster Risk
- Published Researcher with a wide range of peer-reviewed papers in international journals (such as Sustainability, Socio-Economic Planning Sciences, and Geohazards)



Prof. Diana María Mojica

Cardiff ,Lecturer in Geospatial Science
University, UK

Lecture Title

**The working title of my Lecture will be:
Gender Disparity in STEM from
Kindergarten to Professional Life**



Professional Practice

- Social Vulnerability and Resilience (SVR) Team Leader, Global Earthquake Model (GEM) Foundation, Italy (2016–2018)
- External Consultant for Disaster Risk Reduction, Caritas Switzerland, Colombia (2018)
- Project Manager Assistant for preparedness and emergency response, Institute of Risk Management and Climate Change (IDIGER), Colombia (2001–2007)
- Registered Professional with certifications as an Associate Business Continuity Professional (ABCP) and Fellow of the Higher Education Academy (FHEA)
- Expert Collaborator with international organizations including the World Bank (WB), JICA, and the United Nations (UNU-EHS)
- Specialist in Spatial Indicators for Recovery, Disaster Risk Management, and the application of Sentiment Analysis in post-disaster assessments

Awards & Recognitions

- 1st Prize, Best Research Award – IDRC Davos 2016
- Open access fees award – Resilience Academy 2013–2014
- Order of Merit 'Cacique Teusacá' (2005)
- Meritorious Mention to the Bachelor Thesis (2001)



Prof. Husam AlWaer

Academic Background

- M.Arch (Honours), MRTPI
- PhD in Sustainability University of Liverpool.

Academic Career & Contributions

- Chair of Urban Design at the University of Dundee, School of Art and Design (Architecture & Urban Planning).
- Associate – Kevin Murray Associates.
- Associate – Proctor and Matthews Architects.
- He previously researched and taught at Reading and Liverpool universities.
- BREEAM Accredited Professional (AP)
- Recognised Practitioner in Urban Design (UDG)
- PlacemakingX Expert
- Member of ICOMOS Syria



Prof. Husam AlWaer

Chair of Urban Design, University of Dundee, School of Art and Design (Architecture & Urban Planning)

Lecture Title

Adapting to Climate Change in the Middle East: Opportunities within Soft, Compact, and Livable Cities and Neighborhoods



KEYNOTE SPEAKERS



Professional Practice

- Worked with various UK and international governmental and corporate agencies on research, training, and engagement projects.
- Focus on sustainable urbanism, including concepts such as 20-minute neighborhoods and the development of innovative methodologies for urban design facilitation and management.
- Member of the Urban Design Group Executive Committee
- An award-winning author with published work covering architecture, urbanism, sustainability, healthy neighbourhoods, placemaking facilitation, and performance evaluation.
- Invited as an official observer and presenter at COP26, Glasgow, and speaker at the World Urban Forum, Cairo, 2024

Awards & Recognitions

- Recipient of multiple prestigious awards from the Institution of Civil Engineering (ICE): - Reed Mallik Award
- George Stephenson Medal (2016, 2018, 2023, 2024)
- Honorary Chief Editor of the Urban Design and Planning journal



Prof. Mohamed M. Youssef

Academic Background

- Bachelor's Degree in Urban Planning and Design, Cairo University, Egypt (1992)
- Master of Science in GIS for Urban Community Planning, ITC, Netherlands (1998)
- Ph.D. in town planning and sustainable urban development, University of Liverpool, UK (2007)

Academic Career & Contributions

- Associate Professor of Urban Planning and Action Area Planning (Since 2020)
- Head of Architecture Department, Misr Institute for Engineering and Technology (MET), Mansoura, Egypt (2013–2023)
- Visiting Professor, Department of Geography, Town Planning Program, Qatar University, Qatar (2008–2009)
- GIS Lecturer, Civic Design Dept., University of Liverpool, United Kingdom (2002–2005)
- Supervisor of Graduation Projects, Cairo University
- Teaching Expert for over 20 courses in Urban Planning, GIS, and Architectural Design (since 1992)
- Published Researcher with numerous academic papers in international journals and conferences (JER, JUR, and ICCAUA)



Prof. Mohamed M. Youssef

Professor of Urban Planning, Design and Architecture, Cairo University.

Lecture Title

Predictive Urbanism and Smart Growth: A Multi-Scenario Framework for Sustainable Development in Modern Egypt

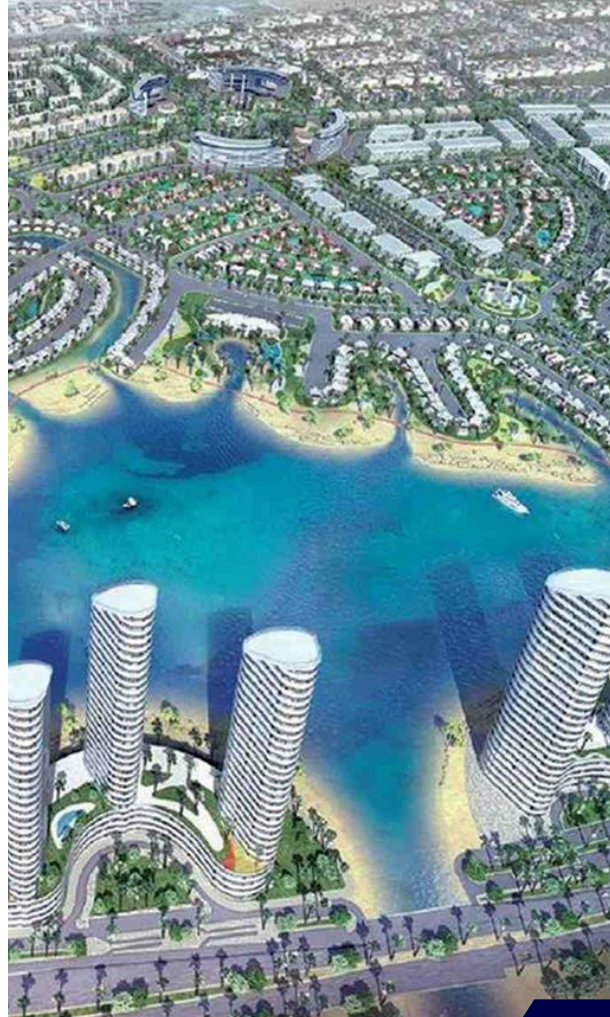


KEYNOTE SPEAKERS



Professional Practice

- Registered as Strategic Urban Planner, Land use Planner and GIS Expert in the Egyptian General Organization of Physical Planning (GOPP), Egyptian Ministry of Housing in 2010
- Member of the Egyptian Engineering Syndicate, Architecture Branch (Since 1992)
- Collaborator with government organizations such as the General Organization for Physical Planning (GOPP), the Urban Research Centre at Cairo University, and the Research Centre for Housing and Building Materials.
- Specialist in Action Area Planning and Future Scenario Building for Greater Cairo's urban growth



Prof. Noha Nabil

Academic Career & Contributions

- Professor of Urban Planning, Faculty of Engineering, Matareya, Capital University
- Vice Dean, Faculty of Engineering, Capital University
- Advisor to the President of Capital University
- Secretary of the Architecture and Urban Planning Committee for the Promotion of Professors and Associate Professors
- Over 20 years of experience combining academic and consulting work
- Research interests in strategic planning, urban management, and sustainability
- Particular emphasis on the transition to digital and green cities

Professional Practice

- Participation in the preparation of strategic plans for cities and national projects in collaboration with government agencies and the UN-Habitat.



Prof. Noha Nabil

Professor of Urban Planning,
Vice Dean, Faculty of Engineering, Matareya,
Capital University

Lecture Title

**Critical Perspectives on Sustainability
Gaps in Digital Cities**



Prof. Rana Badr

Academic Background

- Bachelor's Degree in Architectural Engineering (1996)
- Diploma in Architectural Engineering (2002)
- Master's Degree in Architectural Engineering (2005)
- Ph.D. in Architectural Design, Building Codes (2009)
- Bachelor's Degree in Interpretation (2023)

Academic Career & Contributions

- Professor of Architectural Design, Latakia University
- Lecturer, Yarmouk Private University (2009–Present)
- Administrative Deputy, Faculty of Architectural Engineering (2015–2017)
- Administrative Deputy, College of Fine Arts (2015–2017)
- Dean, Faculty of Architectural Engineering, Tishreen University – Latakia (2017–2022)
- Dean, Faculty of Fine Arts, Tishreen University – Latakia (2017–2022)
- Participant in many local and international conferences
- Publishing many research papers in scientific journals.



Prof. Rana Badr

Professor of Architectural Design, Latakia University

Lecture Title

Humanizing Architecture and Urban Planning in the Age of Technology: A Predictive Approach Contributing to Reshaping the Future



KEYNOTE SPEAKERS



Prof. Rana Badr

Professional Practice

- Developed Expert, Regional Planning Team for the Tartus–Homs–Talkalakh Axis (2005–2007)
- Work Team Leader for several general engineering projects in the Syrian governorates
- Certified Translator, Regional Planning Project for Latakia Governorate (2005)
- European Union Certified Trainer in 3D Printing and CNC Engraving

Awards & Recognitions

- Best Research Prize, Med-Green Forum, Florence, Italy (2025)



KEYNOTE SPEAKERS



Prof. Wael Seddik

Academic Background

- BSc Bachelor of Architecture Faculty of Engineering – Mansoura University .
- MSc Architectural Engineering.
- PhD Architectural Engineering Dundee University UK.

Academic Career & Contributions

- The Dean of the Faculty of Engineering at New Mansoura University
- (Present).
- Professor of Architecture and Environmental Design at the Faculty of Engineering, Mansoura University(2008).
- contributed significantly to the establishment of several Architecture Departments in engineering faculties across private universities and institutes within Egypt's Delta region.
- The author and co-author of over 60 academic publications in internationally refereed journals .
- He has supervised and examined more than 50 master's and doctoral theses in various Egyptian universities
- He is the author of the international book "Climate Responsive Design Strategies of Dwellings in Egypt" (Lambert Academic Publishing).



Prof. Wael Seddik

Dean of the Faculty of Engineering
at New Mansoura University

Lecture Title

Balancing Intelligence and Identity: The Opportunities and Pitfalls of AI in Contemporary Architecture and Urban Design



KEYNOTE SPEAKERS

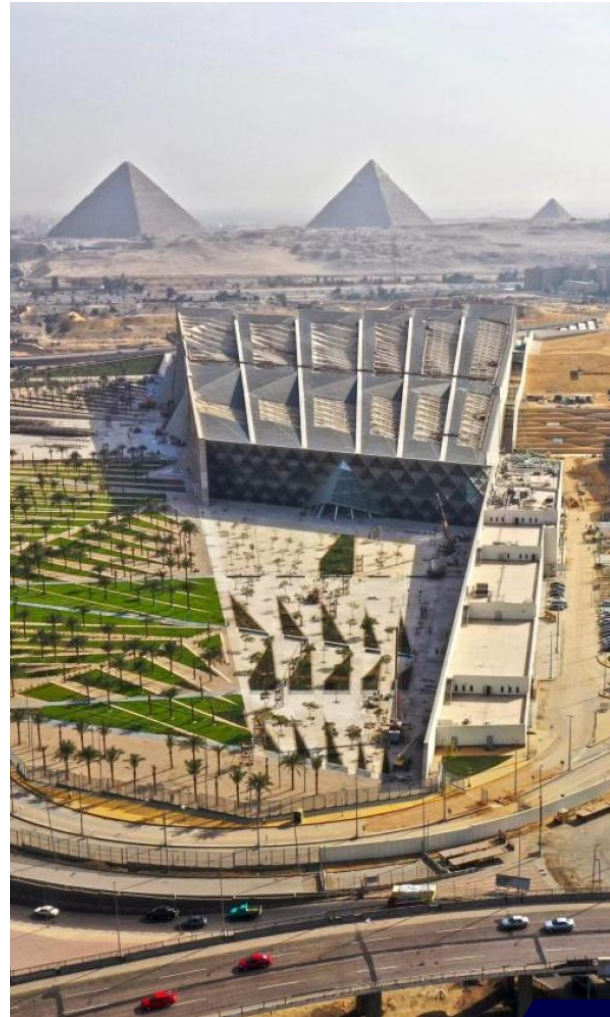


Professional Practice

- Served as New Mansoura University Coordinator for the MOSAIC Competition, organized by the Innovators Support Fund (ISF).
- The University Coordinator for the Partnership between New Mansoura University and the University of East London (UEL).
- Acts as the University Coordinator for the Best Eco-Friendly University Competition 2024.
- Acts as an Engineering Consultant for several architectural and environmental projects that integrate sustainable design principles and community development strategies.

Awards & Recognitions

- Awarded first prize in the Supreme Council of Culture's Architecture Competition, for a project addressing the impacts of climate change on the built environment.
- The Faculty of Engineering at New Mansoura University achieved 6th place in Africa in the UI GreenMetric Global Sustainable Universities Ranking.
- Multiple student teams awarded Innovation and Excellence Scholarships by the Innovators Support Fund (ISF).



Prof. Yasser Mansour

Academic Background

- Bachelor's Degree in Architecture, Ain Shams University
- Master's Degree in Urban Design, Kansas State University
- Ph.D. in Architecture, University of Michigan, USA

Academic Career & Contributions

- Faculty Member, West Virginia University
- Faculty Member, United Arab Emirates
- Chairman of the Architecture Department, Ain Shams University (2006–2017)
- Founding Member and Board of Trustees, European Universities in Egypt (EUE)
- Professor Emeritus of Architecture, Ain Shams University
- Chairman of the Scientific Committee for Promoting Faculty Members
- Supervision and Examination of more than 100 Master's and Ph.D. Degrees in Architecture and Urbanism
- Publishing +120 Research Papers in Scientific Journals and Conferences



Prof. Yasser Mansour

Professor of Architecture,
Ain Shams University
Chairman of the Scientific Committee for
Promoting Faculty Members.

Lecture Title

**Grand Egyptian Museum: Emblem for
Eternity**



KEYNOTE SPEAKERS



Prof. Yasser Mansour

Professional Practice

- General Coordinator, Grand Egyptian Museum (GEM) Project (2001–2010)
- Founding President, CONCEPT Architectural Consultancy
- Founding Partner and CEO, 5 UDC Firm
- Design and execution of over 200 projects in architecture, urban design, planning, interior design, and project management
- Consortium Member, for developing the masterplan of the New Administrative Capital and many other national projects
- Chairman of Competitions Jury in Egypt, USA, Spain, Saudi Arabia, UK, Emirates, South Africa, and Germany

Awards & Recognitions

- LEED Gold Certificate, USGBC
- Ain Shams University Appreciation Award (2023)



KEYNOTE SPEAKERS



Affiliation

- Consultant level member of the Egyptian engineering Syndicate
- Member of Saudi council of engineers
- Grade (A) certificated architect from Qatari professional engineers
- In the process to get NCARB certification

Professional Practice

- Architect and a partner at Unii Design, an international architectural practice with offices in the UAE , Qatar, the United Kingdom, and Egypt, with plans for expansion in USA
- His professional work spans multiple countries, including Saudi Arabia, the UAE, Qatar, Egypt, the USA, Switzerland, Hungary, Oman, Libya, and Japan.
- His practice covers a wide spectrum of building including: Mixed-use buildings-Residential buildings - High-rise towers and skyscrapers - Commercial and Governmental buildings -Hotels and resorts



ENG.Osama Ahmed Elfar

Architect and a partner at Unii Design

Lecture Title
Open Discussion



Awards

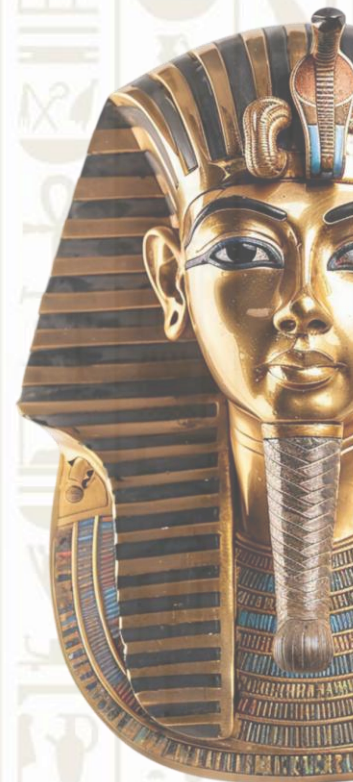
- Winning Competition - LUSAIL TOWERS
- Winning competition for Luxurious residential development located in Lusail City, Doha, Qatar accommodating spectacular views through 1-, 2- and 3-bedroom apartments all finished in a uniquely modern style.
- Winning Competition - MINISTRY OF FOREIGN AFFAIRS
- In this prestigious competition to Design the new building of ministry of foreign affairs, several international architectural firms have participated in designing The Seven Floor building along Doha Corniche. Competition jury has selected my proposal and announced the winner of the first price back in 2020, the building to be completed by end of 2024.
- Winning Competition - WEST BAY BEACH
- the first prize competition was awarded for west bay water front development in the Heart of Doha city. That has the first public beach in the city plus all the F&B, Retail, Entertainment and sport facilities to serve the visitors. The development includes improving pedestrian experiences and the urban design of the neighborhood.





Conference Themes

- **Smart Solutions in Architecture and Urbanism**
- **Environmental Design and Climate Change Adaptation**
- **Technology and Digital Transformation in Architecture and Urbanism**
- **Heritage and Identity in Contemporary Architecture**
- **Artificial Intelligence and the Future of Architecture and Urban Design**
- **Architectural Education and Scientific Research**
- **Architectural Education and Scientific Research**
- **Digital Transformation and Sustainability in Architecture and Urbanism**
- **Architectural and Urban Governance**
- **Sustainable Urban Development**





Interdisciplinary BIM Collaboration as Managed Information Exchange: A Case Study

Manar Bekeer (1)

Mohamed Anwar Mohamed Fikry (2)

Zeyad Mohamed Tarek El Sayad (3)

(1) M.Sc. Student, Dept. of Architecture, Faculty of Engineering, Alexandria University, Egypt

(2) Professor, Dept. of Architecture, Faculty of Engineering, Alexandria University, Alexandria, Egypt

(3) Lecturer, Dept. of Architecture, Faculty of Engineering, Alexandria University, Alexandria, Egypt

Abstract. As architecture and construction in Egypt move toward digital delivery, the challenge is no longer only adopting BIM tools, but using them in a way that produces reliable, decision-ready information across disciplines. This paper addresses that challenge through a documentary case study of a public psychiatric hospital project, where BIM-based collaboration through effective coordination was implemented across architecture, structural, and MEP disciplines within a Common Data Environment over multiple design stages. The study uses project coordination records, clash reports, issue logs, and meeting documentation to examine how digital coordination practices evolved and how information exchange became more dependable over time.

The analysis shows that the technical value of BIM is realized most clearly when innovation in tools is matched by innovation in workflow. Coordination performance improved as three practices became more consistent: traceable issue management, explicit assignment of responsibilities, and verification of model updates before formal acceptance. Together, these practices reduced recurring coordination disruption and supported a shift from repeated clash detection to controlled, decision-support information exchange.

The paper demonstrates how BIM can function as a practical technological framework for improving interdisciplinary delivery, and it offers evidence-based guidance for strengthening digital coordination practices in modern Egyptian construction and building engineering.

Keywords. BIM, digital coordination, information management, common data environment, interdisciplinary collaboration, Egypt





An AI-Based Methodological Framework for Enhancing Indoor Air Quality and Thermal Comfort in Educational Buildings.

Ghada Adel Helal Zeweita(1)

Sara Hosny Shaalan (2)

Mai Wahba Madkour (3)

(1) Professor of Design and Environmental Control, Faculty of Engineering, Tanta University, Egypt

(2) Researcher, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

(3) Lecturer, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Indoor air quality (IAQ) and thermal comfort are two critical elements that define the effectiveness of the educational environment, as well as lounging atmosphere in educational buildings. Nonetheless, state-of-the-art operation schemes frequently adopt traditional or reactive approaches and are generally incapable of dealing with the dynamic nature of the indoor environmental conditions as well as variations in occupancy. Due to this shortcoming, the current scientific community has long been seeking more advanced, operation-oriented approaches through data analysis and proactive prediction for further improving the control of our environment in an efficient and sustainable manner. The objective of this research work is to develop an AI-oriented solid framework for enhancing the performance of indoor air and heat quality in educational buildings. The study uses a practical (applied) analysis approach by developing a smart operating system that uses environmental data and building occupancy characteristics for use in support of performance-based decisions through predictive modeling.

The presented structure does not use direct field measurements at this stage and is outlined in terms of a comparison among three operation strategies: conventional mode, reactive conditional response strategy and AI predictive control. Results suggest that the predictive control approach can lead to substantially improved stability of IAQ (reduced CO₂ concentration variability and likelihood for critical peaks) in addition to more stable thermal conditions relative to classical and reactive approaches. These findings suggested that a transition from reactive to proactive control logic could mitigate unexplained operational behavior in VAC systems and therefore limit the necessity for abrupt responses, leading towards a more balanced and sustainable indoor environment.

The study also found that the incorporation of AI technologies in driving the facilities operations of educational buildings is not just a technological advancement for building systems control but embodies a paradigm shift in indoor management whereby design and occupants are made to manage indoor conditions reactively while this approach curtails problems prior to bringing about discomforts through proactive prediction and analysis. The methodological framework adopted herein, therefore offers a good scientific and practical basis for future research development (including full scale field applications and quantification of the EEP performances) of healthier, more resilient and sustainable educational buildings.

Keywords: Indoor Environmental Quality; Indoor Air Quality; Thermal Comfort; Educational Buildings; Artificial Intelligence; Smart Buildings.





Traffic Impact Assessment of Local Projects to Achieve Quality of Urban Life: A Study of the Logistics Zone in Seberbay, Tanta City

Lobna Abdallah Abd Elfattah Agha (1)
Sara Hosny Shaalan (2)

(1) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

(2) Lecturer, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Traffic Impact Assessment (TIA) studies are essential decision-support tools in urban planning and architectural design within Egyptian cities, aiming to enhance urban quality of life. Traffic congestion, noise, and pollution negatively affect residents' comfort, safety, and well-being. In Egypt, there is a lack of an official local system for comprehensive traffic impact evaluation, despite TIA studies being mandatory for major projects. With the continuous expansion of mega-projects in logistical areas, there is an urgent need for scientific tools and local standards to assess and understand the impacts of these developments on the surrounding urban environment. The Sabry Bay area in Tanta, which is experiencing diverse functional growth

and an increasing reliance on private vehicles, serves as an ideal case study to examine the integration of urban design and traffic impact assessment. This study explores the relationship between TIA and urban design, emphasizing the role of planning in improving traffic efficiency, reducing congestion, and minimizing environmental and social impacts. A practical application is conducted on the General Hospital in Sabry Bay, involving the development of a TIA methodology, data analysis, and the application of sustainable Transit-Oriented Development (TOD) indicators, while linking them to the Green Pyramid Rating System as a local evaluation framework. The findings highlight the importance of integrating traffic studies into the early design stages to achieve functional urban development with low traffic impact, while promoting urban sustainability and quality of life.

Keywords. Traffic impact assessment, urban quality of life, sustainability, TOD, green pyramid





From Top-Down to Collaborative Governance: Decoding the Institutional Challenges of Urban Upgrading in Greater Cairo

Ahmed Aboulsaadat (1)

(1) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Egypt's recent upgrading agenda has changed the physical condition of many unsafe areas, but the longer-term

question is what happens after people move in. This paper studies that post-occupancy gap through a review of the literature, a reading of the relevant policy and institutional setting, and a comparative study of two Greater Cairo cases: Al-Asmarat District and the Maspero Triangle. The comparison is organized around institutional coordination, resident participation, livelihood continuity, maintenance, socio-spatial integration, and accountability. The review suggests that centralized delivery has been effective in assembling land, financing projects, and accelerating construction

and relocation. The same model is less persuasive once day-to-day management, upkeep, and resident-state interaction become the dominant concerns. Al-Asmarat reveals both the value and the limits of rapid rehousing, while Maspero makes visible the tensions among regeneration, land value, compensation, and the right to return. The paper therefore argues that physical delivery on its own is insufficient and proposes a Collaborative-Smart Governance Framework linking neighborhoods management, service contracts, social facilitation, and digital monitoring.

Keywords: Urban Governance, Informal Settlements, Greater Cairo, Post-Occupancy Sustainability, Collaborative Governance, Urban Development Fund (UDF).





The Effects of Recent Modifications in Egyptian Building Regulations on Urban Development and Socioeconomic Conditions Over the Past Decade

Mohammed Mostafa Abo Helal (1)

(1) Lecturer, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Financial uncertainty in modern construction projects is on the rise due to complex multinational supplier networks, fluctuating cash flows, and variable exchange rates. These factors pose risks to project completion, financial stability, and deliverable quality. This research examines the effects of cash flow availability and foreign exchange on construction outcomes, focusing on five flagship projects in Egypt after the 2016 currency flotation. [1]. Using a case study approach, the research examined both qualitative and quantitative aspects of schedule changes, cost overruns, and liquidity. Additionally, the study identified several financially restricted projects that were completed. [2]. The findings indicated that projects with high foreign exchange risk exposure experienced an average cost overrun increase of

33%, while those with low foreign exchange risk exposure had a significantly lower average increase of just 2%. Additionally, illiquid projects that suffer substantial delays typically experience delays of 320 to 420 days. In contrast, well-funded projects are completed on schedule. Among the projects, those that are both illiquid and significantly exposed to foreign exchange risks exhibited the most severe performance decline, with cost overruns ranging from 41% to 43% and delays of up to 14 months. [3]. The limitations of its resources affected the overall quality and quantity of work produced. Smaller projects yielded medium-quality output, whereas larger projects produced high-quality results. The findings indicated that disruptions in the procurement system and payment delays, along with fluctuations in foreign exchange rates, are increasing project risks, as further emphasized by the results. [4]. The research suggests that these risks can be mitigated by incorporating public procurement laws that address foreign exchange adjustments, multi-currency payment terms, and enhanced liquidity protection provisions.

Keywords: Egyptian construction industry, cash flow analysis, foreign exchange risk, expense overrun, schedule delay, project performance, currency fluctuations, liquidity limitations, and risk management





A Framework for Upgrading Informal Settlements Based on Street Networks: Using Flexible Performance-Based Standards

Mai Magdy (1)

Walaa Nour (2)

Bahaa Elboshy (3)

(1) Asst. Lect. at HIET, Kafr El-Sheikh

(2) Professor, Dept. of Architecture, Faculty of Engineering, Alexandria University, Alexandria, Egypt

(3) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Informal settlements constitute a complex urban challenge in contemporary cities. Despite their streets pivotal role as multifunctional urban spaces that support mobility, environmental, and socio-economic functions, they have been overlooked as a comprehensive unit of analysis in planning. The research problem lies in the dominance of rigid formal planning standards that overlook the dynamic nature of streets in informal settlements as integrated urban spaces. This leads to ineffective intervention strategies or radical eradication decisions that obliterate the urban and social identity of these areas. Accordingly, this study aims to develop an integrated theoretical framework that repositions the street in informal settlements as a fundamental driver of urban upgrading and improving quality of life. The study adopted inductive and deductive approaches through a critical literature review, a conceptual analysis of street characteristics across four

dimensions (morphological, physical, behavioral, and visual), and a comparison of its roles in formal and informal contexts to identify the normative gap. Consequently, this study advances a perspective that diverges from conventional approaches, concluding that streets in informal settlements should not be regarded merely as “haphazard, neglected spaces,” but rather as valuable urban assets endowed with distinctive spatial qualities and a human scale that foster socioeconomic cohesion. Accordingly, instead of rigid adherence to prescriptive engineering standards that may fragment the unique social fabric of these areas, the research proposes adopting flexible, performance-based planning standards that prioritize functional efficiency, accessibility, safety, and visual quality. Finally, the research establishes the theory of “The Street as a Catalyst for Upgrading,” asserting that integrated street upgrading creates a state of positive contagion. This spontaneous motivation encourages residents to enhance their building facades, fostering a positive visual identity and transforming the area’s stigmatized image. This, in turn, elevates residents’ civic behavior and achieves sustainable urban and social development for the area.

Keywords. Informal Settlements, Catalyst for Urban Upgrading, Performance-Based Standards, Positive Contagion, Urban Identity





The Role of External Finishes in Achieving Thermal Comfort in Hospitals and Reducing Energy Consumption

Saleh (1)

(1) Associate Professor, Dept. of Architecture and Urbanism, Faculty of Engineering,
Elmergib University, Libya

Abstract. The exterior finishes are one of the most important elements contributing to the thermal convenience in hospitals and reduce energy consumption and raise the quality of the performance of employees and improve patient health. The problem of research lies not to rely on external finishes in hospital buildings to achieve thermal comfort and reduce energy consumption, so that the need to study and clarify the importance of the role of external finishes of hospitals. This research aims to clarify external finishes used to achieve thermal comfort and study its effectiveness and contribution to reducing energy consumption.

The research depends on the analytical descriptive curriculum by reviewing the scientific auditor adopted and related to external finishes of hospital buildings





Exploiting the potential of 3D printing construction technology using sustainable building materials

Hosny Ahmed Dwair (1)

(1) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Developing advanced construction techniques that take advantage of technological advancements and artificial intelligence tools is one of the biggest challenges facing modern architecture and urbanism. One such technique is the use of 3D printing technology, which is an inventive way to cut costs and speed up the building process while also reducing material loss. These reductions in costs are then reflected in energy consumption, which in turn results in the creation of sustainable buildings. It might be made of recycled materials in order to maximize the benefits of scientific study. These materials will be suggested in this study, and an effort will be made to develop a material that can be used in this manner to arrive at an integrated strategy for It might be made of recycled materials in

It might be made of recycled materials in order to maximize the benefits of scientific study. These materials will be suggested in this study, and an effort will be made to develop a material that can be used in this manner to arrive at an integrated strategy for the implementation of a certain kind of inexpensive, energy-efficient structure. One of the most significant technological advances and inventions of the twenty-first century is 3D printing, with investments in the global market estimated to reach 190 million US dollars in 2021 and 680 million US dollars by 2030. Keywords: 3d printing, sustainable, materials.

Keywords: Construction techniques, 3D printing, Recycled materials, sustainable.





The role of Intelligent Transportation Systems (ITS) in reshaping and sustaining urban spaces

Mona Elsaid Ahmed El Desoki (1)

Prof. Dr. Walaa Ahmed Nour (2)

Assoc. Prof / Dr. Lobna Abdullah Agha (3)

Assoc. Prof / Dr. Wesam Abu Hajjaj Mihana (4)

(1) Asst. Lect. at HIET, Kafr El-Sheikh, Egypt

(2) Professor, Dept. of Urban Planning and Design Engineering, Tanta University, Egypt

(3) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

(4) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. This research explores the transition from traditional urban patterns to 'Smart Cities' based on digital knowledge and Artificial Intelligence (AI) to address contemporary urban challenges. The study focuses on analyzing the dimensions of the smart city (governance, mobility, environment, and economy), with a particular emphasis on 'Intelligent Transportation Systems' (ITS) and their role in enhancing traffic efficiency and reducing energy consumption through monitoring and control technologies. By examining models from European cities, the research concludes that smart governance and e-mobility are fundamental pillars for achieving urban sustainability and developing technical solutions for urban crises. This research

addresses the lack of urban planning policies for integrating smart technologies into transportation systems. Focusing on Kafr El-Sheikh, the study evaluates how Intelligent Transportation Systems (ITS) can resolve traffic congestion and improve pedestrian pathways. The ultimate goal is to formulate a data-driven urban development strategy that leverages smart city components to ensure a sustainable, integrated, and future-proof transit network.

Keywords. Smart Cities, ITS, Urban Sustainability, Urban Spaces.





The Integration of Interior Design Elements and Modern Technologies in Patient Accommodation Units to Achieve Sustainability

Esraa khatan(1)

Prof. Dr. Walaa Ahmed Nour (2)

Marwa Ahmed Kamer El-Dawla (3)

(1) M.Sc. Student, Architectural Engineering Department, Tanta University, Tanta, Egypt

(2) Professor, Dept. of Urban Planning and Design Engineering, Tanta University, Egypt

(3) Associate Professor, Dept. of Urban Planning and Design Engineering, Tanta University, Egypt

Abstract. The research examines the properties of advanced finishing materials suitable for use in hospital patient accommodation units, with the aim of providing a safe and healthy indoor environment for both patients and those in contact with them, as well as achieving appropriate thermal comfort that reduces reliance on industrial energy consumption. This, in turn, contributes to creating an effective therapeutic environment that helps accelerate the healing process.

Furthermore, the study seeks to develop a comprehensive framework that links interior design to its role in directing the therapeutic environment toward achieving better health and psychological comfort for patients, while enhancing energy efficiency in buildings and fulfilling the principles of environmental sustainability. The research examines the properties of advanced finishing materials suitable for use in hospital patient accommodation units, with the aim of providing a safe and healthy indoor environment for both patients and those in contact with them, as well as achieving appropriate thermal comfort that reduces reliance on industrial

energy consumption. This, in turn, contributes to creating an effective therapeutic environment that helps accelerate the healing process. Furthermore, the study seeks to develop a comprehensive framework that links interior design to its role in directing the therapeutic environment toward achieving better health and psychological comfort for patients, while enhancing energy efficiency in buildings and fulfilling the principles of environmental sustainability.

The research addresses the following main themes:

- Theme One: Studying the concept of the human dimension in architecture and users' psychological comfort.
- Theme Two: Examining the principles of hospital design, with particular emphasis on patient accommodation units.
- Theme Three: Identifying interior design indicators that support psychological comfort for patients and users.
- Theme Four: Analyzing the impact of eco-technology on interior design as a contemporary design approach, and exploring methods of employing it to achieve sustainable energy conservation in accordance with environmental requirements.
- Theme Five: Presenting analytical models of projects that employed interior design strategies and finishing materials to enhance patients' psychological comfort and contribute to reducing energy consumption.

The study concludes that the integration of interior design elements with modern technologies in patient accommodation units directly contributes to achieving an integrated therapeutic and thermal environment, leading to improved energy efficiency and accelerated healing rates, in support of contemporary sustainable architecture trends.





Implementing Closed-Loop Water Design Systems Towards Self-Sustaining Architecture

Mohamed masod hasen (1)

Abeer Makram (2)

Samer adel abu zahra (3)

Dalia Abdel Razek (4)

(1) Master's Student, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

(2) Associate Professor, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

(3) Lecturer Professor, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

(4) Lecturer Professor, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

Abstract. "In light of the worsening global water scarcity crisis and United Nations projections of a gap between supply and demand exceeding 40% by 2030 due to climate change and population growth, this research paper aims to formulate an integrated design strategy to achieve 'Net Zero Water Buildings,' with a focus on hot and arid regions such as the Middle East. The research methodology relies on a literature analysis to determine the optimal scope for a water management system through a three-dimensional approach: first, reducing water demand using innovative conservation techniques; second, maximizing the utilization of alternative non-conventional sources; and third, implementing onsite wastewater treatment and

recycling systems to offset reliance on freshwater. The study reviews benchmarking cases that have achieved nearly 99% self-sufficiency and concludes with the necessity of designing recycling systems based on precise regional data. It emphasizes the pivotal role of computer modeling and simulation technologies in accurately predicting consumption rates and verifying the operational efficiency of the proposed system prior to implementation."

Keywords: Net Zero Buildings , Black water, Gray water, Control Technologies.





Employing Computer Applications and Artificial Intelligence to Achieve Urban Sustainability An Applied Study on the Development of Road Networks in Alexandria City

Marwa Ahmed Kamer El-Dawla (1)

Amr Ahmed Zeina (2)

Ahmed T. Azab (3)

(1) Associate Professor, Dept. of Urban Planning and Design Engineering, Tanta University, Egypt

(2) Associate Professor, Dept. of Urban Planning and Design Engineering, Tanta University, Egypt

(3) B.Sc., Architectural Engineering, Scientific Researcher, Tanta University, Egypt

Abstract. Contemporary cities are facing increasing challenges resulting from rapid urban growth, continuous population increase, and the rising demand for transportation services. These factors have led to the intensification of traffic congestion problems, increased energy consumption, and heightened environmental, economic, and social impacts within urban areas. In light of these challenges, the need has emerged to adopt innovative planning tools capable of supporting the achievement of comprehensive urban sustainability, beyond the limitations of traditional approaches to the planning and management of road networks. Within this context, this study aims to examine the employment of computer applications and artificial intelligence techniques as supportive tools for achieving urban sustainability through the development of urban road networks, which represent one of the vital components of the urban infrastructure influencing urban performance efficiency and quality of life.

Alexandria City was selected as a reference scope for the study due to its urban significance and the increasing traffic challenges it faces.

The study adopts an integrated research methodology that includes a theoretical component for building a conceptual and intellectual framework through a review of scientific literature related to computer applications, artificial intelligence, and sustainable urban planning, in addition to a comparative analytical component that examines successful global models of smart sustainable cities. This approach aims to extract a set of planning, traffic, technological, environmental, and administrative indicators associated with road network development and the achievement of urban sustainability.

Based on the theoretical analysis, supported by the findings of the comparative analytical study, the study reaches a methodological conclusion confirming that the effective use of smart technologies in road network development should be based on the integration of planning indicators, traffic indicators, technological indicators, environmental indicators, and administrative indicators in order to achieve urban sustainability. This integrated approach constitutes a fundamental basis for improving road network efficiency, reducing environmental, economic, and social impacts, and supporting the transition toward smart sustainable cities capable of responding to present and future challenges.

Keywords: Optimization; Artificial Intelligence – Computer Applications – Sustainable Urban Planning – Smart Sustainable Cities





An Integrated Smart Water Efficiency Strategy for the Built Environment Based on Expert's Testing – Case Study: Mansoura University Administration Building

Raghda Abdelwahab Darwisha (1)

Sherif Ahmed Shetaa (2)

Lamis Saad Eldin Elgawia (3)

(1) Architectural Engineering Department, Faculty of Engineering, Mansoura University, Egypt

(2) Architectural Engineering Department, Faculty of Engineering, Mansoura University, Egypt

(3) Architectural Engineering Department, Faculty of Engineering, Mansoura University, Egypt

Abstract. Egypt's sustainable growth is seriously threatened by its growing water scarcity issue, necessitating immediate and situation-specific built environment solutions. International green building rating systems provide guidelines, but they sometimes overlook regional infrastructure and climate conditions. The purpose of this paper is to create and validate a context-sensitive, comprehensive framework for smart water efficiency in Egyptian public buildings. The study used a four-phase methodology. First phase included key criteria which were extracted through a comparative analysis of four prominent rating systems, including the Green Pyramid Rating System (GPRS) and Leadership in Energy and Environmental Design (LEED). Second phase included this

criteria which were statistically validated through a survey of fifteen multidisciplinary Egyptian experts, analyzed using the Statistical Package for the Social Sciences (SPSS). In the third phase a new, weighted diagnostic tool was developed, and finally the fourth phase included applying this methodology on the Mansoura University Administration Building, a realworld case study. Significant inefficiencies were shown by the results, which showed a baseline performance score of just 28 out of 100. The building's score increased to a strong 78 out of 100 when the suggested smart strategy changes were put into practice. This change, which shows a 35% improvement in performance, shows that focused, regionally tailored strategies can result in significant water savings. This study conducted that the proposed Integrated Smart Water Efficiency Strategy for the Built Environment can be applied on all Mansoura university campus buildings and the built environment can be transformed from a major water consumer into a key agent of water conservation.

Keywords: Smart Water Efficiency, Rating Systems, Built Environment, Sustainability, Expert's Testing





A Transferable City Information Modeling Roadmap for Environmental Performance Assessment in Egyptian Cities

Anas Albayaa (1)

Neveen Azmy (2)

Bahaa Elboshy(3)

(1) Researcher, Architectural Engineering Department, Tanta University, Tanta, Egypt

(2) Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

(3) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

Abstract. Fragmented datasets, high costs of proprietary software, and the absence of a clear, replicable CIM methodology adequate across diverse urban contexts constrain urban environmental assessment in Egyptian cities. This research proposes an integrative CIM-based analysis framework as a transferable roadmap for assessing environmental performance at urban-to-corridor scales under resource constraints. The framework is a multi-phase structured pipeline starting with problem scoping and boundary definition, followed by multi-source data acquisition using remote sensing and open geodata with standardized metadata. Central to this roadmap is a CIM information schema that unifies geometry, semantics, and temporal states (baseline,

current, and future scenarios), supported by an interoperability workflow for harmonizing coordinate systems and simplifying geometries for simulation. The modular analysis suite integrates microclimate, air quality, and ecosystem service assessments as plug-in components with explicit input/output contracts. Performance indicators operate at the urban-corridor level to support transparent scenario comparison and decision-making, for example, by contrasting existing conditions with alternative greening strategies. The roadmap explicitly embeds uncertainty management by documenting data-resolution limits, parameter assumptions, and a staged validation plan. Together, these elements yield a scalable digital framework that provides an applicable, reproducible, and evidence-based solution for Egyptian cities, aligned with Egypt's Vision 2030 priorities of climate adaptation, digital transformation, and affordable municipal planning.

Keywords: CIM; Open-Source GIS; Environmental Assessment; Microclimate; Remote Sensing; Egypt; Sustainable Urban Design





Using Responsive Façades to Address Visual Comfort Challenges in Office Buildings: A Systematic Review

Ola Marouf (1)

Youssef Elkhayat (2)

Usama Konbr(3)

(1) Assistant lecturer, Dept. of Architecture, Faculty of Engineering, Delta University for Science and Technology

(2) Associate Professor, Dept. of Architecture, Faculty of Engineering, Tanta University

(3) Professor, Dept. of Architecture, Faculty of Engineering, Tanta University

Abstract. Visual comfort is one of the key elements in office buildings, as it has a direct impact on performing visual activities and tasks, and user comfort. Visual comfort is achieved when attaining daylighting conditions that enable users to perform their visual tasks without visual stress or disturbance. Recent studies indicate that there are various problems related to visual comfort in office spaces, resulting from adopting different and contradictory design treatments for buildings' façades; solid façades with relatively limited openings lead to poor daylighting distribution, while glazed façades with relatively wide openings cause high levels of glare and thus decreased visual comfort, especially in areas close to these openings. As well as, deep open-plan office spaces also suffer from inadequate daylighting distribution in deep and central

areas. These challenges are exacerbated in buildings with fixed conventional façades and closed configurations. So, the importance of designing façades as an effective mediating element between the external and internal conditions emerges as a key approach to solving visual comfort issues. Therefore, this research paper aims to identify challenges related to visual comfort in office spaces and to analyze the role of the responsive façade as a solution. This study employs a dual methodology, which includes bibliometric analysis and systematic review to analyze scientific literature on responsive façades and visual comfort in office buildings. Initially, a bibliometric analysis using VOSviewer software was conducted on Scopus database studies to explore research trends, keyword frequency, and concept relationships. Thus, a systematic review of relevant studies focused on methodologies and results. The findings highlight research trends and gaps, focusing on limitations that present opportunities for future studies to address these shortcomings.

Keywords: Responsive façade – Visual comfort – Office building – daylighting control – Glare – open office spaces





A Framework for Disability-Inclusive Urbanism: From Regulation to Usability

Hana M. Arafa (1)

Mai W. Madkour (2)

Marwa A. Kamer Eldawla (3)

Amr A. Zeina (4)

(1) Teaching Assistant, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt
(2) Professor of Design and Environmental Control, Faculty of Engineering, Tanta University, Egypt

(3) Associate professor, Dept. of Planning and Urban Design, Faculty of Engineering, Tanta University, Egypt.

(4) Associate professor, Dept. of Planning and Urban Design, Faculty of Engineering, Tanta University, Egypt.

Abstract. Inclusive urban environments assessments are commonly based on a limited “compliance” approach in which accessibility is limited to a set of quantifiable elements such as ramp gradient, curb ramps, and sidewalk widths. This research argues that this prescriptive approach is insufficient as a tool of analysis in disability-inclusive urbanism because accessibility is not experienced as a set of elements in conformance with accessibility standards but rather as a continuous process of movement, crossing, orientation, pause, recovery, and arrival in which movement, crossing, orientation, pause, recovery, and arrival must work as one chain. As a response, this research proposes a multi-layered assessment framework that shifts focus from regulation towards a more

usability-centric approach to urban performance. The framework is developed by a convergent mixed-methods approach consisting of four layers of analysis and one integrative layer: a regulatory layer based on disability legislation and accessibility standards in Egypt, a criteria generation layer that translates regulations into evaluative indicators, a microscale streetscape assessment layer using MAPS- Global, a route/network accessibility layer using the Place Syntax Tool (PST), and a participant-led assessment layer using Stakeholders’ Walkability/Wheelability Audit in Neighbourhoods (SWAN) principles. These elements are synthesized by a combined analytic matrix that reveals areas of convergence and divergence between formal provision and usability. This paper offers conceptual and methodological advancement in identifying the “compliant but unusable” condition as a problem in public space accessibility and proposes a framework by which urban designers, planners, and policymakers can identify, understand, and address in developing cities.

Keywords: Accessibility Assessment – MAPS Global – Disability Inclusive Urbanism – Place Syntax – Public Space Usability





Urban Landscape Unit Classification for Preserving Spatial Values: A Design-Oriented Approach in Fustat Hills Park, Cairo

Maryam Mohamed Nabil (1)

Aladin Yassin (2)

Marwa Ahmed Kamer Eldawla (3)

Walid A. Abdellatif (4)

(1) Teaching Assistant, Dept. of Planning and Urban Design, Faculty of Engineering, Tanta University, Egypt

(2) Professor of Urban Development and Preservation, Dept. of Urban Design, Faculty of Urban and Regional Planning, Cairo University, Egypt.

(3) Associate professor, Dept. of Planning and Urban Design, Faculty of Engineering, Tanta University, Egypt.

(4) Assistant Professor, Dept. of Environmental Planning and Infrastructure, Faculty of Urban and Regional Planning, Cairo University, Egypt.

Abstract. Urban landscapes are increasingly recognized not merely as aesthetic backdrops, but as an active and operational framework for sustainable cities. Despite this growing recognition, a significant methodological gap remains—namely, the lack of a clear and structured classification system capable of interpreting the complexity of urban landscapes. This gap often constrains effective urban conservation practices and limits opportunities to enhance urban livability. To address this challenge, the present research proposes a tailored methodological framework that deconstructs the

urban landscape into distinct Landscape Units. Each unit is systematically analyzed through an integrated triad encompassing its intrinsic value (spatial and historical), functional role, and level of impact within the broader urban context. The proposed methodology is tested through its application to Fustat Hills Park, a site characterized by pronounced historical depth and topographical complexity. The results demonstrate that the unit-based classification functions as an effective planning and design tool, supporting informed decision-making processes that balance the preservation of spatial identity with the regeneration of the urban fabric. Ultimately, the study provides a practical roadmap for repositioning urban landscapes as active, interconnected systems that contribute to urban sustainability and improved quality of life.

Keywords: Urban Landscape; Landscape Unit Classification; Spatial Values; Urban Design; Urban Conservation; Fustat Hills Park





High-Performance Institutional Architecture in Hot-Arid Climates: A Comprehensive Energy Audit and Dynamic Simulation Analysis of a University Facility in Cairo

Ayat Khalaf, KAMAL (1)

Marwa Mohamed, El-
ELRASHIDEY(2)

Heba Hassan ISMAIL (3)

- (1) M.Sc. Student, Dept. of Architecture , Al-Azhar University, Cairo, Egypt
- (2) Dept. of Architecture , Al-Azhar University, Cairo, Egypt
- (3) Associate Professor ,Dept. of Architecture , Beni-suef University, Cairo, Egypt

Abstract. The building sector in the Middle East and North Africa (MENA) is currently facing a dual challenge: the rapid expansion of urban infrastructure and the escalating thermal stresses imposed by a changing global climate. Within this context, higher education facilities emerge as a particularly energy-intensive building typology due to high occupancy densities, extended operational hours, and a heavy reliance on mechanical cooling and electronic equipment. This research provides a high-fidelity diagnostic analysis of a university building in Cairo, Egypt, comprising a total area of 7170.83 . Utilizing the EnergyPlus Version 8.9.0 simulation engine integrated with the DesignBuilder graphical

interface, the study evaluates the annual energy performance, end-use distributions, and peak demand profiles under Typical Meteorological Year (ETMY) conditions. The simulation results reveal a site Energy Use Intensity (EUI) of 183.14 and a source EUI of 338.88. A critical end-use breakdown identifies cooling as the primary energy driver, accounting for 62.89% of total consumption (825,931.55 kWh), while interior equipment and lighting contribute 23.67% and 10.90%, respectively. The analysis further scrutinizes the building's envelope, revealing that a south-facing Window-to-Wall Ratio (WWR) of 34.35% contributes significantly to the peak cooling demand of 616.55 kW recorded in August. By benchmarking these findings against regional standards and the Egyptian Green Pyramid Rating System (GPRS), the study identifies substantial opportunities for energy rationalization. Recommendations focus on orientation-specific envelope retrofitting, the integration of passive shading, and the adoption of advanced operational strategies to align with Egypt's Vision 2030 and the National Energy Efficiency Action Plan (NEEAP). This work establishes a quantitative baseline for the transition toward nearly zero-energy institutional buildings in hot-arid climatic zones.





The virtual reality of documenting the architectural heritage towards the revival of heritage gardens (A case study of heritage gardens in Greater Cairo)

Mai Wahba Madkour (1)

Lubna Abdel Fattah Agha(2)

Hafsa Mostafa Mohamed Mostafa (3)

(1) Professor of Design and Environmental Control, Delta University for Science and Technology, 2019

(2) Assistant Professor, Dept. of Architecture, Faculty of Engineering, Tanta University, Egypt

(3) B. Sc., Dept. of Architectural Engineering, Delta University for Science and Technology, 2019

Abstract. This paper explores the potential of utilizing Virtual Reality (VR) technology as an innovative tool for documenting and reviving heritage gardens in Greater Cairo. Despite their historical and cultural significance, these sites face severe threats from unplanned urban expansion and neglect. This study adopts an analytical-applied methodology, beginning with an assessment of the current state of heritage gardens, followed by the development of immersive 3D digital models. The developed digital models attempt to reconstruct both the spatial characteristics and historical context of heritage gardens within an immersive environment. to enhance user engagement and perception. The results

thatThe findings indicate that immersive virtual environments can significantly enhance public awareness regarding heritage conservation. The research provides a practical framework for heritage institutions in Egypt to preserve cultural identity through modern digital documentation.

Keywords: Virtual Reality, Architectural Heritage, Heritage Gardens, Revival, Documentation, Greater Cairo.





Implementing Closed-Loop Water Design Systems Towards Self-Sustaining Architecture

Mohamed masod hasen (1)

Abeer Makram (2)

Samer adel abu zahra (3) Dalia

Abdel Razek (4)

(1) Master's Student, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

(2) Associate Professor, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

(3) LecturerProfessor, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

(4) LecturerProfessor, Delta University for Science and Technology, Dakahlia, Gamasa, Egypt

Abstract.

In light of the worsening global water scarcity crisis and United Nations projections of a gap between supply and demand exceeding 40% by 2030 due to climate change and population growth, this research paper aims to formulate an integrated design strategy to achieve 'Net Zero Water Buildings,' with a focus on hot and arid regions such as the Middle East. The research methodology relies on a literature analysis to determine the optimal scope for a water management system through a three-dimensional approach: first, reducing water demand

using innovative conservation techniques; second, maximizing the utilization of alternative non-conventional sources; and third, implementing onsite wastewater treatment and recyclingsystems to offset reliance on freshwater. The study reviews benchmarking cases that have achieved nearly 99% self-sufficiency and concludes with the necessity of designing recycling systems based on precise regional data. It emphasizes the pivotal role of computer modeling and simulation technologies in accurately predicting consumption rates and verifying the operational efficiency of the proposed system prior to implementation."

Keywords: Net Zero Buildings , Black water, Gray water, Control Technologies





An Integrated Framework for Achieving Net-Zero Energy and Net-Zero Carbon Buildings in Hot Climates

Ayat Elshahat (1)

Nouran Ahmed (2)

Dalia Abdelrazek (3)

Abeer Makram (4)

(1) Architectural Engineering, Delta University for Science and Technology, Mansoura, Dakahlia

(2) Architecture, engineering, Delta University for Science and Technology, Mansoura, Dakahlia

(3) Architecture, engineering, Delta University for Science and Technology, Mansoura, Dakahlia

(4) Architecture, engineering, Delta University for Science and Technology, Mansoura, Dakahlia

Abstract. The urgent need for sustainable urban environments has placed reducing energy consumption and greenhouse gas emissions in the building sector at the forefront of research priorities. As buildings contribute significantly to global primary energy use and operational emissions, transitioning to zero-energy (NZEB) and zero-carbon (NZCB) buildings is crucial for mitigating climate change. In Egypt, this transition aligns with Egypt's Vision 2030, which prioritizes sustainable urban development and enhanced energy efficiency as national imperatives. This

study delivers a comprehensive, quantitative, and systematic review of recent scientific literature, comparative analyses, design strategies, and real-world case studies to identify practical pathways toward zero-energy and zero-carbon building standards. Employing a multidimensional analysis of current scientific advances, the study introduces a performance-based design framework that clarifies the architectural decision-making process. The framework emphasizes minimizing energy demand and embodied carbon emissions, tailored to the climatic context of hot regions. Ultimately, the proposed methodology serves as a robust reference for architects and researchers, translating broad sustainability objectives into actionable, data-driven design solutions that inform and guide their work.

Keywords: NZEB, NZCB, GHG, Sustainability, Design strategies, integrated Framework, and Hot regions.





Relationship between human behavior and urban design in Existing city streets and the impact of artificial intelligence on improving the efficiency of urban design for existing streets and its relationship to human behavior.

Marwa Ahmed Kamer El-Dawla (1)

Abdelrahman Osama El-Hawary (2)

Sara Hosny Shaalan (3)

(1) Associate professor, Dept. of Planning and Urban Design, Faculty of Engineering, Tanta

(2) Researcher, Architectural Engineering, Tanta University, Egypt

(3) Lecturer, Architecture Department, Faculty of Engineering, Tanta University, Egypt

Abstract.

This thesis investigates urban and behavioral deterioration in existing Egyptian cities through the case of El-Mahalla El-Kubra, where incremental, uncoordinated growth and predominantly car-oriented street modifications have weakened walkability, comfort, and the social performance of the public realm [18], [20]. The study conceptualizes street degradation as an interactional phenomenon: the physical environment shapes users' choices and perceptions, while users' coping behaviors—such as informal crossings, sidewalk occupation, and conflictive movement patterns—gradually reinforce spatial disorder and reduce safety and belonging. The thesis develops an integrated analytical framework that links urban design determinants—street hierarchy, cross-section configuration, edge conditions, land-use intensity and mix, permeability, microclimatic comfort, and public-space amenities—to measurable behavioral indicators, including route choice, walking speed, dwell duration, crossing behavior, activity distribution, conflict points, and user-reported safety and satisfaction.

Within this framework, Artificial Intelligence (AI) is examined not as a symbolic “smart city” label, but as an operational decision-support layer that enhances the capacity to interpret complex behavioral evidence, prioritize interventions, and evaluate design alternatives with greater transparency and repeatability.

Methodologically, the research transitions from theoretical assessment to a five-step applied pipeline: (1) field observation and documentation of visual and behavioral issues; (2) hybrid data collection, incorporating user perception surveys and flow statistics; (3) algorithmic processing using Space Syntax to analyze the spatial network and calculate integration values; (4) extraction of analytical maps and heatmaps to identify congestion nodes; and (5) the formulation of an AI-informed integrated design model.

The resulting dataset is organized into a coherent diagnostic profile that supports evidence-based interpretation of how spatial conditions generate specific behavioral outcomes. The thesis culminates in a context-responsive model for upgrading existing streets that sets measurable targets for accessibility, safety, and sense of belonging, and proposes a prioritized package of interventions such as crossing redesign, traffic calming, sidewalk continuity and management, cycling accommodation where feasible, shading and seating strategies, and activation of street edges. The findings indicate that integrating AI-supported spatial and behavioral analysis into the urban design process improves the alignment between design decisions and actual street use, enabling realistic, flexible, and scalable solutions for the rehabilitation of streets in existing Arab cities and the creation of more human-centered and sustainable urban environments.

Keywords: Urban Design, Human Behavior, Artificial Intelligence (AI), Existing Cities, El-Mahalla El-Kubra, Urban Planning.





Assessing the Role of Solar Energy in Urban Sustainability: A Multi-Dimensional Framework for Photovoltaic Integration

Abdelwahab Magdi Zeedan(1)

Neveen Youssef Azmy (2)

Hosny Dewair(3)

(1) Researcher, Dept. of Architecture, Faculty of Engineering, Tanta University, Tanta, Egypt

(2) Professor; Dept. of Architecture; Faculty of Engineering, Tanta University, Egypt

(3) Associate Professor; Dept. of Architecture; Faculty of Engineering, Tanta University, Egypt

Abstract. Rapid urbanization had increased global energy demand, reinforcing reliance on conventional energy sources and amplifying environmental pressures within cities. Consequently, renewable energy had become a critical component of sustainable urban development strategies. Among available technologies, solar energy—particularly photovoltaic systems—had demonstrated significant technological maturity and scalability, offering substantial potential to enhance the environmental performance of urban systems.

Despite this potential, the contribution of solar energy to urban sustainability remained insufficiently conceptualized and assessed. Predominant sustainability assessment frameworks, such as LEED and BREEAM, had addressed renewable energy in generalized terms,

providing limited insight into the spatial, functional, and governance-related dimensions of solar energy integration at the urban scale. This limitation had constrain the effective incorporation of solar technologies into strategic urban planning and policy frameworks.

The study aims to develop an innovative, multi-dimensional assessment framework that systematically captured the contribution of solar energy to urban sustainability. The research adopted a mixed-methods approach, combining a critical review of international sustainability frameworks, analytical synthesis of key indicators, and expert validation through surveys. By bridging the gap between assessment theory and urban energy practice, the proposed framework offered a strong and adaptable tool to support evidence-based decision-making for the strategic integration of solar energy in sustainable urban development.

Keywords: Urban Sustainability, Solar Energy Integration, Photovoltaic Systems, Sustainability Assessment Frameworks, Renewable Energy Planning, Urban Energy Systems.





A Supportive Design Framework for Enhancing Green Building Assessment in Hot Climate Regions

Mahmoud Reda (1)

Abeer Makram (2)

(1) architecture, engineering, delta university for science and technology, mansoura, dakahlia

(2) architecture, engineering, delta university for science and technology, mansoura, dakahlia

Abstract. Green building rating systems are commonly implemented to incentivize sustainability in building construction and operation; their applicability to hot climate regions, however, is constrained by the lack of climate-responsive design strategies. The purpose of this study is to review international and national green building rating systems in the context of hot climate region to identify the climate responsive design strategies applicable to severe thermal conditions. The focus is on making the process of assessing buildings more relevant by making climatic responsiveness more important than generic sustainability measures. This research uses a methodology consistent with systematic reviews; it evaluates already existing green

building rating systems to identify climate-sensitive design measures appropriate for hot climate regions. This analysis can be used as a comprehensive framework to examine the extent to which existing analysis schemes can support with climatic issues. According to the results, the study makes a conceptual desert-solutions based design support framework contribution. The climate-sensitive framework to be developed will bring climate issues into building assessment methodologies helping decisionmakers, Planning authorities, building designers to assess the appropriateness of buildings in hot climate areas and, in so doing, extend green building assessment methodologies into new horizons. Keywords: (Building assessment, Passive design, Climate-responsive design, Hot climate regions, Sustainability ratings).





A resilience-based framework for long-term planning to protect endangered heritage sites using artificial intelligence technologies

Mohamed Kamal Ghodya (1)

Mona Abdel Ghaffar Abdel Majeed (2)

Enas Tawfik Ahmed Allam (3)

(1) Associate Professor, Dept. of Architecture, Faculty of Engineering, at Delta University for Science and Technology

(2) Associate Professor, Dept. of Architecture, Faculty of Engineering, at Delta University for Science and Technology

(3) Associate Professor, Dept. of Architecture, Faculty of Engineering, at Delta University for Science and Technology

Abstract. The complex interactions between rapid climate change, geopolitical shifts, development pressures, and technological obsolescence pose significant existential risks to global cultural heritage. Current preservation methods, which rely on fixed and reactive solutions, conflict with the dynamic nature of these challenges. This research presents the Long-Term Dynamic Framework (LTDF), an innovative and integrated systematic framework for proactive long-term planning. By understanding cultural assets as complex dynamic systems, this model aims to shift heritage management from the concept of "static preservation" to a model of "adaptive systemic management." The four integrated pillars of the proposed framework are as follows: (1) continuous sensing and diagnosis using Internet of Things

(IoT) networks and predictive artificial intelligence models; (2) resilient adaptation through reversible engineering interventions and adjustable management policies; (3) intergenerational engagement through digital twin platforms and interactive digital governance; (4) knowledge security through comprehensive digital archiving and long-term data storage in memory banks.

This research introduces the Future Vulnerability Index (FVI) model, a dynamic quantitative tool for assessing various risks and prioritizing actions. The study uses three distinctive case studies a coastal site (Old Alexandria), a densely populated historic city (Old Sana'a), and a post-conflict site (Mosul) to evaluate this model and demonstrate its effectiveness. The research concludes that, to preserve cultural heritage for future generations in an increasingly turbulent world, adopting this systematic and adaptive approach is an ethical and practical necessity, not merely an intellectual luxury.

Keywords: long-term planning, heritage resilience, predictive artificial intelligence, dynamic preservation, heritage risk management.





Architectural Reformulation of Applied Thinking for Archaeoacoustics Identity of Egyptian Temples

Nermeen M. Omar (1)

Kholoud Eldemerdashb (2)

(1) Associate Professor, Dept. Architecture, Faculty of Engineering, Kafr El-sheikh University, Egypt

(2) Master's student, Dept. of Architecture, at the Faculty of Engineering, Tanta University.

Abstract. The archaeoacoustic identity represents an integral architectural dimension in ancient Egyptian temples, where sound played a central role in shaping the spatial and ritual experience. Temples are considered the earliest forms of museums, used to showcase the achievements of kings and gods and to document history through inscriptions, statues, and obelisks, in addition to serving as places of worship. Today, they are managed as part of a system of museums and archaeological sites. Current acoustic experiences within museums utilize sound to enhance the visitor experience, typically within a controlled sound range of (35-45) dB to ensure comfort and auditory immersion through audio guides or

smartphone applications. This means that the actual sound range is the sound the visitor hears through the device itself, not a general sound presenting the original story within the space, so that the experience is personal, not spatial, thus reinforcing the temple's identity. The original acoustic experience of the temple relies on presenting the original story, the characteristics of which are determined primarily by the location and frequency of the sound sources, as examined through experiments reconstructing the human voices of certain ancient mummies. Secondly, the audience locations and its nature of the activity (through the interpretation of inscriptions and symbols on temple walls). Thirdly, the architectural geometry of the space (the remaining witness to the case). By understanding the relationship between the acoustic characteristics of humans and historically designed architectural spaces, and the resulting use of acoustic simulation, the museum experience can be reconstructed without relying on modern acoustic enhancement techniques.

Keywords: Acoustics experience, Museums, Temples, Archaeoacoustic identity, Worship spaces, and Musical spaces.





The Potential of AI tools to assess and improve walkability, case study: Tanta City

Sara Hisham Br (1)
Shahira Sharaf Eldin (2)
Bahaa Elboshy (3)

(1) Assistant Lecturer at Dept. of Architecture, at the Faculty of Engineering, Tanta University, Egypt

(2) Professor , Dept. of Architecture, at the Faculty of Engineering, Tanta University

(3) Associate Professor , Dept. of Architecture, at the Faculty of Engineering, Tanta University, Egypt.

Abstract. Pedestrian safety constitutes a cornerstone of sustainable urban mobility, particularly in cities coping with high traffic volumes and rapidly expanding road networks. In many developing urban contexts, including large parts of Egypt, existing infrastructure often fails to provide safe, continuous, and legible pedestrian environments, as traffic management priorities continue to favor vehicular throughput over walking comfort and protection. The problem is particularly pronounced on multi-lane roadways that lack adequately pedestrian crossings, this imbalance translates into frequent informal edge crossing, and heightened accident risk. At the same time, advances in artificial intelligence, especially in computer vision and automated image analysis,

offer new opportunities to support the identification and siting of pedestrian crossing infrastructure in data constrained settings. This study develops an AI assisted methodological framework for assessing street networks and urban morphology in Egyptian cities, with the aim of generating precise, quantitatively grounded recommendations for pedestrian crossing locations along major thoroughfares. The approach combines widely available satellite imagery from Google Maps with the Gemini model to produce classification and analytical walkability maps. The workflow unfolds in three core stages: first, a morphological and geometrical analysis of the street network; second, the generation of structured design and planning proposals for additional or upgraded pedestrian crossings; and third, a validation of model outputs through expert review by urban planning and transportation professionals. The framework is tested through a case study focusing on the primary street network of Tanta City, in the Nile Delta region of Egypt. Results show that the Gemini based workflow can effectively interpret high resolution satellite imagery, analyze street hierarchies, assess intersection density, evaluate the connectivity of the urban fabric, and propose pedestrian crossing locations aligned with established planning and safety criteria.

Keywords: Walkability; Pedestrian Crossing; Urban Street Networks; Computer Vision; Artificial Intelligence; Satellite Imagery





Towards applying sustainability indicators in preserving urban heritage in Egypt.

Monira Abdalla Ragab Ahmed (1)

(1) Lecturer, Dept. of Architectural Engineering, Misr Higher Institute of Engineering and Technology, Mansoura (MET), Egypt

Abstract. Interest in preserving architectural heritage and its associated lifestyles is growing after a long period of neglect. It has become clear that architectural heritage preservation is inseparable from sustainability, as demonstrated by its various indicators. Architectural heritage is one of the most important non-renewable resources, and this research focuses on the architectural heritage of entire cities, as it is an integral part of the urban fabric and represents a cultural treasure of which people are proud. The intersection of sustainability with architectural heritage preservation represents a continuity between the past, present, and future. Architectural heritage preservation is defined as "the process that encompasses all

methods of preserving heritage for the longest possible period, so that it plays a significant role in the development and progress of the urban community surrounding the heritage."

Therefore, the research challenge lies in the need to identify and understand sustainable architectural heritage preservation methods that apply sustainability indicators with a clear vision in heritage areas. This research also aims to identify the characteristics of urban sustainability quality in heritage areas by developing a framework that clarifies the relationship between sustainability, urban heritage, and sustainable preservation, and by proposing a working mechanism for planners and architects. The research proposes a starting point for applying sustainable urban conservation methods to our heritage environment, and then arrives at results and recommendations that emphasize the need to integrate urban conservation strategies with sustainability indicator data, in order to achieve sustainable urban conservation of heritage areas.

KEYWORDS: Conservation, Architectural Heritage, Sustainable Conservation, Sustainable Heritage, Sustainability, Sustainability Indicators





Towards an Intelligent Framework for Design Change Management in Construction through AI and BIM Integration

Alaa Mossad Ibrahim (1)
Mohamed Shawki Abou-Leila (2)
Mohamed Osami Rageh (3)

(1) Assistant lecturer, Dept. of Architecture, Misr Academy for Engineering and Technology Mansoura, Egypt

(2) Professor of Architecture, Dept. of Architecture, Faculty of Engineering, Mansoura University, Egypt.

(3) Assistant Professor, Dept. of Structural Engineering, Faculty of Engineering, Mansoura University, Egypt.

Abstract. Despite the transformative potential of Building Information Modeling (BIM) and Artificial Intelligence (AI) in construction project management, their integration remains fragmented, particularly in cost estimation and process optimization. This research addresses the critical gap in synergizing BIM's data-rich modeling capabilities with AI-driven analytical tools to enhance decision-making, resource management, and cost prediction accuracy. The study proposes a novel integrated framework that bridges BIM software with machine learning (ML) algorithms to automate and optimize project management workflows. By leveraging AI's predictive analytics and BIM's multidimensional data, the model aims to dynamically analyze project

parameters, forecast costs, and streamline resource allocation in real time. The framework emphasizes the development of a holistic digital ecosystem where AI enhances BIM's functionality through adaptive learning, enabling proactive risk mitigation and data-driven planning. Preliminary findings highlight the model's potential to reduce cost overruns, minimize inefficiencies, and improve collaboration among stakeholders. This research contributes to advancing smart construction practices by demonstrating how AI-BIM integration can transform traditional project management into a predictive and highly efficient process. The outcomes are expected to provide actionable insights for industry practitioners seeking to harness technological convergence for sustainable, cost-effective project delivery.

Keywords: AI-BIM integration; design change management; construction project management; machine learning; predictive analytics.





Sustainable High-Performance Concrete Incorporating Recycled Concrete Aggregates and PVC-FRP Waste Fibers: Toward Circular Construction in Egypt

Mohamed Masoud(1)

Samer Adel zahra (2)

Abeer Makram (3)

(1) Master's Student, Delta University for Science and Technology, Gamasa, Egypt

(2) Lecturer, Delta University for Science and Technology, Gamasa, Egypt

(3) Associate Professor, Delta University for Science and Technology, Gamasa, Egypt

Abstract. Global water scarcity intensifies with UN projections indicating 40% supply-demand gap by 2030. This research develops an integrated design framework for Net Zero Water Buildings in hot and arid regions, particularly the Middle East. Through systematic literature analysis, regulatory framework comparison (GPRS, Estidama, LEED), and case study examination, we establish an eight-step methodology combining: (1) aggressive demand reduction ($\geq 50\%$), (2) alternative water source integration (rainwater, HVAC condensate, greywater, blackwater), and (3) on-site treatment systems. Case studies demonstrate 95–99% water self-sufficiency across diverse climates, with arid-region projects (Masdar 2B, UAE) achieving

payback periods of 6–8 years despite <100 mm annual rainfall. Building Information Modeling (BIM) integration enables optimization of water balance calculations and system design. LEED Zero Water provides the only measurable certification framework requiring annual balance verification (Net Water ≤ 0). Findings confirm technical and economic feasibility in water-scarce regions through wastewater recycling as primary source (60–80% of supply), proving Net Zero Water achievable even in extreme desert conditions.

Keywords: Net Zero Water Buildings, Water Self-Sufficiency, Arid Climate Design, Wastewater Recycling, BIM Integration, LEED Zero Water.





Net Zero Water Buildings in Hot and Arid Regions: An Integrated Design Framework

Mohamed I. S. Elmasry (1)
Mohamed.S. A. Aboughaly (2)

(1) Construction and Building Engineering Department, College of Engineering and Technology, Arab Academy of Science and Technology and Maritime Transport, Abu-Qir, Alexandria 5528341

(2) Construction and Building Engineering Department, College of Engineering and Technology, Arab Academy of Science and Technology and Maritime Transport, Abu-Qir, Alexandria 5528341, Egypt

Abstract. The rapid growth of construction activities worldwide has led to significant environmental challenges, particularly the accumulation of construction and demolition waste (CDW). The objective of this research is to recycle the waste of construction buildings and the waste of the PVC-FRP which is harming the environment and occupied a large spaces of landfill for disposal it and turn it into a useful material to enhance the concrete strength and ductility. The recycled fiber products are finely recycled through processes, such as dismemberment, tearing, crushing, and screening using chemical, physical, and heat treatment methods. A comprehensive review of recent literature is presented, followed by a case study

focusing on Egypt as a developing country facing increasing waste management challenges. The environmental, economic, and structural benefits of this approach are analyzed. The findings demonstrate that combining RCA with recycled PVC-FRP fibers can significantly improve sustainability while maintaining acceptable structural performance, supporting circular economy principles in the construction industry.

KEYWORDS: Sustainable construction, Waste recycling, Structural applications of recycled materials, Recycling Concrete Aggregates, PVC-FRP

Keywords: Sustainable construction, Waste recycling, Structural applications of recycled materials, Recycling Concrete Aggregates, PVC-FRP





Smart technologies as a tool to enhance community participation in the planning of public parks in smart cities: A comparative analytical study

Aya El Badawi (1)

Marwa Kameh Eldawla (2)

Shahira Sharaf Eldin (3)

Azza Sobhi Elsakka (4)

(1) Ph.D Student: Dept. of Architecture, Faculty of Engineering, Tanta University, Tanta, Egypt

(2) Associate professor: Dept. of Planning and Urban Design, Faculty of Engineering, Tanta University, Tanta, Egypt.

(3) Professor: Dept. of Architecture, Tanta University, Tanta, Egypt

(4) Associate professor: Dept. of Planning and Urban Design, Faculty of Engineering, Tanta University, Tanta, Egypt.

Abstract. Public parks are one of the most important parts of urban spaces that help make life better in cities. They are also important places for social and environmental interaction. As cities move toward the idea of "smart cities," smart technologies have become useful tools for getting people involved in urban planning and decision-making, which helps make sure that the needs of users and the needs of urban sustainability are met. This research aims to investigate the role of smart technologies in facilitating and enhancing community participation in the planning of public parks within smart cities. It does so by analyzing a range of digital tools and technologies employed to engage the community

participation in the planning of public parks within smart cities. It does so by analyzing a range of digital tools and technologies employed to engage the community in planning processes, such as smart applications, interactive digital platforms, and participatory geographic information systems. The study utilizes a comparative analytical approach by examining and analyzing several international case studies that have successfully utilized these technologies to involve the community in the planning and development of public parks.

The analysis is based on comparing how smart technologies are used and how they affect the planning process and the long-term health of public parks. The research also aims to extract a set of indicators and criteria that can be used in developing mechanisms for planning public parks in Arab cities through smart technologies to enhance community participation.

The study concludes that the utilization of smart technologies significantly contributes to the expansion of community participation and the enhancement of transparency in planning processes, as well as supporting design decision-making that aligns more closely with user needs, thereby improving the efficiency and sustainability of public spaces in contemporary cities.

Keywords: Smart technologies; community engagement; public park planning; smart cities; digital platforms; sustainability of urban spaces





Application of Smart Materials in Facade Design for Enhanced Energy Efficiency and Thermal Comfort

Mohamed Mohamed Mohamed Elhetamy (1)

(1) Researcher, Dept. of Architecture, Faculty of Engineering, Tanta University, Tanta, Egypt

Abstract. To enhance energy efficiency and achieve thermal comfort in contemporary buildings, this study explores the effectiveness of employing smart materials in facade design. The study focuses in particular on evaluating the feasibility of applying these innovative technologies in hot and dry environments, taking the Egyptian environment as an application model. The study relied on a multi-stage methodology, starting with a descriptive analytical approach to trace the properties of smart materials, followed by a comparative phase to analyze leading global cases, and finally arriving at an experimental approach through numerical simulation. To test the effectiveness of the proposed adaptive system, it was applied

practically to Hospital 57357 in Cairo, by integrating materials such as ETFE and PTFE membranes and electrochromic glass within an "air insulation range" to enhance natural ventilation.

The results revealed that these materials contributed to reducing energy consumption by between 20% and 30%, while improving thermal comfort indicators by up to 35% compared to traditional facades, thanks to their ability to instantly adapt to solar radiation. The study concludes by emphasizing the critical importance of incorporating smart materials concepts into sustainable design strategies and developing local design guidelines that require their use to reduce reliance on costly mechanical systems.

Keywords: Smart Materials, Adaptive Interfaces, Energy Efficiency, Thermal Comfort, Hospital 57357.





Humanizing Cities through Street Design: Developing an Integrated Framework for Vibrant Urban Streets in Egypt

Nada Nageh Mohamed Gaballah(1)

Walaa Ahmed Nour (2)

Marwa Ahmed Kamer Eldawla (3)

Amr A. Zeina (4)

(1) Demonstrator, Dept. of Architectural Engineering, Faculty of Engineering, Tanta University, Tanta, Egypt

(2) Professor, Dept. of Architectural Engineering, Faculty of Engineering, Tanta University, Tanta, Egypt

(3) Associate Professor, Dept. of Planning and Urban Design, Tanta University, Tanta, Egypt

(4) Associate Professor, Dept. of Planning and Urban Design, Tanta University, Tanta, Egypt

Abstract. In recent decades, urban design has predominantly emphasized infrastructure efficiency, vehicular mobility, and technological advancement, often at the expense of the human experience in public spaces. This paradigm has contributed to the decline of urban streets as socially interactive, inclusive, and accessible environments, thereby negatively affecting urban livability and overall quality of life. In response, the concept of Humanizing Cities has emerged as a critical approach that prioritizes human needs, well-being, and everyday experiences within urban environments. However, despite its growing prominence, there remains a notable lack of comprehensive and integrated frameworks that systematically inform both the evaluation and

design of vibrant, human-centered streets. This study seeks to address this gap through the development of a holistic framework grounded in Humanizing Cities principles for the assessment and design of urban streets. The framework emphasizes four key dimensions: environmental quality, social interaction, spatial functionality, and economic vitality. A multi-phase methodological approach is adopted, beginning with a theoretical review to establish key concepts related to urban design, human needs, and the principles of humanizing urban spaces. This is followed by an analytical phase examining selected local and international case studies to derive applicable evaluation indicators.

The proposed framework is empirically applied to Al-Estad Street in Tanta, Egypt, using a mixed-method approach that integrates field observations, structured questionnaires, and stakeholder interviews to ensure methodological rigor and data validity. The findings reveal generally low to moderate levels of user satisfaction, particularly in environmental and urban dimensions, while the economic dimension demonstrates comparatively stronger performance.

The study underscores the importance of adopting Humanizing Cities principles in street design to enhance inclusivity, livability, and sustainability. The proposed framework provides a practical and transferable tool for urban planners and designers, supporting more resilient and people-oriented urban development.

Keywords: Humanizing Cities; Human-centered design; Urban streets; Public spaces; Urban livability





Utilizing Artificial Intelligence to Enhance the Efficiency of Monitoring Government Engineering Projects Execution

(1) Ishraga Ibrahim Osman Omer

(2) Awaad Saad Hasan

(1) Ph.D Student, Dept. of Architecture, Faculty of Engineering, Sudan University of Science and Technology, Khartoum, Sudan

(2) Professor, Dept. of Architecture, Sudan University of Science and Technology, Khartoum, Sudan

Abstract. Government engineering projects serve as a fundamental pillar of national development; however, they consistently face challenges regarding field monitoring accuracy and adherence to timelines due to reliance on traditional systems. This study aims to provide a systematic framework for improving the monitoring efficiency of these projects by employing Artificial Intelligence (AI) technologies. The research adopts a descriptive-analytical approach to explore the research gap in current government monitoring systems, while analyzing key performance indicators (KPIs) that can be optimized through intelligent algorithms, such as risk prediction and real-time resource data analysis. The scientific value of this paper lies in proposing a Conceptual Model that integrates the data flow of government projects

with AI engines to support proactive decision-making. The results indicate that integrating technologies such as "Big Data Analytics" and "Machine Learning" significantly reduces the likelihood of execution delays and provides high transparency in tracking actual progress versus planned schedules. The study concludes with several recommendations, most notably the necessity of automating data flow from construction sites to centralized smart platforms and developing the skills of engineering staff to interact with AI-driven decision support systems, ensuring the sustainability and quality of national projects.

indicators and criteria that can be used in developing mechanisms for planning public parks in Arab cities through smart technologies to enhance community participation.

The study concludes that the utilization of smart technologies significantly contributes to the expansion of community participation and the enhancement of transparency in planning processes, as well as supporting design decision-making that aligns more closely with user needs, thereby improving the efficiency and sustainability of public spaces in contemporary cities.

Keywords: Artificial Intelligence, Government Project Monitoring, Engineering Management, Schudel Management Digital Transformation, Decision Support.





Enhancing South and West Facades Performance to Achieve Thermal Comfort in a Facility in Hot Arid Climate

(1) Rania Elghamry

(i) Architecture Engineering Department, Faculty of Engineering , Tanta University, Egypt

Abstract. Thermal comfort in buildings located in hot arid climates is a critical challenge due to intense solar radiation and high ambient temperatures. The south and west facades are among the most exposed building elements, receiving significant solar gains that negatively impact indoor thermal conditions and increase cooling energy demand. This study aims to enhance the performance of these facades in order to achieve better thermal comfort and energy efficiency in a representative facility.

The research focuses on the application of passive design strategies to reduce heat gain through the building envelope. Key approaches include the use of external shading devices such as horizontal overhangs and vertical fins, which help to

limit direct solar exposure. The study also examines the role of material selection, including thermal insulation, high thermal mass, and reflective surface finishes, in minimizing heat transfer.

In addition, the optimization of window design is considered by controlling the window-to-wall ratio and using high-performance glazing to reduce solar heat gain while maintaining adequate daylight. Natural ventilation strategies are also incorporated to improve indoor air movement and reduce reliance on mechanical cooling systems. Furthermore, the integration of green elements, such as vegetation, is explored for its cooling effect on facade surfaces.

The findings indicate that improving facade design can significantly reduce indoor temperatures and enhance thermal comfort. The study concludes that climate-responsive facade treatments are essential for achieving sustainable and energy-efficient building performance in hot arid regions.

Keywords: Thermal Comfort, Hot Arid Climate, Facade Design, Shading Devices, Energy Efficiency, Passive Design





Sustainability of Egyptian Heritage Sites through Urban Documentation using 3D Photogrammetry

Sara Hosny Shaalan(1)

Ahmed Mohamed Elsherif (2)

(1) Architecture Engineering Department, Faculty of Engineering , Tanta University, Egypt

(2) Public Works Engineering Department, Faculty of Engineering , Tanta University, Egypt

Abstract. Rapid urbanization, unsustainable tourism, and climate change threaten Egypt's heritage sites, inducing the need for digital documentation of such areas to ensure preservation of the country's cultural identity. Traditional documentation approaches that have been widely adapted in Egypt are costly and time and effort consuming, whilst the use of state-of-the-art digitization instruments such as 3D laser scanning has been limited by high operational costs and limited availability. Hence, this research evaluated the efficiency of 3D photogrammetry as a sustainable, cost-effective, precise, and photorealistic alternative for heritage sites digitization and sustainable management in Egypt. For

this, Structure from Motion (SfM) technique was adapted in El-Moaz Street, Cairo, Egypt, by acquiring approximately 300 overlapped images using a cellphone, and processing the images with the free RealityScan 2.1 photogrammetry software. Images were accurately aligned and distinctive features extracted, generating a point-cloud and 3D model (digital twin) of the study area with centimeter accuracy. The findings demonstrated that 3D photogrammetry can be an invaluable low-cost urban digitization tool for Egyptian heritage sites, providing precise measurements for architectural and structural analysis, recording sites vulnerable to deformation or loss, and supporting sustainability by creating virtual tours and digital archives.





مركز البحوث والاستشارات الهندسية
جامعة طنطا - كلية الهندسة
**RESEARCH AND ENGINEERING
CONSULTANTS FACULTY OF
ENGINEERING TANTA UNIVERSITY**



**ENGINEERS SYNDICAE
GHARBIAH GOVERNORATE**



مجموعة إعمار الدلتا
Eamar Al-Delta Group



KLEEK
DEVELOPMENTS



**ALMOAAZEN FOR INTEGRATED
GENERAL CONTRACTING
AND CONSTRUCTION**



ELSAIDY GROUP
FOR INTEGRATED CONTRACTING



**EGYPTION BUILDING
COMPANY**



**AL TABARK FOR
CONSTRUCTION**



**DELTA
BUILDING
SYSTEMS**

SPONSORS





RESEARCH & ENGINEERING CONSULTATIONS CENTER, FACULTY OF ENGINEERING TANTA UNIVERSITY



The Centre, is a unique unit with technical, financial, and administrative independence established with the agreement of the Higher Council of Universities, by decree No. 13 of February 4, 1994

The fields of work for the Engineering Research and Consultation Center: The Center for Research and Engineering Consultations at the Faculty of Engineering of Tanta University consists of specialized engineering groups. Each group is dedicated to evaluating different types of consultations, studies, and necessary designs, writing specifications, supervising implementation, conducting examinations, and preparing engineering reports. The center provides various fields, which are categorized into five different sections as demonstrated below:

- I. Civil and Architectural Engineering
- II. Electrical Engineering
- III. Mechanical Engineering
- IV. Chemical Engineering
- V. Environmental Studies

SPONSORS





ENGINEERS SYNDICATE GHARBIAH GOVERNORATE



The Syndicate of Engineers was established as a successor to the Syndicate of Engineering Professions, which had been founded by Law No. 89 of 1946. The Syndicate subsequently evolved in response to the political and social developments of the Egyptian people, particularly after 1952. The Syndicate operates to achieve the following objectives:

1. Advancing the scientific and professional standards of engineers, maintaining the dignity of the profession, and establishing and implementing the necessary frameworks to regulate professional practice. It also ensures that members fulfill their duties in service to the country and oversees the implementation of these regulations.
2. Mobilizing the collective strength of Syndicate members and organizing their efforts in service of society to achieve national goals and economic development objectives. This includes addressing practical implementation challenges, proposing appropriate solutions, and participating actively in national endeavors.
3. Fostering a spirit of fraternity and cooperation among Syndicate members, working to improve their engineering, social, and financial standards, and securing their lives and caring for their families socially, economically, health-wise, and culturally.
4. Contributing to the study of economic development plans as well as industrial and engineering projects.
5. Participating in the planning of educational programs and curricula to ensure they keep pace with society's needs, serve its interests, and meet its requirements.

SPONSORS





EMMAR ELDELTA REAL ESTATE INVESTMENT



"Established in 2007, Contracting, a distinguished part of the EamarAldelta Group, has been recognized as a significant contributor to the construction industry in Egypt. The company's portfolio, comprising over 150 projects, extends to encompass high-end residential complexes, expansive administrative buildings including universities, commercial malls, and advanced healthcare facilities. A commitment to excellence and innovation is consistently demonstrated in every project undertaken. Services offered by EamarAldelta Contracting encompass site evaluations, preconstruction planning, and project completion, all conducted in accordance with international standards. The aspiration to lead the industry with sustainable and innovative construction solutions is deeply ingrained in the company's ethos. Integrity, transparency, and a commitment to environmental and social responsibility are paramount, ensuring that each project not only aligns with industry benchmarks but also contributes positively to the community and the sector at large."

SPONSORS





Kleek Developments



Kleek Developments emerged as a transformative force in Egypt's real estate market, born from the collaboration of two industry powerhouses: Style Home Developments and Emaar Al Delta. With over two decades of experience and more than 80 landmark projects, Kleek is driven by a philosophy of creating vibrant communities that blend modern living with cultural harmony.

Anyone can build buildings. Few know how to build belonging. At Kleek Developments, life happens between homes in shared moments, familiar faces, and everyday connections. That's what makes a real community

SPONSORS





El Moazen For Integrated General Contracting & Construction



Well established contracting and construction company with almost 30 years experience in the execution of construction projects with governmental and no governmental agencies. Looking for more expansion now with variety of projects.

Industry : Construction

Company size : 11-50 employees

Founded :1992

SPONSORS





ELSAIDY GROUP FOR ENGINEERING AND CONSTRUCTION



Established in 1975 with a focused model in local trade, our group has consistently evolved over the decades. We expanded our expertise into import and export, followed by the establishment of a specialized firm for architecture, engineering designs, general contracting, and supplies. With our strategic expansion into real estate investment and local manufacturing, the pillars of ElSaidy Group were fully realized.

We take pride in our excellence in modern architectural design and general contracting, becoming—by the grace of God—one of the industry giants in the Egyptian construction sector within a remarkable timeframe. We are committed to excellence, meticulously selecting a team of engineers and technicians who possess deep technical expertise and a dedication to high-quality execution.

Our portfolio includes a wide range of projects across all new urban developments and coastal regions, most notably in New Alamein City, the Fifth Settlement, the New Administrative Capital, and other emerging cities. Our motto is Integrity, Trust, and Quality. We constantly strive for distinction and growth, driven by your partnership and continuous support.

SPONSORS





EGYPTIAN CONSTRUCTION COMPANY



An Egyptian joint-stock company established in 1982, specializing in all types of general and specialized contracting with a high level of professionalism, expertise, and efficiency. The company has successfully executed numerous projects in collaboration with various state authorities and agencies, including the Armed Forces (Air Force and Engineering Authority), the Ministry of Military Production, the Ministry of Health, the Ministry of Higher Education, the Ministry of Aviation, the Ministry of Justice, Petroleum Air Services (PAS), and the private sector.

The company's diverse portfolio includes the construction of integrated tourist resorts, hospitals, educational and administrative buildings, residential complexes, aircraft hangars, passenger terminals, and integrated court complexes.

ECC is committed to the continuous development of its services, driven by client needs and market demands, while maintaining the highest standards of credibility and integrity. Backed by elite scientific and technical cadres who possess exceptional skill and professionalism, the company utilizes the latest resources and modern equipment, earning its reputation as one of the industry's best, as attested by all its clients

SPONSORS





AL TABARK FOR CONSTRUCTION



One of the specialized companies in general contracting and engineering design, the company is registered with the Egyptian Federation for Construction and Building Contractors.

First Classification: Integrated building works, including restoration and finishing works.

Fourth Classification: Foundation works, electromechanical and electronic works, and communication networks.

The company's experience extends across the entire Arab Republic of Egypt, covering a wide range of project types. Its portfolio includes residential buildings, hospitals, colleges, universities, courts, conference halls, sports facilities and complexes, industrial projects, wastewater treatment plants, infrastructure works, schools, as well as the construction and finishing of branches of the National Bank of Egypt. Additionally, the company has contributed to urban development and administrative buildings, utilizing all available technical capabilities.

El Tabarak Company takes pride in fostering a supportive and collaborative work environment for its employees, which is directly reflected in the high-quality services delivered to its valued clients, who remain at the core of its focus.

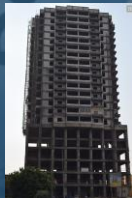
We are an organization committed to continuous growth in the field of integrated construction works. We strongly believe in our effective role within Egyptian society, and our dedication to serving the interests of clients across various sectors drives us to execute projects with excellence, high quality, and maximum efficiency.

SPONSORS





Delta Building Systems



BUILDING THE FUTURE OF EGYPT

Sustainable Strength with Delta Block

Delta Sand Bricks was originally founded 1985 by Sand Bricks Holding Co, a Conglomerate owned by the government. They acquired two factories, which were erected during 1985-1988, from Ytong Sweden. The factories were constructed in Quesna, Monefya and in Abassa, Sharqeya.

Delta Building Systems Co. was bought by Plena through a privatization around the year 1997, DBS is the market leader of manufacturing and promoting Autoclaved Aerated Concrete (AAC) products, services, design & engineering for factories in Egypt and neighboring countries.

DBS's Delta Block building unit is the core of a sustainable, quality controlled, ecological building system. In addition to the Delta Block building unit, DBS also manufactures wall finishing dry mixing products that make up our eco-friendly productive building system complete to enhance a greener world in Egypt, meanwhile provides the most Cost efficient building system, with the highest quality for our clients.

SPONSORS





**ARCHITECTURE
ENGINEERING DEPARMENT**



**PLANNING AND URBAN
DEPARMENT**



DEPARTMENT OF ARCHITECTURE ENGINEERING & PLANING and URBAN DESIGN



TANTA UNIVERSITY



Prof. Hassan Wahby



Prof. Laila Mohamed



Prof. Mahmoud Zaki



Prof. Ahmed Abdelwahab



Prof. Engy El-Darwish



Prof. Walaa Nouz



Prof. Shabana Shantal Hala



Prof. Alwan Sami



Prof. Eman Saleh



Prof. Asmaa Gamal



Prof. Ummma Komba



Prof. Mai Makhoul



A.Prof. Marwa Ismail



Prof. Norwan Amer



A. Prof. Dina El Mahdy



A. Prof. Engy Hassan



A.Prof. Norwan Amer



A.Prof. Mostafa Elwan



A. Prof. Laila Agla



A.Prof. Bahaa El-Din



A.Prof. Hany Dawar



A.Prof. Maged Zaglo



A.Prof. Wamen Mahanna



A.Prof. Walaa Mahanna



A.Prof. Youssef Elkhayat



A. Prof. Amr Sakhi



A.Prof. Ahmed Abdelhadi



Dr. Gehan Saeed El-Din



Dr. Eman Elshahaby



Dr. Ahmed Elshawarby



Dr. Rania Elghemry



Dr. Sara Shaban



Dr. Sohean El-Moni



Dr. Mohammed Abu-Fadel



Dr. Hagar Abu-Elgassal



Dr. Fatma El-Ashwah



Dr. Mohamed Elzaid



Dr. Rania Abdel



A. Prof. Amr Zaita



Dr. Mohamed Saleh



Arch. Oula Hassan



Arch. Nourhan Mahmoud



Arch. Sara Att



Arch. Sara Hashan



Arch. Aline Zaiter



Arch. Dalila Al-Tahawy



Arch. Nouran Gabara



Arch. Tetana Zaiter



Arch. Mohamed Hadeb



Arch. Nouran Kamel



Arch. Staimas Gnd



Arch. Amr Agha



Arch. Amr Shady El-Din



Arch. Eman Gamal



Arch. Shorouq Adel



Arch. Ezzan Hamed



Arch. Rana Youssef



Arch. Amrwa Gaber



Arch. Bayan Farag



Arch. Faten El-Shantal



Arch. Ezzan Tarek



Arch. Ezzan El-Damirah



Arch. Aya Elswaf



Arch. Walaa Mohamed



Arch. Abdelrahman Gnd



Arch. Mai Magdy



Arch. Marwan El-Shaykh



Arch. Khalid El-Shaykh



Arch. Sameh El-Bendary



Arch. Hanaa Arifa



Arch. Marwan Adel



Arch. Walaa Abdelkamel



Arch. Omer Hamdy



Arch. Alaa Mousad



Arch. Menna Tarek



Arch. Mai Salim



Arch. Noha Nagah



Arch. Abdelmoneem Karm



Arch. Hala Saad



Arch. Menna Shams



Arch. Mohamed Khalil



Arch. Mosta Shaban



Arch. Narmen Nagah



Arch. Narmen Nagah



Arch. Samir El-Shawarby



Arch. Aline Nour



Arch. Maryam Ghazal



Arch. Shorouk Attia



Arch. Mervat El-Shawarby



Arch. Nourhan El-Shawarby



Arch. Amr Noha



Arch. Hiba Muhammad



Arch. Selma Moustaf



Arch. Mohamed Rashed



Arch. Staimas Abdel



Arch. Mira Inad



Arch. Marwan Mohamed