10th International Scientific Conference of The Military Technical College
7-9 July 2020

The 13th International Conference on Civil and Architecture Engineering

Conference Program and Abstracts
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Preface

The Military Technical College is pleased to organize the Eight International Conference on Civil and Architectural Engineering. The conference is a chance to bring together all scientists and engineers from Egyptian armed forces and their counterparts in the universities, research center, academic and technical institutions from Egypt and other countries. It is our hope that the conference will provide a good opportunity to exchange knowledge, and to find appropriate solutions to present problems in Civil and Architectural Engineering fields. The conference has the aim to provide an environment of submitting and discussion of modern advances and experience on various Civil and Architectural Engineering activities that cover the following fields:

1- Concrete Structures
2- Geotechnical Engineering
3- Material Quality and Control
4- Metallic Structures
5- Project Management
6- Sanitary Engineering
7- Structural Analysis and Design
8- Structure Dynamics
9- Surveying and Photogrammetry
10- Transportation Engineering
11- Water Resources Engineering
12- Architectural Engineering
13- Building Technology
14- Environmental Engineering
15- Urban Planning

Forty-six manuscripts were submitted after receiving our call for papers. Professors from M.T.C., Egyptian universities and other research organization refereed these papers. From the Forty-six papers, only forty-one papers were accepted for presentation in the conference. These papers will be published in the conference proceeding after their discussion in the conference sessions.

The conference committee would like to acknowledge the valuable response received from all contributors. We are also grateful to the members of scientific committee for their great help in assessing all the received papers.

We hope that the conference is successful in solving some problems in the armed forces and different civil engineering sectors.
Conference High Committee

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Maj. Gen.Prof .Dr. Yehia Mehasseb  
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## Conference Scientific Committee

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|---------------------------|--------------------------|
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| Prof. Ahmed Abdelkhalea   | Future Univ.             |
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| Assoc. Prof. Waael A. M. Sheta | Alazhar               |
| Prof. Youssry B. Shahin   | Monofia                 |
SCIENTIFIC SESSIONS
Tuesday
7 July 2020
### Session No. 1

| Title | Water Resources & Transportation Engineering (WR&TE) |
|-------|------------------------------------------------------|
| Date  | Tuesday 7-7-2020                                     |
| Time  | 9:00 - 10:45                                         |
| Place | Room B                                               |
| Chairmen | Maj. Gen. R. Dr. Nabil H. Abd El Metaal  |
|        | Brig. Gen. R. Prof. Dr. Osama M. Moussa               |
|        | Col. Dr. Ashraf M. Osman                             |

### Comparison of gridded datasets for the simulation of stream flow in Africa

**Mostafa Tarek, François P. Brissette and Richard Arsenault**

**WR3**

### Using Remote Sensing Techniques to Determine New Route for the Nile Valley

**Osama M. Moussa, Ahmed S. Khalil, Hasan E. Elhefnawy and Mohamed M. Kamal**

**WR5**

### Studying effects of asphalt modification by Nanosilica and Nanoclay on asphalt binder and hot mix asphalt properties

**Ahmed W. Oda, Ahmed El-Desouky, Hassan Mahdy, Osama M. Moussa**

**TE1**
Comparison of gridded data sets for the simulation of stream flow in Africa

Mostafa Tarek1,2, François P. Brissette1 and Richard Arsenault1
1École de technologie supérieure, Université du Québec, 1100 Notre-Dame West, Montréal, Québec, Canada, H3C 1K3
2Department of Civil Engineering, Military Technical College, Egypt.
Correspondence to: Mostafa Tarek (mostafa_tarek45@mtc.edu.eg)

Abstract: In recent decades, many parts of the African continent have experienced high precipitation variability with periodic drought and flood events. However, the network of streamflow gauges is too sparse in most countries to adequately capture these variations. In addition, no observed reference climatological dataset exists to adequately represent precipitation and temperature changes within all topographic and climatic zones. Consequently, the use of global gridded datasets needs to be considered. This paper aims to use the different available gridded datasets as inputs to a hydrological model to evaluate dataset performance. Eleven precipitation and two temperature gridded datasets are used to this effect. The precipitation datasets include two gauged-only products, four satellite products corrected using ground-based observations, four reanalysis products and one merged product of gauge, satellite, and reanalysis. The two temperature datasets include one gauged-only and one reanalysis product. The ten precipitation and two temperature datasets were combined in their 20 possible arrangements for analysis purposes. Each combination was used to force the HMETS lumped hydrological model. The model parameters were calibrated individually for each combination against the streamflow records 850 African catchments. The Kling-Gupta Efficiency (KGE) was used to evaluate the semi performance. Results show that both temperature datasets performed equally well. were however observed between precipitation datasets. The MSWEP merged performing precipitation dataset, followed by two satellites (TRMM and CHIRPS) and one reanalysis (ERA-5) product. The performance of both gauged-only datasets (CPC and GPCC) was inferior, outlining the limitations of extrapolating information in data-sparse regions.
WR-5

Using Remote Sensing Techniques to Determine New Route for the Nile Valley

Osama M. Moussa¹, Ahmed S. Khalil¹, Hasan E. Elhefnawy² and Mohamed M. Kamal²

¹Military Technical College
²Egyptian Armed Defense

Abstract: The collapse of dam structure leads to serious disasters for surrounding areas along the waterway. The objective of this research is to determine a new route for the waterway by using remote sensing techniques. Drainage pattern is determined from Digital Elevation Model (DEM) of Shuttle Topographic Radar Mission (STRM) by using the ARC-GIS software. The most appropriate route for the new valley is determined by using DEM and assisted by topographic maps of scale 1:500000 starting from Toshka lake until Qattara downrange and passing through the depressions of El-Dakhla, El-Farafra and El-Baharia Oases.

The route selection is matched with the expected new valley that proposed by Prof. Dr. Farouk El-Baz in his project "The Development Project / Corridor of Development Project [1]."

Keyword: DEM, ARC-GIS, Remote sensing, Drainage pattern.
Effects of asphalt modification by Nanosilica and Nanoclay on asphalt binder and hot mix asphalt properties

Ahmed W. Oda¹, Ahmed El-Desouky ², Hassan Mahdy³, Osama M. Moussa¹

¹ Department of Civil Engineering, Military Technical College, Cairo, Egypt.
² Canadian International College, Cairo, Egypt.
³ Ain Shams University, Cairo, Egypt.

Abstract. In the Hot mix asphalt (HMA) is widely used in asphalt paving in most of countries. The goal of this paper is to study the effect of adding nanomaterials on the properties of asphalt binder and HMA. An experimental program has been conducted to study how to evaluate the performance of the modified asphalt binder and the modified HMA. Nanosilica (NS) and Nanoclay (NC) were used as modifiers. NS and NC were added at 3%, 5% and 7% by bitumen weight. Tests were performed to evaluate enhancement occurred in Penetration, softening point (SP), rotational viscosity (RV), Marshall stability tests, loss of stability and indirect tensile strength were performed on modified asphalt mixtures. Results were compared with control mix. Results shows significant enhancement in most of properties of asphalt binder and HMA. Penetration decreased by 24.07% at 3% NC and 20.37% at 5% NS, 3% NC and 5% NS were chosen to be optimum nanomaterial content (ONMC). Modified bitumens by 3% NC and 5% NS were used to produce modified asphalt mixtures. The modified mixtures showed a significant enhancement in stability and indirect tensile strength (IDT), but they, in contrast, had a harmful effect on the loss of stability (LOS).

Keywords: Modified Asphalt; Asphalt; Hot Mix Asphalt; Nanomaterial; Nanosilica; Nanoclay; Modified Bitumen; Loss of stability
| Session No. 2 |
|---------------|
| **Title** | Geotechnical Engineering (GE) |
| **Date** | Tuesday 7-7-2020 |
| **Time** | 11:00-12:45 |
| **Place** | Room B |
| **Session Chairmen** | Brig. Gen. Prof. Dr. Nabil M. Nagy, Dr. Ahmed M. El Shesheny, Brig. Gen. R. Prof. Dr. Osama M. Moussa, Col. Dr. Ashraf M. Osman |

| GE2 |
|-----------------------------------|
| Finite Element Analysis of Reinforced Sand Under Circular and Ring Footing |
| A. Abd El Rahman, Nabil M. Nag and Ismail M. Kamal |

| GE3 |
|-----------------------------------|
| Displacement assessment of rock socketed shafts: a numerical approach |
| A. M. H. Mahmoud and A. M. Samieh |

| GE4 |
|-----------------------------------|
| Geological, Geotechnical and Geophysical Aspects of Zafarana Wind Farms Sites and Their Expansion at Gabel El Zeit Sites Egypt |
| H. Kamal, G. Saudi and Abdel Aziz Abd Aal |
Finite element analysis of reinforced sand under circular footing

A. Abd El Rahman¹, Nabil M. Nagy², Ismail M. Kamal², Mostafa A. Hassan³

¹ Msc. Candidate, Military Technical College, Cairo, Egypt.
² Professor, Military Technical College, Cairo, Egypt.
³ PhD, Military Technical College, Cairo, Egypt.

Abstract: This paper presents the results from numerical investigations carried out on circular footing rests on Geo-grid reinforced sand. The finite element program (Plaxis-2D) was used to validate experimental results carried out by [1]. This experimental work studied the effect of variation of Geo–grid reinforced layers (N= 0, 1, 2, and 3) under circular footing. The validation with experimental work was considerably agreed with an average percentage of 93%. Then a parametric study has been conducted to evaluate the soil performance of circular footing, under the same loading conditions. Several parameters have been investigated to identify the best soil behaviour that achieves maximum bearing capacity and minimum settlement under the footing. The parameters include number of Geo-grid layers (N), the Geo-grid layer width (L), the spacing between the footing base and topmost Geo-grid layer (U), the spacing between Geo-grid layers (h) and the Geo-grid stiffness (K). The results indicated that by increasing the number and the width of the Geo-grid reinforced layers the bearing capacity ratio increases up to a limited extent. Moreover, the optimum number of Geo-grid layer equals four layers for circular footing.

Keywords: bearing capacity, footing shape, reinforced soil, Geo-grid layer.
Displacement assessment of rock socketed shafts: a numerical approach

A. M. H. Mahmoud\(^1\) and A.M. Samieh\(^2\)

\(^1\)Hot Engineering & Construction Company, Free Trade Zone Plot E65, Kuwait.
\(^2\)Department of Civil Engineering, Helwan University, Ibrahim Abd El-Razik Street, El-Naam, Mataria, Cairo, Egypt.

engasmaa_mah@yahoo.com, abcan98@yahoo.com

Abstract. Assessment of shallow/deep foundations settlement, under the working load range, has to be assessed to complete the design of any foundation system. The settlement of shafts resting on or socketed into sound rock is generally negligible. Settlement may be significant for shafts socketed into weak rock. Numerical approaches are among the promising tools that can be adopted to assess the settlement of piles socketed into rock. This study presents the results of a proposed numerical modeling scheme to predict the vertical displacement of socketed shafts. A comparison between the predicted and the monitored responses is presented to evaluate the viability of the proposed numerical scheme to assess the socketed shafts vertical displacement. A good comparison is exhibited between the results of the proposed model and those of the monitored test piles. In addition, the results of a sensitivity study are presented to highlight the influence of some numerical analysis controlling parameters such as the rock-shaft interface strength, the shear strength characteristics and the deformation modulus of the rock formation on the predicted numerical response.
Abstract. The growing need for sustainable power generation has led to increasing number of power plants, of fossil-fuel type and of non-conventional type. The foundation types of wind turbine towers in power plant structures are mainly depend on the geotechnical and structural considerations and also and other geological and geophysical considerations. The safety and economic conditions also play a vital role in the design of foundations. Such foundations must effectively be designed taken into consideration large overturning moments and dynamic loading due to extreme wind and earthquake. The present research is focused on studying the geotechnical, geological and geophysical aspects and characterizes of soils in Zafarana Wind Farms sites and their expansion at Gabel El Zeit sites on the Suez Gulf of Egypt. The study first address and study the geological aspects of both sites Zafarana Wind Farms sites and Gabel El Zeit sites. Second the geotechnical and geophysical characteristics are studied based on establishing data base from 698 borings and 8 seismic refraction profiles across Zafarana wind Farm sites and 10 borings and 2 seismic refraction profiles at Gabel El Zeit site. The geotechnical testing and geophysical profiles were compiled to determine the variation of the soil profile as well as the characteristics of the soil layers within the study sites. The results showed construction of 8 representative boring logs at Zafarana Wind Farm sites and 2 representative boring logs Gabel El Zeit sites to represent the soil the characteristics of the soil layers and site statgerphy. Also, the study shows the result of P wave velocity and shear wave velocity across both sites and within the studied soil layers up to 30 m. All these results from this research will help to study the foundation and the structure of wind turbine tower, where these types of tall structures are similar to chimney structures in design and other engineering considerations.
| Session No. 3                                      | 13th International Conf. on Civil & Arch. Eng. 7-9 July 2020 |
|---------------------------------------------------|-------------------------------------------------------------|
| Title                                             | Structural Analysis & Project Management (SA & PM I)         |
| Date                                              | Tuesday 7-7-2020                                            |
| Time                                              | 13:00 -14:45                                                |
| Place                                             | Room B                                                      |
| Session Chairmen                                  | Maj. Gen. Dr. Hasan M. Farag                                 |
|                                                   | Brig. Gen. R. Prof. Dr. Osama M. Moussa                      |
|                                                   | Col. Dr. Ashraf M. Osman                                     |

| Numerical Modeling of New Connection Pontoon under Static and Dynamic Loads | SA1 |
|---------------------------------------------------------------------------|-----|
| Ahmed S Elaresh, Mostafa M Abdel Wahab, Shreif A Mazek and Ashraf M Osman |

| New Model to Calculate Blast Loading on Above and Underground Structures | SA2 |
|------------------------------------------------------------------------|-----|
| Hassan M. Farag                                                        |

| Simulation and Optimization of a Metallic Ferry under MLC70Loading       | SA3 |
|------------------------------------------------------------------------|-----|
| Mohamed N. Lotfy, Yasser A. Khalifa, Abdelrahim k. Dessouki and Elsayed Fathallah |

| Multi-objective optimization of sandwich composite pressure hull for decreasing weight and drag force and increasing buckling load capacity | SA4 |
|----------------------------------------------------------------------------------------------------------------------------------|-----|
| Mohamed Helal and Elsayed Fathallah                                                                                                |
Numerical Modeling of New Connection Pontoon under Static and Dynamic Loads

Ahmed S Elareshy¹, Mostafa M Abdel Wahab², Shreif A Mazek³, and Ashraf M Osman⁴

¹ M.Sc. Student, Department of Civil Engineering, Military Technical College, Egypt.
² Professor at Department of Civil Engineering, Military Technical College, Egypt.
³ Professor at Department of Civil Engineering, Military Technical College, Egypt.
⁴ Asst. Professor at Department of Civil Engineering, Military Technical College, Egypt.

Abstract. The development of floating bridges is a major engineering challenge to make the existing bridges durable and easy to construct. The connection pontoon unit between the heavy communication bridge (HCB) and the assault bridge (AB-PMM71) is discussed as developed by Mazek et al. [1]. The new connection pontoon (NCP) should offer fast assembly time to operate the combat floating bridge. The floating bridge system including the HCB, the AB-PMM71, and the NCP is modeled. The 3-D numerical model of the floating bridge system is proposed by the nonlinear finite element analysis under static and dynamic Military load Class MLC70. The field test for the new floating bridge system was conducted by [1].

The proposed finite element model of the floating bridge system is verified based on the practical field test developed by [1]. The numerical results have good agreement with those obtained by the reviewed field test.

Keywords: Floating Bridges, Dynamic Analysis, Military Load Class 70 ton (MLC70).
New Model to Calculate Blast Loading on Above and Underground Structures

Hassan M. Farag (MTC)

Abstract: Blast loading is a type of extraordinary dynamic load to which structures or any object may be exposed to. The load resulted on structures or any targets from explosion is a complicated task to do. This paper presents an accurate and so simple model and program “BLAST” to predict the blast or shock wave resulted from the explosion that termed “Over Pressure” which comes from conventional and non-conventional weapons (such as Nuclear weapons). The pressure from the mass of air flow at and behind the shock front that termed the "Dynamic Pressure" is also predicted. The loads on any structure or target from the explosion are combination of overpressure $P_o(t)$ and dynamic pressure $P_d(t)$, this dynamic load on different faces of a structure either above or under the ground is predicted and presented in this paper. The over pressures resulted from different charges or weapon yields that are calculated in this study are compared to those obtained from “ConWep”. The load on structures predicted by the present study is also compared to that obtained from “AUTODYN” software. A study is performed to investigate the effect of depth of burial on the load affecting the different faces of the buried structure.

KEYWORDS: Explosions, Nuclear, Overpressure, Buried structures, Dynamic loading.
Simulation and Optimization of a Metallic Ferry under MLC70 Loading

Mohamed N. Lotfy¹, Yasser A. Khalifa¹, Abdelrahim k. Dessouki² and Elsayed Fathallah¹

¹Department of Civil Engineering, Military Technical College, Cairo, Egypt.
²Ain Shams University, Cairo, Egypt.

Abstract. Floating ferries are used for both civilian and military purposes. This study concerned with a ferry composed of sixteen connected floating pontoons. This ferry is simulated and optimized to carry Military Load Capacity MLC70 (Tank load). Consequently to the increasing demand of evolution and cost optimization, the design optimization is performed in this paper to obtain the optimum minimum weight which minimize both the cost and the buoyancy factor. The simulation of the ferry is performed using the finite element program ANSYS software. Furthermore, different grades of the structural steel and aluminium alloy are incorporated in this study. The simulation is verified with both practical and mathematical results. The performance of the ferry is investigated, In addition to the design parameters, constraints and objective functions are determined. The optimum weight of the ferry is obtained, followed by a reduction in the buoyancy factor; accordingly the capacity of the ferry can be increased. Comparison between the behaviour of the different ferries using different materials is operated considering stresses, deformations and weight. Conclusions and recommendations are then stated.

Keywords: Floating; Pontoon; Optimization; Ferry; Steel; Aluminium; Modelling; ANSYS
Finite Element Modelling and Multi-Objective of Sandwich Composite Hull for Decreasing (weight and Drag Force) and Increasing Buckling Load Capacity

Mohamed Helal$^{1,2}$ and Elsayed Fathallah$^3$
$^{1,2}$Taif University, Saudia Arabia and Mansoura University, Egypt
$^3$M.T.C., Egypt

Abstract: In under water applications, space vehicles, and aircrafts the weight becomes important factor. Additionally, the design of composites structures greatly depends on number of layers and the fiber orientation angle. Therefore, this work presents the optimization of sandwich composite pressure hull in order to minimize (weight and drag force) and maximize buckling load capacity using ANSYS Parametric Design Language (APDL). Tsai-Wu and maximum stress failure criteria were incorporated for predicting the first-ply failure. The major and minor radius of the pressure hull, the ring and long beams dimensions, the fiber orientation angle and layer thickness are taken as design variables. The results illustrated that, core thickness ($T_{core}$) has a great effect to resist the shell buckling. While, it has a little effect on both Tsai-Wu and maximum stress failure index.
| Military Technical College | 13th International Conf. on Civil & Arch. Eng. |
|---------------------------|---------------------------------------------|
|                           | 7-9 July 2020                                |
| Session No. 4             |                                             |
| Title                     | Structural Analysis & Project Management (SA & PM II) |
| Date                      | Tuesday 7-7-2020                             |
| Time                      | 15:00 -16:45                                |
| Place                     | Room B                                      |
| Session Chairmen          |                                             |
|                           | Maj. Gen. Dr. Hasan M. Farag                 |
|                           | Brig. Gen. R. Prof. Dr. Osama M. Moussa      |
|                           | Col. Dr. Ashraf M. Osman                    |

Optimization of the Panels Used in Free-Form Buildings and Its Impact on Building Cost  
*Sara M. Elkabany, Ahmed M. Elkordy and Hesham A. Sobh*  
SA5

Optimization of Load-Bearing concrete Wall Using Genetic Algorithm To achieve Mechanically Integrated Behavior  
*Sara M. Elkabany, Ahmed M. Elkordy and Hesham A. Sobh*  
SA6

Deflection of Thin-Walled Panels Loaded in Shear with Different Types of End Stiffeners  
*E. A. Mousa, M. H. El-Boghdadi and N. M. Yossef*  
SA7

Elements of Safety Management System in the Construction Industry and Measuring Safety Performance  
*Mostafa Elsebaei, Omar Elnawawy, Ayman Othman and Mohamed Badawy*  
PM1
Optimization of the Panels Used in Free-Form Buildings and Its Impact on Building Cost

Sara M. Elkabany¹, Ahmed M. Elkordy² and Hesham A. Sobh³

¹Assistant lecturer at Architecture Department, Faculty of Engineering, Al-Azhar University, Cairo, Egypt
²Professor & Head of Architecture Department, Faculty of Engineering, Al-Azhar University, Cairo, Egypt
³Professor of Architecture & Vice Dean of Faculty of Engineering, Al-Azhar University, Cairo, Egypt

Sara.alkabany@azhar.edu.eg

Abstract: The outside surfaces of the free form buildings include panels with very complicated curvatures in their design. As the curvature of the panels becomes higher, the more costly the building costs, a free-form building designer needs to perform the procedure to minimize curvature of the panels at the early design stage while at the same time calculating the cost of structure panel optimization without compromising the features of its free-form facade. Nevertheless, in the early design stages, it is very difficult to estimate costs for design options and to find a good approach to the design intent and budget cap. Many designers lack panel optimization knowledge and understanding technology. This research proposes how Grasshopper can be used to optimize the panels for the free-form facade, a commonly used program which can be easily approached by a building designer and how to measure building costs in accordance with the process of optimization. The optimization panel is mainly done by linking the continuity analysis function Grasshopper to the Function of continuity analysis. The analysis of free-form ventures is conducted to check the validity of the results.

Keywords: Free-Forms; Cost; Optimization; Panel And Algorithm.
Optimization of Load-Bearing concrete Wall Using Genetic Algorithm To achieve Mechanically Integrated Behavior

Sara M. Elkabany¹, Ahmed M. Elkordy² and Hesham A. Sobh³
¹Assistant lecturer at Architecture Department, Faculty of Engineering, Al-Azhar University, Cairo, Egypt
²Professor & Head of Architecture Department, Faculty of Engineering, Al-Azhar University, Cairo, Egypt
³Professor of Architecture & Vice Dean of Faculty of Engineering, Al-Azhar University, Cairo, Egypt
Sara.alkabany@azhar.edu.eg

Abstract: This paper proposes mechanical and growth characteristics of nature inspire shapes to be applied to load-bearing walls. In this study, this is performed by analyzing the case studies of O-14 Building, Victoria Gate and The Broad Museum. A model was created through the SolidThinking Inspire program using the morphogenesis tool. The model design is based on the algorithm for topology optimization and will be compared in terms of structural and material performance with the selected case studies. Optimizations results are found to be effective and designed with maximize stiffness in order to prevent deformation which is clearly reflected in the cost estimate in the initial design stages.

Keywords: Genetic Algorithm; Optimization; Load Bearing Walls and Free-forms.
Deflection of Thin-Walled Panels Loaded in Shear with Different Types of End Stiffeners

E. A. MOUSA*, M. H. EL-BOGDADI†, N. M. YOSSEF†1

*Department of Structural Engineering, Faculty of Engineering, Tanta University, Tanta, Egypt
†Corresponding author (Mobile: +201225151616; Fax: +20403315860; Email: nashwa.yossef@gmail.com, nashwa_abdeltawab@f-eng.tanta.edu.eg.

ABSTRACT
Numerical analysis for the load/deflection behavior of thin-web plate girders will be studied in this paper using a finite element program. An analytical approach presented in literature was discussed, and hence, it was used to calculate the load/deflection values in pre-buckling and post buckling stages. Conforming finite element load-deflection curves within the theoretical approach is the main goal of this study. The effect of different parameters on load-deflection curves is proposed. Stiffener thickness (t_s), end post type (no end post (NEP), with rigid end post (REP), and with non-rigid end post (NREP)) and end distance (e) are the main parameters considered in this paper. The analytical approach estimates well the load/deflection behaviors REP and NREP plate girders with (a/h_w < 1.4). On the other hand, the analytical approach can’t estimate either for the shear strength or the deflection of NEP plate girders.

KEYWORDS
Plate girders; Shear behaviour; In-plan deflection; End stiffeners; Finite element mode
Elements of Safety Management System in the Construction Industry and Measuring Safety Performance

Mostafa Elsebaei¹*, Omar Elnawawy², Ayman Othman³, Mohamed Badawy⁴

¹ Teaching Assistant at The British University in Egypt, Post Graduate Student at Ain Shams University; Mostafa.adel@bue.edu.eg
² Professor, Structural Engineering Department, Ain Shams University; nawawyomar@hotmail.com
³ Professor, Head of Architecture Department, The British University in Egypt; Ayman.othman@bue.edu.eg
⁴ Ph.D., Structural Engineering Department, Ain; Mohamed.badawy@eng.asu.edu.eg

* Correspondence: Mostafa.adel@bue.edu.eg

Abstract. Construction industry is considered to be one of the most hazardous industries in the world. The reason could be attributed to its hazardous nature as it is an accident-prone industry. Thus, a need for better understanding of safety management system is essential for improving safety performance in this sector. This paper discusses briefly the elements of safety management by presenting different systems (such as Oregon OSHA Occupational Health and Safety Administration, and OTAR Overseas Territories Aviation Circle) and elaborating their elements. It also discusses two types of measuring safety performance the first is the lagging indicators and the second is the leading indicator. In addition, a field study was conducted to explore contractors’ perception on safety management. A questionnaire was distributed to construction firms. 200 responses were collected and analyzed. All of the results showed positive answers which indicate that safety in performance in Egypt is slightly above average as all means were close to average.
Wednesday
8 July 2020
| Session No. 5 | Title | Date | Time | Place | Session Chairmen |
|--------------|-------|------|------|-------|------------------|
|              | Architecture Engineering (AE) | Wednesday 8-7-2020 | 9:00 -10:45 | Room B | Maj. Gen. Prof. Dr. Mohamed A. Barakat |
|              |                                |                  |             |       | Brig. Gen. Assoc. Prof. Mohamed F. Abd El Aleem |
|              |                                |                  |             |       | Col. Dr. Mohamed M. Mahdy |

| Cairo Airport Between Origination And Future Vision | AE1 |
|-----------------------------------------------------|-----|
| Mostafa Mahmoud Saber , Alaa El Din Abdel Rahman Ibrahim and Salah Zaki Saeid |

| The Reflective Impact of Different Teaching Strategies in Teaching Architecture and Interior Design Practical Courses | AE2 |
|-----------------------------------------------------------------------------------------------------------------|-----|
| Marwa Abdelalim, Noura Aji, Sherif Mahmoud and Mohammad Fahmy |

| Appropriate Housing Projects Management of a Random Sample in the Greater Cairo Region | AE3 |
|--------------------------------------------------------------------------------------------|-----|
| Maged Moneer Gad, Ahmed Galal El Din Aly |

| The history of monasteries in Egypt as self-sustained settlements | AE4 |
|-----------------------------------------------------------------|-----|
| Gena Romel, L Sherif, and S Ashour |

| Flexible Design: An Innovative Approach for Achieving Sustainability in Primary Public Schools in Egypt | AE5 |
|-----------------------------------------------------------------------------------------------|-----|
| Yara A Fahmy and Ayman A E Othman |
Cairo Airport Between Origination And Future Vision

Mostafa Mahmoud Saber¹, Alaa El Din Abdel Rahman Ibrahim² and Salah Zaki Saeid²

¹Department of Architecture - College of Engineering - Al-Azhar University
²Prof. Department of Architecture, Faculty of Engineering, Al-Azhar University

mostafa2ms@yahoo.com

Abstract: Airports are the latest means of transportation that reflect the progress of human civilization and reflect the distinctive identity of each country. The passenger building is the main component of the airport, which in turn contains many dynamic and constantly evolving facilities depending on the increase in passenger traffic and the continued entry of new aircraft and modern operating and service systems that are constantly heading to try to facilitate and accelerate the travel procedures, as the development of airports in recent years is a remarkable development that promotes the level of booms as a result of increased air traffic in the world. The airports have become one of the most important international projects. In this research, Cairo Airport has been chosen because it is considered the largest airport used in Egypt, and the interface that arrives from the outside world to Cairo. It accommodates all foreign air movements for all foreign airlines operating in Egypt. In this research, a detailed explanation about Cairo Airport will be provided by studying its components from the ground side, passenger buildings and the air side, and studying the area of Cairo Airport and how to benefit from unexploited places at the airport by studying the elements of the airport city and how to benefit from the application of the components of the airport city at Cairo International Airport.

Keywords: Airport - Airport City – landside – Terminal Building - Airside.
The Reflective Impact of Different Teaching Strategies in Teaching Architecture and Interior Design Practical Courses

Marwa Abdelalim¹, Noura Aji² and Mohammad Fahmy³

¹Assistant Professor, Prince Sultan University, Architectural Engineering Department, Riyadh, KSA
²Lecturer, Prince Sultan University, Interior Design Department, Riyadh, KSA
³Associate Professor, Military Technical College, Head of Civil & Architecture Engineering Branch, Cairo, EGYPT

Corresponding email address: mabdelalim@psu.edu.sa

Abstract. Achieving learning outcomes in a creative manner, actually considers a vision for all instructors whether theoretical courses or practical courses, in a reflective way where such reflection interfere to boost students’ self-confidence while enhancing their knowledge. The research investigates some effective teaching strategies that attempt to bridge the gap between theories and real application trying to close the loop of getting both interior/architectural design projects, and construction technology integrated.

The research adopts an ontological assumption of applying questionnaire and surveys to recognize this silent war, is it in the students’ mind as just fear of MAKE NO MISTAKE or fear from the future career. According to Tony Robbins. He said if you want a better result then ask yourself a better question. The main research problem is thinking about the rational beyond the reflection of effective teaching strategies as well as solving the problems that fear junior architects and interior designers, to know exactly where is the battlefield? A whole mechanism of some teaching and learning strategies as well as direct assessment tools, in accordance with well-defined rubrics were applied.

The researcher presents a considerable hypothesis that assures that believing in the architecture and interior design students’ abilities and the instructor’s variable teaching strategies can bring out examples of best practices in teaching philosophies.

Keywords: Flipped classroom strategy, One to one basis, circle talk, assessment tools
Appropriate Housing Projects Management of a Random Sample in the Greater Cairo Region

Maged Moneer Gad and Ahmed Galal El Din Aly

1 Doctor Engineer, Architecture Department in Obour high Institute for Engineering and Technology, PhD (Wuppertal University, Germany).
2 Assistant Professor Civil Engineering Department, Modern University for Technology and Informations, Cairo, Egypt.
Corresponding Author: Dr. Eng./ Maged Moneer Gad, gadmaged@yahoo.de

Abstract: The housing industry is an essential part of the urban development that requires full cooperation of different parties including public sector institutions, individuals, and private sector institutions and groups. This is to achieve economic, social, and urban developments. Everyone’s right of having a decent home is a basic demand makes it an essential requirement to offers different appropriate housing solutions. After the industrial revolution and the development of mechanization with the technology development, also the economy and social changes, the human concepts through the years changed and evolved the housing patterns, methods forms and uses, as the human needs concepts and cultures changed, from the need of only a shelter above the head to protect from weather into home that provides not only protection but also physiological and psychological comfort, recreational means to practice indoor various activities, all that resulted into the development of houses from two or three stories to include a family into the current form of residential multistory towers that contain large number of residents families.

This research paper is based on the multistory buildings residents’ opinion, their point of view, their requirements for designing a suitable residential house that consider natural elements that affect the urban planning and the shape of the city, therefore a questionnaire was made to collect the opinion for some samples Of the population. Accordingly, the researcher used the descriptive analytical method by designing a survey questionnaire to evaluate and collect information about a suitable housing for the residents and to derive (the requirements) for a comfortable housing that provides the necessary needs for the population and that was distributed to a sample of (500) individuals. Income, social, and educational levels were taken into consideration, and valid survey lists were emptied and analyzed.

The study ended to several results and recommendations, the most important of which are: 1) The residential building should be residential only without the presence of other usage in it; 2) The residential buildings‘ height should not exceed 5 floors; 3) The residential building should not contain more than 10 apartment units; and 4) There should be some special services for residential buildings, as a suitable number of parking spaces, as well as the elevator in the buildings and a terrace.

Key words: residents, residential needs, populations, multistory buildings, residential buildings, office buildings, commercial buildings.
The history of monasteries in Egypt as self-sustained settlements

G Romel, L Sherif, and S Ashour
Department of Architecture, Faculty of Engineering, Arab Academy for Science, Technology & Maritime Transport, Cairo, Egypt

gina_romel@aast.edu
Lobna.sherif@aast.edu
shaimaa.ashour@aast.edu

Abstract. Monasticism initiated in Egypt and has spread worldwide. It introduced a new self-sustained architectural innovation called “monasteries”. Monasteries can be considered as homogeneous self-sustained settlements through history. This paper aims to document the origins of monasticism, leading to the development of self-sustained monasteries: conceptually, economically, and architecturally. It relies on observations, maps, and historical references. The main challenges in collecting data for this paper were the lack of published references about origins of monasticism. Most of the resources are rare documents stored in the Coptic Clerical and Theological College of Cairo, and libraries of monasteries. Thus, the paper analysis present monasteries as self-sufficient, self-sustained settlements that survived through history since the fourth century to the current state through: (zoning, architectural elements, building materials, and building techniques). The architectural analysis shows that the architectural solutions of monasteries evolved in respect to the geographical location, and context. Monasteries architecture relies on trials and errors, until it reached an applicable architectural model.

Keywords: History of Monasteries, Architecture, self-sustained settlements, Egypt.
Abstract: Public schools in Egypt are considered a valuable asset that should be preserved and sustained, as they play a paramount role for the development of a sustainable community. Whereas, currently, the schools in Egypt are not sustainable from social, economic and environmental perspective as they are generally heavy, fixed and normally irreversible once construction has been completed. This is due to the traditional construction method used in the construction of schools which consumes time and generates a vast amount of waste. In addition, the changing demands of the occupants may confront the need for future expansion or complete changeover. With the increase in labour costs, lack of skilled labours for different trades, demand for faster construction, increased considerations for safety and environment and above all meeting these demands at an economic and reasonable price requires us to change the approach used in construction. Hence, these faults could be sufficed with the introduction of green prefabrication methods as a flexible design approach to enhance sustainability for primary public schools in Egypt. Therefore, this paper aims to investigate the role of flexible design for achieving sustainability in primary public schools in Egypt through Green Prefabrication. A research methodology consists of literature review to investigate the topics of primary public schools, traditional construction, flexible design, Green prefabrication and sustainability.

Keywords: Green prefabrication, Sustainability; Primary Public Schools; Egypt; Flexible Design; Matrix
| Session No. 6 | Building Technology (BT) |
|---------------|--------------------------|
| Title         | Wednesday 8-7-2020       |
| Date          | 11:00-12:45              |
| Place         | Room B                   |
| Session Chairmen | Maj. Gen. Prof. Dr. Mohamed A. Barakat  
|                | Brig. Gen. Assoc. Prof. Mohamed F. Abd El Aleem  
|                | Col. Dr. Mohamed M. Mahdy |

| Paths Towards Energy Efficient Building Using Nano Architecture  |
| Nader Gharib and Basant Ahmed                          | BT1 |

| PV Grid-Connected Systems: Performance and Architectural  |
| Integration Aspects                                   | BT2 |
| Hala Alaa and Nader Gharib                           |

| Comparison of Egyptian Innovation in Affordable Housing with |
| Global Models                                              | BT3 |
| Hebatalrahman Ahmed                                       |
Paths Towards Energy Efficient Building Using Nano Architecture

Nader Ghariband Basant Ahmed1, 2,*

1 Head of Architectural Engineering and Environmental Design Department, Engineering & Technology College, Arab Academy of Science, Technology and Maritime Transport, Port Said 42511, Egypt.
2 Architectural Engineering and Environmental Design Department, Engineering & Technology College, Arab Academy of Science, Technology and Maritime Transport, Alexandria 21913 P.O. Box 1029, Egypt.

*Arch_Nader@gmail.com

Abstract. Nanotechnology has been in a massive use in the last two decades in many fields specially the architecture and construction field. Applying nano technology in architecture is taking place and has become the biggest challenge in our time. The challenge of nano architecture is to improve the material properties, adding new properties or production new materials which used in architecture design of the building or in construction phase. The study aims to reduce the energy usage of the building by using nano architecture and to achieve one of the environmental sustainability factors. The research adopts the descriptive theoretical approach of nano technology and nano material in field of architecture and its impact on the energy use of the building. This followed by the second analytical part which examines the nano materials and nano devices through examples of global sustainable projects and nano architecture applications which leads us to a huge difference in the architecture design and reduces the total energy usage of the building. In conclusion, the research shows the effect of using nano material and devices on the building energy use which can help to save the environment by reducing the energy consumption.

Keywords: Nano architecture – Nano material – energy efficient building – environmental sustainability
PV Grid-Connected Systems: Performance and Architectural Integration Aspects

Hala Alaa¹ * and Nader Gharib¹, ²

¹ Architectural Engineering and Environmental Design Department, Engineering & Technology College, Arab Academy of Science, Technology and Maritime Transport, Alexandria 21913 P.O. Box 1029, Egypt.

² Head of Architectural Engineering and Environmental Design Department, Engineering & Technology College, Arab Academy of Science, Technology and Maritime Transport, Port Said 42511, Egypt.

* eng.hala.alaa1@gmail.com

Abstract. Considering the high global rates of carbon dioxide emissions, there is a great concern about renewable energy especially solar energy in buildings. Despite its growth, there has been limited acceptance of architects and stakeholders concerning the use of solar energy technologies in buildings, and subsequently, insufficient architectural integration. Here, the research aims to develop better understanding of architects for the design stages, considerations, and possibilities regarding solar PV grid-connected systems in buildings using inductive methodology, thus analysing the technology specifications and good integration practices. The research determines the factors that influence the early design and conception phase of the building. It develops a framework for architects concerning the technical and physical aspects affecting the design process, through building needs, cell types, system performance, site conditions, space and environmental requirements, and BIPV integration possibilities. In conclusion, this study will help in the implementation of PV grid-connected powered buildings in new projects by addressing previous design challenges and providing data for architects and researchers on the system design and performance.
Comparison of Egyptian Innovation in Affordable Housing with Global Models

Hebatalrahman Ahmed
Consultant in Materials Science and Applications
hebatalrahman11@yahoo.com

Abstract: Affordable housing is a set of building models which is considered as type of low-income housing primarily by providing residential products that are within their reach and difficult living conditions. The models of affordable housing are often linked to rapid and constructive housing in the face of disasters.

In these work survey about different types of affordable housing was done with the advantages and disadvantages of each type. The combatability of each type with sustainable in construction according to national and international standards was considered. The risk assessment related to this type of construction was evaluated.

The Egyptian innovation in the affordable housing which is registered as patent in the Egyptian patent office is studied. The new building has one floor with spherical external shape for energy conservation, it is consisting of multilayers movable walls moving on the streams. The metallic structure is installed in the soil surface by fixation elements, it is equipped with sensors which is controlled automatically to detect climate changes.

The movement of successive layers can be controlled manual or automatic according to climate changes. The movement of insulated layers is done by sliding on dedicated channels, it is equipped with upper and lower ducts located on several axes positioned at the top and bottom of the ball so that the upper and lower positions are located on one axis. The unit has conical top contain the layers folded to the top and prevent the accumulation of dust and water. The layers can be stored inside the conical top. The Egyptian patent model is compared with the common global models of affordable housing to explain its advantages and disadvantages.

Keywords: Affordable Housing, Risk, Sustainable Building, Innovation.
| Design out waste as an approach for achieving sustainability in Egyptian housing projects | EE1 |
|---------------------------------------------|-----|
| Laila A. Elsawaf and Ayman A. E. Othman     |     |
| Passive Solar Technique Using Trombe Wall: Simulation of Energy Performance in Hot Climates | EE2 |
| Ayah Mohamed Ramadan.                       |     |
| The philosophy of visual perception of the external space with a vision of the biophilic design that achieves quality of life | EE3 |
| Enjy Ibrahim Youssef, Khaled Mustafa Khorsed, Sherif Sabri |     |
| Environmental Assessment of Coastal Resorts: Recreational Spaces as a Case Study | EE4 |
| Mohamed Sobhi Hassan, Wael Ahmed Sheta, Ahmed Mohamed El Kordy |     |
| Performative Design Optimization for Shading Screens | EE5 |
| Ahmed Mohamed Elkordy, Hesham Ahmed Sobh, and Mohga Ali Abdelslam Youssef |     |
Design out waste as an approach for achieving sustainability in Egyptian housing projects

Laila A. Elsawaf and Ayman A. E. Othman
Senior Student, Architectural Engineering Department, Faculty of Engineering, The British University in Egypt, Cairo-Suez Desert Road, El-Shorouk, Cairo, Egypt. E-mail1: Laila141068@bue.edu.eg

Professor of Construction and Project Management, Head of Architectural Engineering Department, Faculty of Engineering, The British University in Egypt, Cairo-Suez Desert Road, El-Shorouk, Cairo, Egypt. E-mail2: ayman.othman@bue.edu.eg

Abstract: Housing projects have been increasing rapidly during the previous years to fulfil community needs and achieve the national and international sustainable development objectives. Due to their nature, housing projects generate a significant amount of waste that accounts for approximately 40% of the solid waste that the construction industry generates annually. Many of these wastes are a result of inappropriate decisions adopted during the design process such as using non-sustainable materials and inefficient use of natural recourses. Meanwhile, research has revealed that achieving sustainability within housing projects is a crucial challenge, yet an essential one. This called to think differently and adopting creative strategies for reducing construction waste during the design process. Therefore, this research aims to develop matrix that correlates the aspects of sustainability with design out waste strategy as an approach of achieving sustainability in housing projects. A research methodology consists of literature review and case study was designed to accomplish three objectives. Firstly, literature review was used to investigate the topics of sustainability, design out waste strategy and housing projects. Secondly, a case study was presented and analysed to identifies the design out waste strategy for reducing waste as an approach to achieve sustainability. Finally, developing a matrix that correlates sustainability and design out waste strategy.

Keywords: Waste Reduction, Design out waste strategy, Sustainability, housing projects, Waste.
Passive Solar Technique Using Trombe Wall: Simulation of Energy Performance in Hot Climates

Ayah Mohamed Ramadan.  
1Lecturer at Faculty of Engineering, Modern Academy for Engineering and Technology, Cairo, Egypt.  
eyahezzat54@gmail.com

Abstract. The research aimed to evaluate a Trombe wall, a solar wall, is an important component of passive solar strategies. It is a very compact wall and can be south-facing or north-facing, which is painted black and made of exclusive material that absorbs a lot of heat. The main advantage of Trombe wall is that they are often easily built from locally obtainable materials, very dependable and having less repair, maintenance and operation costs. The analysis of gathered data concludes that Trombe wall can provide great advantage to indoor environment thermal comfort and enhancing energy performance compared to single skin facades. The research has shown that Trombe wall has possibility of providing acceptable internal thermal comfort through "Mixed-Mode" ventilation strategy in hot climate, this is important in determining the possibility of Trombe wall in incorporating "Mixed-Mode" ventilation reducing energy usage in cooling demands and is proven by applying a simulation using Design-Builder software of "Energy plus "simulation engine on a case-study of a model of office building with two façades alternative base case. The conclusion of this research that Trombe walls can reduce the cooling load by 75% compared to the base case with annual energy savings.

Keywords: Trombe wall; Passive solar heating and cooling; Energy efficiency; Thermal comfort.
The philosophy of visual perception of the external space with a vision of the biophilic design that achieves quality of life

Enjy Ibrahim Youssef¹, Khaled Mustafa Khorsheed², Sherif Sabri³

¹Ph.D. researcher at Al-Azhar University e-mail:
²Professor, Department of Engineering, Al-Azhar University
³Professor, Department of Urban Planning, Al-Azhar University

enjyyusuf123@gmail.com

Abstract.—The research deals with the study of the integrated relationship between the elements of visual perceptions of the void and its interaction with the vital elements of it through the study and address the concept and philosophy of visual perceptions of the void and its development through the ages and the effect of these visual perceptions on the perception of life in the vacuum at its levels the three vitals It is the first level: belief in the existence of a life of visual formations and the sense of awareness of users in a dynamic interaction, and comes the second level: with regard to the mental and mental path of the user aware of these visual perceptions as physical elements with vital visions to convey the perception to the existence of real life and not Imagine it, level 3: The presence of the user in the scope of visual perceptions interactively with the characteristics of the formations that he realized between his mental perceptions and his inner feelings and his impression of the place and his human interaction towards it in the conscious and unconscious mind of his vital qualities surrounding the pulsating quality Life has vivid images that interact with the pulse of natural ingredients in the void The research has found that the interaction between human and visual perceptions in the void has exceeded the limits of time and space and has become more oriented towards biophilic design that enhances communication between nature and human, the architect has an important role in applying the concept of biophilic and expressing it to design elements space.

Key words: - Quality of Life - biophilic Design - External space - Visual Perception
Environmental Assessment of Coastal Resorts: Recreational Spaces as a Case Study

Mohamed Sobhi Hassan¹, Wael Ahmed Sheta², Ahmed Mohamed El Kordy³
¹ lecturer Assistant of Architecture
Department of Architecture, Faculty of Engineering, Al-Azhar University- Cairo.
sobhieg@hotmail.com
² Assistant Professor of Architecture,
Department of Architecture, Faculty of Engineering, Al-Azhar University- Cairo
wael.sheta@azhar.edu.eg
³ Professor of Architecture
Department of Architecture, Faculty of Engineering, Al-Azhar University-
Cairoahmed.elkordy@ymail.com

Abstract. Tourism is one of the most important resources of national income in Egypt. Tourism as a vital role in bringing economic benefits to local communities, helping with conservation efforts or placing value on aspects of cultural heritage. Egypt is one of the world's most attractive countries in terms of its natural and historical characteristics, which makes it eligible to play an important role in the international tourism market. The vision of Egypt 2030 urges all sectors of the state to adhere to the axes of sustainability. Thus, the tourism sector is studying the current situation in the hotel industry and exploring the possibility of applying sustainability to hotels and resorts. This paper studies some of the sustainable practices in outdoor recreational spaces (especially in landscape) affects positively on conservation and the reduction of operation cost. The research method applies the seven principals of Xeriscape, which is considered as one of the sustainable benchmarks to evaluate landscape practices. The research aiming at assessing the coastal resorts in the Red Sea, Egypt from an environmental standpoint, analysing the operation practices in the recreational landscape which affects positively resources, conservation and the reduction of operation cost.

Keywords—Environmental Assessment, Recreational Spaces, Sustainability, Tourism Development.
Performative Design Optimization for Shading Screens

Ahmed Mohamed ELkordy¹, Hesham Ahmed Sobh²
¹²Professor - Department of Architectural Engineering – Al-Azhar University
Mohga Ali Abdelslam Youssef Assistant lecture - Department of Architectural Engineering – Al-Azhar University

E.mail: Mohga.ali@azhar.edu.eg

Abstract: The need for energy-conscious design starting from early design phases has become a vital issue. It has become necessary to take immediate action to avoid dangerous consequences for future generations. Among strategies and solutions used in discussing problem of a buildings’ energy consumption, the most important methods of saving energy in building are by carefully designing its facade. Building façade plays a significant role in architecture; it is not only a mean to express the design concepts but it is the main moderator between exterior environment and internal spaces. Ecological facades are defined as the ability to response and adapt to the changes of the environmental conditions. The strategies mainly focus on the functions and performances of Ecological facades in the context of indoor daylight quality.

The geometry of the proposed screen is not a focal point of this paper, as the aim is to find a method for designing and evaluation non-conventional solar screens that improve indoor daylight quality, while the specified shading screen is installed in front of a transparent full floor to ceiling glass facade. It is assumed that by using the shading screen, the required lighting levels are being maintained, while the heat gain is being reduced. In addition, the designed patterns play a role as an architectural feature of the building. Ultimately, the presented shading screens are based on geometric ornamental patterns and arranged according to the lighting requirements. Results are indicating a multi-disciplinary approach in the design of the shading screens, which can be employed in creating similar prototypes with different climatic and loading requirements.
| Military Technical College | 13th International Conf. on Civil & Arch. Eng. |
|---------------------------|---------------------------------------------|
|                           | 7-9 July 2020                                |

| Session No. 8 | Title | Date | Time | Place | Session Chairmen |
|---------------|-------|------|------|-------|------------------|
|               | Environmental Engineering (EE II) | Wednesday 8-7-2020 | 15:00-16:45 | Room B | Maj. Gen. Prof. Dr. Ehab H. Mahmoud |
|               |       |      |      |       | Brig. Gen. Assoc. Prof. Mohamed F. Abd El Aleem |
|               |       |      |      |       | Col. Dr. Hesham A. El Kady |

| Comparison of occupant thermal comfort with and without passive design for an educational building: a case study in Cairo. | EE-7 |
| Mohammad Fahmy, Sherif A. Mahmoud, Ibrahim M. Obwy and Marwa Abdelalim |

| Life cycle assessment of a residential building in Egypt: A case study | EE-8 |
| D. M. Morsi, W. S. Ismael, Mohamed Elmahdy and A. E. Abd El Hamed |

| The impact of an external obstacle daylight in deep office spaces at hot arid zone | EE-9 |
| Doha M. Saeed |
Comparison of occupant thermal comfort with and without passive design for an educational building: a case study in Cairo.

Mohammad Fahmy¹, Sherif A. Mahmoud², Ibrahim M. Olwy³

¹Associate Professor, Architecture Department, Military Technical College, Cairo, Egypt.
²Senior Lecturer, Architecture Department, Military Technical College, Cairo, Egypt.
³Assistant Lecturer, Architecture Department, Military Technical College, Cairo, Egypt.

Abstract: Occupant thermal comfort in educational buildings is important for students as it support the educational process itself. The passive design of naturally ventilated buildings plays a crucial role in achieving occupant thermal comfort but the passive design itself might be of higher cost to convince the owner even with proofs from the pre and while design simulation outputs. In this paper, the as built of a 1000 students’ educational building is simulated using Design Builder and compared with the same thermal zones of the as built but with passive cooling applications. Two wind catchers, shading devices, low e-glass windows, double skin façade, and double roof were applied. The status of student comfort was improved noticeably, results show that air temperature, air speed and thermal comfort achieved …… for the as built and recorded …….. for the passively modified version of the building.

Keywords: passive cooling, educational buildings, occupant thermal comfort, design builder
Life cycle assessment of a residential building in Egypt: A case study

D M Morsi, W S Ismael, Mohamed Elmahdy and AE ABD EL-HAMED

1 Teaching assistant at the higher institution of engineering, Sherouk Academy, Civil Engineering Department, Egypt
2 Lecturer at the British University in Egypt, Architectural Engineering Department El Sherouk City, Suez Desert Road
3 Department of Structural Engineering, Cairo University, Giza, 12613, Egypt
4 Department of Civil Engineering, Higher Institution of Engineering, Sherouk Academy.

Abstract. The present study quantified the significant environmental impacts of a residential building located in New Cairo, Egypt, covered all life cycle steps from cradle to cradle with a projected 60-year life span: (i) an inventory of all the construction materials were analysed, covering the building structure as well as the energy consumption; (ii) Three types of functional units were defined; (iii) the six top building materials were examined, and a sensitivity analysis was conducted to investigate the impact associated with the choice of building materials. The result shows that two life cycle phases, product and operation, were more significant in all of the impact categories, and two building assemblies, the structure and the floor most of the environmental loads. In terms of the sensitivity analysis, the structural concrete had the largest impact, dominating four of the seven selected impact categories, then hot-rolled structural steel took the second material of the largest impact after concrete. Finally, limitations and challenges are discussed to explore better design decisions in future studies.
The impact of an external obstacle daylight in deep office spaces at hot arid zone

Doha M. Saeed
Teacher of Architecture, Bader University in Cairo,
eng.doha.m@gmail.com, Egypt.

Abstract: The use of effective daylighting systems is one of the main factors that influences energy consumption in buildings especially in deep office spaces. Therefore, the need for innovative daylighting systems with optimum overall daylighting performance - especially in term of saving energy performance - is an essential design element for such spaces. Light shelf systems are the most major potential lighting systems that can be used to provide such innovative daylighting systems.

The parametric approach was implemented where all possible combinations of the various design parameters for the main two design elements of the light shelf system (light shelf and room specifications) were computed through Diva-for-Rhino (Grasshopper). The study of optimized light shelf systems in deep office spaces has been carried out in case of an external obstacle (neighbor) and without it – according to the Egyptian building codes - in order to identify the impact of such design elements on the performance of the optimized light shelf system in the main four directions in hot arid zone climate.

Keyword: Light shelf systems – obstacle - deep office spaces - Diva-for-Rhino (Grasshopper)
Thursday
9 July 2020
| Session No. | Title                                               | Speakers                                                                 |
|------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| 9          | Urban Planning (UP I)                               | Sherif Sabri, Maged Elmahdy, Abd Alrahim Kasem, Mohamad Farrag Fayad     |
|            | Major national projects as development poles and their impact on urban development. A case study of the new city of El Alamein in the north western axis | Asmaa Gabr, Kamal Khalaf and Gamal Helewa                                 |

Maj. Gen. Prof. Dr. Ehab H. Mahmoud  
Col Dr. Hany Abd El Khalek  
Lt Col. Dr. Sherief Ibrahim
Abstract In this paper will brief the audience about the origins and status of the transition governance approach which was developed over a decade ago in the Netherlands and has since been adopted worldwide. Transitions are fundamental changes in the structures and practices of (parts of) our cities and societies. Transition governance has been developed based on empirical and theoretical insights and an understanding of the dynamics and mechanisms of transitions. It provides a governance philosophy and concrete instruments and methods aimed at influencing the direction and pace of urban change dynamics towards sustainability. The approach is generic for complex societal issues and persistent unsustainability. It is used to address transition challenges on the scale of regions, cities and neighborhoods, as well as to initiate transformations in socio-technological systems such as energy, water and mobility. Transition governance in practice creates a new interface between policy makers and other societal actors. Local governments can be (but are not necessarily) in the driving seat with this approach and, together with (often) external transition experts, co-develop pioneering frontrunner networks called transition arenas. These transition arenas form the basis for developing society based transition agendas, strategies and experiments. Through the specific process design and approach to structure the transition agenda a collective ambition and perspective is developed which fuels all sorts of innovative projects and experiments. To local governments and other actors (such as citizens, businesses, institutions and other organizations), transition governance is a learning process during which opportunities are created to build upon each other’s transformative capacity and play into local dynamics.

Key words: Transition, governance, transformation, city, Sustainability.
Major national projects as development poles and their impact on urban development: A case study of the new city of El Alamein in the northwestern axis

Asmaa Gabr, Kamal Khalaf, Gamal Helewa

Al-Azhar University, Faculty of Engineering, Urban Planning Department, Egypt

Email: Assmaa.gabr2015@yahoo.com

Abstract- The major national projects are considered Egypt's vision in investing its various resources and one of the most important methods used to create urban development on all development sectors, starting from the local level through the regional level to the national level, which occurs a great development in its urban environment, especially the scope of those projects, and its role in terms of being development poles. It helps in spreading urban development with its pivotal concepts. By measuring the extent to which these projects are able to physically attract urban investment to evaluate the investment orientation of these projects, by identifying the factors affecting the national projects' capacity for urban polarization, and then defining the form of the relationship that links these factors to urban polarization through a statistical mathematical scale. On comparative theoretical studies, And, through this scale, it is possible to measure the urban polarization capacity of any existing national project or any urban gathering in the light of the proposed national project, and predict the potential population of the project, as it is possible to determine the priorities for development and investment, which in turn reflects on the spread of urban development in all parts of the Republic. The research aims to identify national projects of various levels of planning, And to identify the major projects, including those with development poles, and to identify the elements of its success and determine its development returns by measuring its urban polarization capacity.
Military Technical College  
13th International Conf. on Civil & Arch. Eng.  
7-9 July 2020

| Session No. 10 |
|----------------|
| **Title** | Urban Planning (UP II) |
| **Date** | Thursday 9-7-2020 |
| **Time** | 11:00-12:45 |
| **Place** | Room B |
| **Session Chairmen** | Maj. Gen. Prof. Dr. Ehab H. Mahmoud  
Col Dr. Hany Abd El Khalek  
Lt Col. Dr. Sherief Ibrahim |

| Architectural Design Firms’ Social Role to develop Sustainable Heritage Communities in Egypt  
*Dalia A Elweshahy and Ayman A E Othman* | UP5 |
|---|---|
| Evaluation of Slum Upgrading Interventions - Literature Review and Methodological Approaches  
*Hesham El-Maradny, Mohamed M. Mahdy and Hesham El-Kady* | UP6 |
| Managing of City Transition Toward Sustainable Eco. Urbanism (Proposed paradigm)  
*Sherif Sabri, Maged Elmahdy, A. Alrahim Kasem and Mohamad F. Fayad* | UP-8 |
Architectural Design Firms’ Social Role to develop Sustainable Heritage Communities in Egypt

Dalia A Elweshahy ¹ And Ayman A E Othman ²

¹Senior Student, Architecture Engineering Department, Faculty of Engineering, The British University in Egypt, Cairo-Suez Desert Road, El-Shorouk, Cairo, Egypt
²Professor of construction and project management, head of architectural engineering department, faculty of engineering, The British University in Egypt, Cairo-Suez Desert Road, El-Shorouk, Cairo, Egypt.

Corresponding Author Email: Dalia145555@bue.edu.eg

Abstract: Cultural heritage buildings are a crucial element for future generations, as they preserve the cultural identity unique to where they are located. Moreover, they create one of the most dominant and memorable architectural achievement that have significant historical and cultural values. However, heritage buildings in Egypt suffer from a surge in demolition due to the deteriorated conditions of their surroundings areas, as well as, the maintenance of only the physical structures without considering the surrounding communities. Egypt constantly encounters many challenges such as poor coordination from the government due to shortage of skilled people, poor heritage awareness of local communities and lack of finance needed for achieving sustainable development. On the other hand, Architecture Design Firms (ADFs) act as a supporting tool for the government as they have a vital role in the local community development; which further act as the cornerstone of developing the historical regions. Hence, in order for the ADFs to achieve such development, they need to activate their Corporate Social Responsibility (CSR) role which is a driver for developing the heritage community. Consequently, this research aims to develop a matrix that correlates CSR with ADFs as an approach to achieve sustainable heritage communities in Egypt. A research methodology consists of literature review to investigate the topics of CSR, Heritage community development and ADFs. Finally, developing a matrix the relation between the architect’s social responsibility and the indicators of sustainable development of local communities.

Keywords: Corporate Social Responsibility, Heritage Community Development, Sustainable Development, Architecture Design Firms, Heritage Buildings
Evaluation of Slum Upgrading Interventions - Literature Review and Methodological Approaches.

Hesham El-Maradny * Mohamed M. Mahdy * Hesham El-Kady *

* Architecture Engineering Department, Military Technical College, Cairo, Egypt

helkady@mtc.edu.eg

Abstract. This work addresses slums definition according to UN-Habitat, and provides some objectives of impact evaluation of slum upgrading projects. The main objective is to clarify the importance behind the slum upgrading projects (interventions), through over viewing the slum upgrading interventions and their main characteristics then summarize methodology of evaluation studies. This paper gives an overview of counterfactual question, qualitative and quantitative methodologies discusses main strategies to control bias in Quasi-experimental approaches, and provides a summary about common past evaluation challenges and recommendations which can be applied to future work.
Managing of City Transition Toward Sustainable Eco. Urbanism (Proposed paradigm)

Sherif Sabri, Maged Elmahdy, A. Alrahim Kasem, Mohamad Farrag Fayad.
Engmohamad.frag@gmail.com

Abstract: The current research clarifies the main basics of Mutation's strategy towards sustainable eco-urbanism which they are (Climate, renewable energy, zero waste, water, landscape, sustainable transport, local and sustainable materials, retrofitting of existing districts, green buildings, livability, local food, cultural heritage, urban governance, education and knowledge, strategies for urban areas), and what spinoff the reliable Universal Criteria in addition to concept the managing of sustainability transition in cities.

The aim of the research was to present and elaborate a proposed model for managing the sustainable transformation of Egyptian cities, so that they are suitable to deal with and apply to most existing and new urban communities, with a view to transforming them into sustainable environmental cities and communities, by working to develop a future vision for the sustainable image that the city will reach, dependent on Scientific foundations and an understanding of the problems these regions suffer from, to explain sustainability strategies in light of the general data for these areas and the current and future needs of the population and the available capabilities.

The proposed model consists of ten consecutive stages of operations and is related to each other, where the subsequent stage is based on the data of the previous stage, and the success of the previous stage has a positive impact on the success of the subsequent stage and vice versa.

The main findings of the study are: preparing and implementing the management of Egyptian cities transformation into sustainable cities: include the flowing:

Building an institutional framework to manage urban sustainability transitions at the national level
Prepare a strategy for existing and new cities
Provide the necessary financial resources for implementation
Information integration and capacity support
Institutional support and capacity building - Support capabilities

Key words: Managing, transition transformation, eco urbanism, sustainable city, Sustainability
### Material Quality and Control (MQ & C)

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MQ&C-2

Static and Dynamic Performance of Two Stage Concrete

Mohamed A.E.M. Ali*

*Department of Civil Engineering, Military Technical College, Cairo, Egypt

Abstract. Concrete is arguably the most important construction material in the world. In the last decades, it has been reported that infrastructures faced extreme static and dynamic loads which caused structural catastrophic disasters [1]. The increase usage of conventional concrete in engineering industries led to high consumption of mineral resources which caused several environmental damages related to reduction in the rocket layers [2], besides, the economical damages due to the high demand of natural resources materials which rises the cost of construction [3]. Therefore, the utilization of recycled waste rubber (steel wires) in concrete can be a sustainable solution for waste construction developments [4]. Recently, two stage concrete (TSC) (non-traditional concrete) was introduced. Placing of coarse aggregate followed by injecting the cementitious materials among the aggregate layers in the formwork are the basic steps of producing TSC. Evaluating the static and dynamic performance of TSC were the objectives of this study. Cement, aggregates, water, recycled steel wires of rubber tires were utilized in manufacturing TSC specimens. The compressive characteristic and impact resistance of TSC test specimens were evaluated. Results showed that steel wires improved the dynamic behaviour of TSC, while a slight to no effect was observed on its compressive characteristics. This study demonstrates the potential to engineer sustainable TSC mixtures.

Keywords: Two-stage concrete; impact; sustainability
Thermal Conductivity for Foamed Paste made of Cement and Cement kiln dust

Rafik K. Abdel Wahab¹,²

A. Prof. Civil Engineering Department, Faculty of Engineering, Qena Branch- Al-Azhar University -Egypt
Vice Dean of High Institute for Engineering and Technology In Obour City –Qalyobia -Egypt

Dr.rkhairy@gmail.com

Abstract As with most large manufacturing industries, by-product materials are generated. Cement kiln dust is a by-product material of cement manufacturing process. The aim of this paper is to investigate the properties of foamed paste made of CKD in addition of different percentage of cement. Compressive strength and thermal conductivity had been determinate. The results were encouraged to use the Foamed (Cement kiln dust – cement) Paste (FCKDC) as an insulation material. The results indicate a comparable value for thermal conductivity which vary from (0.074– 0.3) W/mk.

Keywords: Cement, Cement kiln dust (CKD), Thermal conductivity, Compressive strength, Foamed Paste
Investigating the experimental process for partial replacement of cement with sugarcane bagasse in the construction industry

Nadin Dawouda, Amany Michealb, Rania Rushdy Moussac

a, b & c The British university in Egypt (BUE), Suez Desert Road
El Sherouk City, 33811, Cairo Egypt

Nadin150210@bue.edu.eg

Abstract: In the last few decades there has been speedily increasing in the agriculture and industrial wastes. This causes many environmental issues and raises the potential to contaminate the natural resources of living such as water, air and soil. Recently, the amount of organic waste produced daily has been rising, while it is poorly managed. It is either burned or disposed improperly, which effect negatively the environment and public health. On the other hand, during the cement production process many wastes, and pollutants are generated which have major negative impacts on the environment. Cement is considered as a substantial constituent of building materials in the construction industry. Many research’s intended to explore the potential of utilizing organic waste products in the construction industry by partially replacing cement with organic wastes such as sugarcane bagasse to create an eco-friendly brick with appropriate structure properties. Previous research’s used different treatment techniques to treat the organic waste and prepare it for construction industry. It was noticed that the treatment method used in previous research’s affected the structural properties of the new bricks with organic waste partially replacing. This research intends to study and analyse the process and techniques used by other researcher’s experimental work to treat and replace cement with sugarcane bagasse.

This research will present the best procedures for partially replacing cement with sugarcane bagasse in cement bricks without compensating the structural properties of regular cement bricks. This study will analyse and compare previous researcher’s experimental work to obtain the best experimental program and to utilize sugarcane bagasse in brick industry.

KEYWORDS: sugarcane bagasse, cement, eco-friendly block, partial replacement, thermal conductivity, strength
Structural Behavior of Light Weight Ferrocement Walls

Yousry B. I. Shaheen¹, Mohsen Mousa² and Eman Gamal³

¹² Department of Civil Engineering, Faculty of Engineering, Menoufia University, EGYPT.
³ Civil Engineer and Postgraduate Fellow

Abstract: This paper presents the experimental results of research to develop ferrocement sandwich panels for use as wall bearing units. The proposed panels are lighter in weight relative to the conventional reinforced concrete panels. The sandwich panels consisted of two thin ferrocement layers reinforced with one or two layers of closely spaced galvanized welded wire mesh and expanded steel mesh. The core of the panel was made of light weight brick. Steel wires were used to tie the steel meshes of the two skin layers together and to act as shear connectors to transfer shear between the two ferrocement skin layers. These steel wires were embedded in the mortar joints of the brick. The thickness of the ferrocement skin layer was 10mm when single layer of wire mesh was used and 15mm when two layers of mesh reinforcement were used. Experimental investigation was conducted on the proposed panels. A total of 10 sandwich panels Having the dimensions of 600mm width and 700mm height were tested under compressive loadings until failure. The deformation characteristics and cracking behavior were measured and observed for each wall panel. The results showed that high ultimate and serviceability loads, crack resistance control, high ductility, and good energy absorption properties could be achieved by using the proposed panels. This could be of great construction advantages for both developed and developing counties.

Keywords: Ferrocement; Sandwich Panels; Deformation characteristics; Serviceability load; Ductility and Energy absorption properties; Cracking pattern; Ultimate loadings.
Effect of crumbed rubber Treatment method on the Flexural Behavior of High Strength Rubberized Concrete Slabs

Fatma M. Eid¹*, A. A. Bashandy ², M. A. Mazyad ³ and M. A. Arab ⁴

¹Fatma M. Eid, Associated prof., Civil Engineering Department, Minoufiya University, Egypt (E-mail: dr.fatmaelzahraa@gmail.com)
²Alaa Ali Bashandy, Associated prof., Civil Engineering Department, Minoufiya University, Egypt (E-mail: eng_alb@yahoo.com)
³Mohammed Ahmed Mazyad, Assistant lecturer, Civil Engineering Department, Thebes academy, Egypt (E-mail: mohammedmazayd79@gmail.com)
⁴Mohammed Abd El-Salam Arab, Assistant prof., Civil Engineering Department, Beni-Suef University, Egypt (Corresponding Author; E-mail: emarab@eng.bsu.edu.eg)

*Correspondence: dr.fatmaelzahraa@gmail.com, fatma_elzahraa2002@yahoo.com

Abstract. The most important research trends that the world is currently interested in are those that have a positive impact on the environment. The burning of the waste tyres is one of the most used means to get rid of these tyres, which causes a lot of gases to the air. The use of crumbed tyre rubber in concrete is considered one of the methods with a positive environmental impact. Using crumbled rubber as a partial replacement material of concrete aggregate is found to possess many engineering applications and holds promise within the future. Replacing 5% of the sand volume by crumbed tyre rubber was used. Flexural behavior of treated and untreated rubberized concrete slabs was investigated. Experimental program shows that the behavior of the high strength rubberized concrete slabs can be improved by the used treatment methods. Beside that the coarser of the rubber particles, the more negative effect on the behavior of the high strength rubberized concrete slabs.