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3RD INTERNATIONAL CONFERENCE on ENERGY & ENVIRONMENTAL PROTECTION in SUSTAINABLE DEVELOPMENT

بسم الله الرحمن الرحيم

رابطة الجامعيين

جامعة بوليتكنك فلسطين

Palestine Polytechnic University

المؤتمر الدولي الثالث للطاقة وحماية البيئة

في التنمية المستدامة

**The Third International Conference
on Energy & Environmental
Protection in Sustainable
Development**

ICEEP III
9-10/10/2013



مقدمة

تم انشاء جامعة بوليتكنك فلسطين سنة **1978** بمبادرة من رابطة الجامعيين لمحافظة الخليل بهدف خدمة المجتمع الفلسطيني بمجموعة من البرامج الأكاديمية المتميزة والتي تلبي احتياجات المجتمع ، وفي عام **1990** كانت جامعة بوليتكنك فلسطين المبادرة الى طرح برنامج الهندسة المدنية والمعمارية والذي يدرس الطلبة فيه عدد من المواد التخصصية التي ترتبط بالبيئة ، وفي عام **1999** تم انشاء وحدة خاصة تعنى في مجال البيئة وهي وحدة أبحاث الطاقة والبيئة ، وفي عام **2005** تم انشاء وحدة بحثية اخرى سميت وحدة أبحاث الإلكترونيات الصناعية والتي لها علاقة مباشرة مع أبحاث الطاقة. في عام **2001** تم عقد اول لقاء علمي في مجال البيئة في حرم جامعة بوليتكنك فلسطين تحت اسم اليوم البيئي الأول ، وفي عام **2007** تم عقد المؤتمر الاول في مجال الطاقة وحماية البيئة في التنمية المستدامة تم تلا ذلك المؤتمر الثاني في عام **2009** .

يمثل المؤتمر الدولي الثالث في الطاقة وحماية البيئة في التنمية المستدامة تجمعا للعلماء والباحثين والمهندسين العاملين والمهتمين في مجال البيئة ملتقى علميا هاما ليقدموا آخر انتاجهم وإبداعاتهم العلمية في مختلف مجالات الطاقة والبيئة ، كما ينظم على هامش المؤتمر معرض للصناعات الهندسية التي تركز على آخر الابتكارات العلمية والتطبيقات الهندسية في مجال الطاقة وتكنولوجيا البيئة.

وتحتضن مدينة الخليل هذا الحدث الدولي الهام في مطلع شهر تشرين أول من عام **2013** حيث تتمتع هذه المدينة في هذا الوقت بحلة خضراء من اشجار الزيتون وكروم العنب والتي تضفي على المدينة جوا لطيفا جدا متناغما مع تحديات البيئة . وتبعد مدينة الخليل حوالي **25** كيلومتر جنوب مدينة القدس وترتفع حوالي **1000** مترا فوق سطح البحر، وتمثل مركزا لمحافظة الخليل التي يبلغ سكانها حوالي **700,000** نسمة .



CONFERENCE OBJECTIVES

1. To bring together scholars, scientists, experts and researchers, decision makers, and other stake holders from private sectors in the one platform to discuss issues related to the energy and environmental protections in the sustainable development.
2. To introduce the latest advancement in the two fields.
3. To propose crosscutting issues relevant to both main topics that might also be added to integrate social, health and economical of the sustainable development.
4. To strengthen and enhance the reliability and availability of information and experience exchange on advanced and efficient technologies in both energy and environmental management issues.
5. To emphasize the issue of harnessing alternative energy resources, including renewable, to the domestic needs and to present the latest in the important field of technology.
6. To strengthen regional and international cooperation in fields of global concerns.
7. Exhibiting state of the art technologies related to energy and environmental production & exploitation.....

THEMES OF THE CONFERENCE

i. Energy

1. Energy Resources & Demand
2. Energy System & Networks
3. Energy Transport, Electricity & Fuels
4. Modeling of Energy Systems
5. Renewable Energy Resources & Technologies
6. Energy Auditing & Rational Use of Energy
7. Energy Systems and Planning
8. Energy Education

ii. Environment

1. Climate Change
2. Telecommunication & Environment & Environmental Systems
3. Air Pollutions
4. Environmental Systems & Planning
5. Environmental Education
6. Environmental Data & Information Management
7. Water Resources & Future Conflicts
8. Waste Water Treatment & Management
9. Solid Waste
10. Soil Contamination
11. Natural Resources Management

iii. Planning & Policies

1. Energy Policies, Planning & Economics
2. Environmental Protection & Policies
3. Environmental Policies, Planning & Economics.
4. GIS Techniques in Energy & Environmental Planning
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Title:

THE REALISTIC VIABILITY OF SOLAR PHOTOVOLTAIC AND CONCENTRATING SOLAR POWER

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Abstract

Solar energy is a form of renewable energy that is taking a hold in the current issue of creating clean, efficient energy for everyone without the use of natural resources. This paper looks in depth at the realistic application of such methods to renewable energy on both the large scale city wide implementation and, conversely, the private sector for individual energy needs through separate systems built into homes. Another key topic covered in this paper will be the technical aspect behind the power conversion of solar energy to electricity along with the complications that ensue, as well as the expense of the panels and accompanying systems versus the gain economically, both short term and long.

**Title: Opportunities for Energy Savings in Commercial Properties and luxury Hotels**

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Abstract: An energy conservation study was performed in "Intercontinental Bethlehem Hotel" by the engineering team of PEC (Palestinian Energy and Environment Research Centre) in cooperation with facility engineering department June-2011 . The study aims to obtain an overview of the existing building energy consuming systems that includes lighting, boilers, heating ventilating and air conditioning (HVAC), building control system, motor loads, chillers and refrigeration rooms. The study results and conclusions are examined throughout this study by analysing upcoming actual energy consumption data.

The study is designed to show most cost-effective ways to reduce energy use and costs, in hotel's operation by planning and managing energy programs, employing new technologies, and increasing of energy efficiency. The wide range of energy saving options applicable to commercial properties will be identified. The case study presented will illustrate the effectiveness of planning and managing energy programs.

The study also provides information about the technology options, including key references that will aid interested parties .Also it identifies what has been done so far towards making luxury hotels buildings more sustainable in terms of energy use, and what could be done to improve the buildings. Energy savings opportunities for the major energy consuming systems have been identified. Saving action plan that has a high saving potential was also included.

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**Title: Numerical Study of Performance of a Rectangular PCM Storage Unit****Maher Al-Maghalseh & Khamid Mahkamov**

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Abstract: This paper presents a three dimensional model for simulation of a latent heat thermal energy storage system (LHTESS). The LHTESS is in the form of a rectangular container with a central horizontal pipe surrounded by a phase change material (PCM). Paraffin wax with melting temperature of 60 oC is used as a PCM whilst water is used as a heat transfer fluid (HTF). Thermo physical properties of paraffin wax are assumed to be constant in the modelling process, whereas the density variation is handled by using Boussinesq model. Transient numerical simulations were carried out by using ANSYS/FLUENT commercial software. Simulations performed provide information on the instantaneous temperature distribution, solidification/melting dynamics and the velocities field in the storage unit during the melting process. The effects of the inlet temperature and mass flow rate of the HTF on the charging (melting) process were also investigated.

Keywords: PCM; thermal storage system; paraffin; solar energy

**Title: Comparison of Bus Voltage Configurations for a Residential Wind/PV/Battery Hybrid System Architectures****Aysar Yasin**

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This paper investigates the selection of optimal internal configuration of a stand-alone hybrid power system based on photovoltaic generator (PVG), wind energy generator (WEG) and battery storage system (BSS).

The configurations include high voltage DC bus (HVDC), low voltage DC bus (LVDC) and high voltage AC bus (HVAC).

Dynamic models are designed in MatLab/Simulink/SimPowerSys™ environment in order to study and compare the performance of each configuration. To this purpose some performance indexes are considered, such as: the global efficiency, fraction of energy driven from battery storage system to cover the load demand and fraction of energy delivered to battery storage system from renewable energy sources.

Abstract: The global efficiency of HVDC bus configuration is found the best while the global efficiency of LVDC bus configurations is the lowest. The fraction of energy required from battery energy system is the lowest in LVDC while the HVAC is the highest. The fraction of energy driven to battery energy system in LVDC bus configuration is the highest among the other configurations.

Sensitivity of performance indexes to seasonal load variation is investigated using three patterns of load profiles.

Keywords: Hybrid System, PhotoVoltaic Generator (PVG), Wind Energy Generator (WEG), Battery storage system (BSS), Stand-alone configurations.



Title:	POWER ELECTRONICS IN NEW AGE MILITARY AND DEFENSE TECHNOLOGIES
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Abstract

The events of 9/11 and, more recently, the bombings in Boston, Massachusetts, along with the global threat posed by rogue nations such as North Korea and other countries that have at least some nuclear capabilities, have reaffirmed the need for a strong nation defense that utilizes the latest technology to provide global stability. As these rogue nations become more and more technologically sophisticated, it is important for allied nations around the globe to invest in new power electronic technologies and advancements in the face of a growing threat of a nuclear confrontation that has become seemingly imminent. It is also necessary find new ways to confront an enemy that will rely more upon guerrilla style tactics. This provides a special challenge for engineers in the defense industry. This paper will focus on the use of power electronics in the defence industry and the innovations in new technology as a consequence of their need as it pertains to national defense.

Keywords: GPS, DC-DC convertors, DC-AC convertors, digital radio frequency memory (DRFM), frequency stability, boost regulators, MOSFET, insulated gate bipolar transistors (IGBT), DARPA



Title: Numerical Study of Natural Convection Heat Transfer in A PCM Rectangular Storage Unit with Horizontal Pipe

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Abstract:

A numerical investigation has been carried out to determine the heat transfer coefficient by natural convection during melting process of Phase Change Material (PCM) in Latent Heat Thermal Energy Storage System (LHTESS). The storage unit consists of a rectangular container with a horizontal pipe and PCM filled around the pipe. Paraffin wax with melting temperature 60 °C was used as a PCM in the investigation because it is appropriate for low temperature thermal storage applications. ANSYS/FLUENT software was used in simulating three dimensional models of temperature distribution, melting fraction, and flow fields during the melting process. The temperature variation of the PCM is presented as a function of time as well as the heat transfer coefficient as a function of the temperature difference. Numerical correlations were obtained, presenting the dimensionless Nusselt number as a function of the Rayleigh number for natural convection of PCM during melting process.

KEYWORDS: PCM; thermal storage system; paraffin; solar energy, natural convection.

**Title: Water Pump Behaviours Under Different Solar Irradiation Levels**

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Abstract: This paper presents the behaviours of three-phase induction motor driving centrifugal pump under various solar irradiation levels, where the motor speed and torque depend on the source voltage and frequency, while the water-flow rate depends on the motor speed, density, and static head according to affinity flow. Matlab/ Simulink model is proposed for studying the behaviours of these machines with respect to water flow capacity, motor current, electromagnetic torque, and motor efficiency. The proposed photovoltaic with maximum power point tracking model based on observation and perturbation (O&P) maximum power tracking model is applied. The output voltage is regulated throughout Buck-Boost converter with purpose maintaining the output voltage at predetermined values. Since Induction motors are widely used in pump systems, the electromagnetic torque, water-flow rate are studied for various source frequencies. Comparison analysis is conducted for both motors with respect to water flow-rate, heads elevation, and motor current. In addition to that, the proposed system presents PV-Grid Integrated model, where the power shortage required for normally operation of the pump is drawn from the electrical grid.

Keywords: Induction Motor; Matlab/ Simulink; Photovoltaic; Buck-Boost Converter; Electrical Grids; Centrifugal Pumps, Variable Drives.



Title:	Evaluating the Reliability Worth and Risk Assessment of Electrical Medium Voltage Network: Case Study
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Abstract: The objective of this paper is to develop methods for risk assessment of power distribution systems. The study is concerned with Medium Voltage (MV) network where mathematical method is presented. The degree of reliability of supply is measured by the frequency, duration and magnitude of disturbances to the electrical supply. Both system indices and system worth indices are calculated and evaluated. The ultimate goal of the study is to investigate the above method and to apply it to a test network to test its feasibility. A good test network would be a single representative section of a MV network. By identifying a method that works well on MV networks, it will be possible to gain deeper understanding of MV distribution networks and classify the circuit failure and risk. Furthermore, it will allow a more comprehensive understanding of network risk and the development of alternative ways to quantify network risk which can be applied to wide range of real distribution systems. On the other hand it can be used to predict how the system is expected to behave in the future as well as to investigate the possibility and advantage that could be gained by applying new automated technology to reduce customer outage and Total Network Risk (TNR), the benefits of alternate system design and reinforcement, expansions plans and the related cost worth benefit of the alternatives.



Title: GSM Control System Of An Open Area (Street) Lighting In Hebron/ Palestine Using Photovoltaic Energy Source

Authors: A. K. Daud , Sameer Khader
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Abstract: This paper presents the utilization of generated electrical power from photovoltaic solar panels in open area lighting with a modern GSM wireless control system. Open areas such as Al-Hesbah Street in Hebron which its lighting fixtures are supplied with 24V DC from Photovoltaic energy source. As the load will be fed during night and the main grid will not be utilized, long life deep discharge batteries will be used to store the generated electrical energy from the photovoltaic solar panels during the day time. Batteries charge will be controlled by 24V charge controller. Turning the Light Emitting Diode fixtures on and off and dimming them are accomplished by GSM. GSM is an open, digital cellular technology used for transmitting mobile voice and data services. It is a modern method in street lights controlling especially because of its ability to cover long distances. Particularly can be used by the municipalities and remote control centres .The system will communicate via the GSM network to a central computer to determine when the lights should be illuminated, how bright they should be lit based on ambient light levels, and to also dim the lights after dark when the areas have less traffic. Applying this technology to public lighting, energy savings would be incredible, as well as resulting in far less light pollution. If the Public lights were fitted with solar panels, making the system self- powering, the system will be more efficient. The whole system is controlled by using a PIC microcontroller.

Keywords: Photovoltaic; GSM; PIC Microcontroller; Street Lighting; LED Lamps

**Title:****Sustainable FPGA Controlled Hybrid LED illumination System Design****Akram A. Abu-aisheh, Sameer H.Khader, Ahmad Harb, & and Ashraf Saleem****Authors:**

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Abstract:

This paper presents a road map for the design and development of sustainable hybrid Field Programmable Gate Array (FPGA) controlled High Brightness Light Emitting Diode (HB LED) illumination systems where the FPGA can individually or collectively control an array of HB LEDs. Photovoltaic (PV) panels are used as the primary source of energy in this hybrid system while the electric grid is used as the backup source that supplies power to the HB LEDs only when the power of the PV system is not sufficient to supply all the system HB LEDs and the PV system batteries are depleted below the minimum level set in the system design.

The hybrid illumination system design presented here is an important link between the current AC-based illumination systems and the future sustainable DC-based solar illumination systems. Computer simulation is an important tool for future illumination system design and analysis, so it is presented in this paper to assist designers in analyzing different designs and in optimizing the one to be implemented.



Title: Design A Stand- Alone Generating System to Lighting Animal Farm Using Self Excited Induction Generator

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Abstract: This paper presents design a standalone generating system to lighting animal farm. The proposed idea in this paper is using three-phase self excited induction generator (SEIG) to lighting animal farm with single phase network and fixed load. A modified Steinmetz connection and symmetrical component theorem are used to reduction the unbalance effect in the coils of the SEIG.

A conventional induction machine can be operated as a self-excited induction generator if it is driven at a suitable speed and equipped with suitable excitation capacitors. Squirrel cage induction machines are usually implemented to generate electrical power from renewable energy resources, such as wind energy and biogas energy. Since most of the loads fed by the Pico and Micro power systems are single-phase loads, a single phase source is preferred over three phase source. This is because a single-phase source is cheap, require less maintenance and it need simple protection. However, single-phase induction machines can be operated as a single-phase SEIG, three phases SEIG is cheaper, have better efficiency and more readily it is available at high power rating; greater than 3kW. The use of three-phase SEIG for supplying single phase load is an extreme case of unbalanced operation. The inherent phase imbalance leads to poor generation performance, such as over current and overvoltage, poor efficiency, excessive temperature rise and machine's vibration. These undesirable effects can be alleviated to a large extent by the use of suitable excitation capacitors in modified Steinmetz connection.

Keywords: *Three-Phase Self-Excited Induction Generator (SEIG); Modeling; Biogas Generating System; Lighting Animal Farm; Matlab/ Simulink; Single-phase power generation.*

**Title:****Fuel Quality Implications on Combustion Engines in the West Bank Area of Palestine****Mohammad Karaeen & Imad Khatib**

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Abstract:

Demand on automotive fuel has been growing in the last two decades in Palestinian areas due to the expansion of urban areas from one side and the emerging of the Palestinian Authority (PA), which has established institutions and drafted legislations that encouraged open market with the assistances provided by the donor countries. Nearly, more than 30% of ground private and public transportation means are considered new. Local automotive dealers and agencies are claiming that engine and exhaust systems' failure are due to the properties of the imported fuel; mainly diesel and gasoline (95). With the absence of regular monitoring on the imported fuel, an investigation is carried out to identify the relevant automotive fuel properties and comparing them with the standard index. The investigation is also carried out on the comparison of imported fuel with similar fuel sold in fuel stations in the occupied Jerusalem. This investigation has been carried out using sample collection and testing in accordance to ATSM relevant series. Results showed that nearly all collected samples agree to some extents with the standards identified by EURO 4, with the exception of diesel fuel samples' heat content properties that showed considerable deviation of all samples from the international index.



Title:

**Environmental, Energy and Economical Impacts of Replacing Industrial Vapour
Compression Chillers by Solar Fired Absorption Chillers**

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Abstract:

This article represents a study of the impacts of using renewable techniques employed in absorption refrigeration instead of ordinary vapour compression refrigeration on industrial energy consumption in chilling plants in Palestine. The study has been done by calculating collected solar energy via available spaces to drive solar cooling system, calculating all energy requirements to drive both systems according to related standards, and comparing both at scale of 100 TR cooling capacity. It has been found that solar cooling system equipped with industrial steam load compensator can save 50% of CO₂ emissions, and 28% of running cost and energy consumptions as per Palestine State related data.

Keywords: *Vapour Compression Chiller; Absorption Chiller; Evacuated Tube Solar Heating Array; Energy Consumption.*

**Title:****Anaerobic Digestion of Several Biomasses and New Strategies to Treat the Organic Fraction of Municipal Solid Waste for Biogas Production****Michele Pognani*, Giuliana D'Imporzano and Fabrizio Adani**

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Abstract:

The biogas plants at farm level are good candidates for treating organic residues of both municipalities and the agro-industrial sector in a cost-effective way, and in providing territorially diffused electric and thermal power. Industrial and agro-industrial by-products and residues, animal manures and various types of organic wastes (i.e. source separated organic wastes, lignocellulosic materials, crop residues, vegetable oils, animal fats, protein-rich waste, pre-digested wastewater sludge, animal slurries and manures, waste paper, household waste) were analyzed to evaluate their suitability as substitutes for energy crops in biogas production. Swine manure is always included as a basic substrate in the feeding mixtures, because many of the Italian biogas plants are connected to farms when the organic fraction of municipal solid waste (OFMSW) and olive oil sludge were used as possible solutions such as glycerine from biodiesel production.

Anaerobic co-digestion of a variety of residual biomasses may be a good integrated solution, particularly with wastes that are unsuitable for direct disposal on land. Thus, the substitution or integration of energetic crops with this type of residual biomass in biogas production would allow more independence to the biogas plants from public support, aid in cost reduction, biomass recycling, and fuller integration between agrarian and industrial sectors.

Modern anaerobic digestion (AD) plant treating OFMSW in liquid or dry condition could be suffering from accumulation of high concentration of volatile fatty acids during the initial stage of anaerobic digestion subsequently affect the methanogenic stage in single stage anaerobic reactors. Therefore, two-phase anaerobic digestion systems were developed to permit different bacterial enrichment in two different reactors by providing optimal growth conditions for initial acidogenic and later methanogenic. High investment costs and more complex management characterize this installation. In order to accomplish the phase separation a hybrid bioreactor was designed and applied on pilot scale for treating OFMSW. Hydrolysis was performed in solid condition using liquid recirculation; the percolate is submitted to AD process showing a high methanogenic performance and stability of the process respect standard technologies applied at full scale. Costs are reduced due to its simple design, easy process control and low investment cost than a two stage AD plant.

**Title:****Climate Changes and Trends in Rainfall and Temperature of Nablus Meteorological Station****Authors:****Sameer Shadeed**Water and Environmental Studies
Institute/An-Najah National University
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sshadeed@najah.edu**Abstract:**

The available water resources in the West Bank, Palestine are limited and insufficient to meet the domestic and agricultural water demands. The climate in the West Bank is dominated by a high temporal and spatial variation. The characterization of climate changes in the West Bank is a preliminary step to assess the status of the water resources in terms of utilizable quantities. This will enable the development of an integrated framework to manage these resources. Rainfall and temperature magnitudes and patterns are of great importance to understand the climatic changes and trends in the West Bank. This characterization enhances the management and development of the water resources under climate change conditions. As a first step, a trend analysis of long-term rainfall and temperature data for Nablus Meteorological Station (NMS) was carried out. Nablus city has a Mediterranean semi-arid climate which characterized as hot and dry in the summer, mild and wet in the winter. This paper employs the fundamental statistical concepts and trend analysis to characterize rainfall and temperature data series for the period from 1975 to 2011 of NMS.

In the analysis of rainfall, it was proved that rainfall of NMS is of high variability where the annual rainfall approximately varies between 335 and 1,400 mm with an average of 654 mm. The overall trend of rainfall is towards a wetter climate, with an estimated increase of about 48 mm in the entire studied period. Two period, averaging 600 mm and 697 mm respectively were detected from fluctuation in rainfall. The trend of the first period (1975-1991) is towards a drier climate, whereas the trend of the second period (1992-2011) is towards a wetter climate. Time series of the SPI depict that in 21 out of 36 years there was a drought in Nablus city while extreme drought did not take place during the last 36 years.

In the analysis of temperature, the temperature variability among years was proved, with a standard deviation of 0.8 °C and average of 18.4 °C. The annual mean temperature changes of NMS are characterized by a warming trend. Since 1975, there has been an increase in the annual mean temperature of about 1.8 °C/36 years (≈ 0.05 °C/year). The use of cumulative deviations detected two main periods in the temperature of Nablus city. A relatively cool period from 1975 until 1992 has been followed by the warm period on record from 1997 to present.

It was concluded that the changes in climate of NMS are considerable and largely affect the sustainable yield of the water resources in the West Bank.

Keywords: Climate changes; Rainfall; Temperature; Trend Analysis; Semi-arid; Water resources.



Title:

A Comparative Survey of Environmental Education Goals Between the UNESCO Framework and 10th Grade Palestine Curriculum

Authors:

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Abstract:

The present research, being one string of the Environmental Education (EE), aims to study, and analyze EE objectives in the Palestinian 10th grade textbook from an international point view , namely : to conduct a comparative survey of environmental education goals between the UNESCO framework and 10th grade Palestine Curriculum. To achieve this aim, the researcher refers to the UNESCO framework as a standard tool of EE, then analyzes the Palestinian 10th grade textbook in light of this tool.

The finding of the research indicated that there are partial consistently between the UNESCO EE, and Palestinian 10th grade textbook in two levels of objectives (2 and 3), while there is no match on the other two levels of objectives (1 and 4), on the light of these finding the researcher recommends to policy makers , and the Palestinian writing team of the Environmental Education Curriculum to reform objectives on the light of international trends toward Environmental Education.

**Title:****Effects Of The Thickness Of Block Cutting Machine Gang Saw On Waste Percentages And Productivity****Authors:****Jawad Alhaj**Marble and Stone Center,
Palestine Polytechnic University
00972, Hebron, Palestine
Jawad-alhaj@ppu.edu**Abstract:**

This paper aims at studying the stone waste percentages generated from cutting stone blocks into slabs using stone block cutting machine (Gang Saw). This type of stone waste is in the form of powder (fine stone particles) mixed with cooling water and converted to mud or slurry.

Practical data for the Input (stone blocks) and the output (stone slabs) for this machine was collected from different stone companies in Palestine as random sample. Statistical analysis was carried out for these data related to the thickness of stone slabs. The practical results were investigated, calculated and compared with the ideal values, (ideal values were calculated theoretically for one cubic meter of stone block with dimensions of one meter length, one meter width, and one meter height).

This study shows that, there is inverse relation between the cutting thickness of the gang saw (which equals the thickness of produced stone slabs) and the volume waste percentages and productivity (area of stone slabs produced in square meters per one cubic meter of stone block). Also, the volume waste percentages fluctuate around the ideal values which are 26% for 2cm, 19% for 3cm and 22% for the mixed 2&3cm thicknesses.

**Title:****WASTE MINIMIZATION THROUGH HEAT RECOVERY – A CASE STUDY FOR HEBRON CITY****Authors:****Imad Khatib & Mohannad Nassar**

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Municipal solid waste generated in a large Palestinian city showed high potential recovery. It has been found that organic food waste composed of more than 60% of the generated municipal solid waste while combustible waste streams constitute 80% of the total generated wastes. These figures indicate what potential waste recovery should be used. Recovery of waste is needed not only for the environmental importance it constitute, but also to mitigate the challenges facing development in Palestine in the persistence status-quo resulted from the occupation measures. Unjust occupation measures adversely affect the availability of land, the natural resources and future energy status. In that sense recovery solution addressing these challenges necessitates that while minimizing the generated waste streams, potential recovery must assess tackling the re-use of waste streams either for composting; thus increasing cultivated lands, and/or heat recovery of compostable wastes for energy conversion. Work done on assessing heat recovery showed high recovery potential of combustible waste streams. In the framework of the work done, experimental results of measured heat content in each combustible waste stream, and that of mixed streams showed high recovery potential. Potential for composting and for energy recovery are both worth extra thorough investigations from the technical, financial and possible environmental risks point of views



Title: Isolation of Two Pathogenic Serovars of Salmonella from Municipal Solid Wastes at Yatta Landfill, WEST BANK, Palestine

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Landfill sites are potential bio-hazards as pathogenic microbes may find their way into water sources and, via agriculture or direct contact with humans, re-enter the human food chain. We found, in a previous study of municipal solid waste (MSW) arriving at the Yatta landfill site, which serves the Hebron and Bethlehem directorates, that food waste and faeces, from closed baby diapers, were found to contain Salmonella in abundance from all of the 9 source villages and towns surveyed¹. However, as the pathogenicity of Salmonella varies greatly depending on the exact serovar, and as some of the known serovars do not cause disease in man, a follow-up study was performed to characterize the Salmonella sp so as to provide a basis for better assessing the environmental health risk of these organisms in the MSW.

In this study, we report the use of microbial selection and isolation, along with molecular techniques to provide species and serovar assignment of the Salmonella sp from solid waste samples, taken from the Yatta landfill site in order to better assess the degree of risk posed by the Salmonella in local MSW to humans.

Abstract:

Salmonella was successfully isolated on XLD agar plates from 11 different samples of food and feces from 6 distinct regions of Hebron and Bethlehem. A portion of the *invA* gene of each of these was amplified by PCR and sequenced. All the sequences were variants of two serovars: 9 were Salmonella enterica serovar Heidelberg and two were serovar Newport. Both of these serovars, and especially Heidelberg, have been implicated as important causes of public health concern throughout the world.

We conclude, therefore, that pathogenic serovars of Salmonella are widespread in the districts of Southern Palestine and are surviving in solid waste arriving at the landfill site, which thereby presents a hazard to refuse pickers and other workers on the landfill site, as well as the wider environment through leachate or the clothing of solid waste workers.

Keywords: solid waste; municipal solid waste; Salmonella; bacteria; Environment; public health; food waste; faeces



Title:	Bioremediation Of PAHs-Contaminated Soil Under Anaerobic Methanogenic – Conditions
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Tahseen Sayara

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Abstract: In this research, the degradation of polycyclic aromatic hydrocarbons (PAHs) including Flourene, Phenanthrene, Anthracene, Flouranthene and Pyrene with concentrations simulating a real creosote sample was investigated under anaerobic methanogenic conditions, where thermophilic (55°C) temperature regime was applied. The impact of PAHs concentration and soil to inocula mixing ratio on the process performance of the PAHs removal and the biogas production were systematically studied through central composite design (CCD) technique for 30 days. During this incubation period, PAHs concentration decreased in all treatments indicating that the applied inocula were able to degrade the contaminants, where about 80% degradation rate was achieved. Nevertheless, an inhibition effect was initially observed regarding the biogas production as a result of the PAHs toxicity. However, this inhibition was gradually decreased with the incubation period as the inocula got more adapted with the available environment.

**Title:****Automobile License Detection System and Impact on Environment and Improvement of Human Life Quality****Osama Wadie Ata, Abdallah Abu Munshar, Ahmad Saad & Mohammed Najjar****Authors:**

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Abstract:

We built a wireless system called Automobile License Detection System (ALDS) to alleviate the traffic congestion problem with a potential to directly impact the environment and noise pollutions. It will not fully remedy those pollutions but will help in reducing them, if the system is used effectively. Using the GPRS technology in the cellular network, a barcode of the two dimensional type can be fixed on the side or front windscreen inside the vehicle which holds all its data information. The barcode data is read by a barcode scanner utilized in a smart phone carried by a policeman, which transmits the data back to a computer server, held at the traffic department. The server that searches its database for the particular car retransmits the carried information that includes registration, vehicle type, offences and legal ownership to other policemen, in the area; carrying security accessed smart phones for a possible necessary action. The system has also a potential to send a traffic offence ticket to the vehicle owner's address, as a further convenience adopted in advanced countries.



Title:	Effect of Rubber and Leather Wastes on Concrete Properties
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Abstract

There are different types of rubber and leather wastes generated as byproduct material during manufacturing processes. This research is an attempt to investigate the effect of shredded and crumb rubber from car tyres and leather wastes on the properties of fresh and hardened concrete. The variables of the research are the type and percentage of waste material and curing time of concrete. Waste percentages used were 5%, 7% and 10% by weight of cement in the concrete mixture. Several tests were conducted on the fresh and hardened concrete with rubber and leather wastes, such as workability, compressive strength, indirect tensile strength, and natural absorption.

Results have shown that the compressive strength and indirect tensile strength of concrete decreased with increasing the contents of rubber and leather waste. The workability of fresh concrete increased by increasing leather waste with maximum value of 13.5 cm at 10% of leather waste. At 5% of rubber the workability was higher than concrete alone, but with increasing the percentage to 10%, the workability decreased to about the same value as of concrete alone.

Keywords: Industrial waste, rubber, leather, concrete properties



Title:	Exposure Level Assessment Study of High Frequency Radiation from Hebron Two-Way Radio Tower
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Abstract
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A study of the Hebron two-way radio tower in Halhul, which is part of the two-way radio network that links Bethlehem tower in the West Bank to Khan Younes tower in Gaza strip, was conducted. Hebron Tower was built over the highest spot in the region, 1027 m above the sea level. Analysis reveal that the power density of 226 mW/m², in the constant near field region that extends to 4.66 meters from the antenna surface, falls below the MPE threshold safe levels at $f = 422$ MHz, as per FCC and ICNIRP guidelines. The maximum power density in the far-field that starts at 11.18 meters works out to be 94.2 mW/m²; 3.4% of the designated MPE by FCC Standards and 4.5% of the designated MPE by ICNIRP Standards, which degrades in proportion with $1/R^2$ (R is the propagation distance). Measurements of signal power was conducted for Hebron tower and compared to various other transmitting towers seen from the area. Analysis reveal that power densities of all towers are invariably safe and their power densities fall below international safe standards. Results show that power densities from Orange cellular tower, 3500 m away and Marah radio tower, 2350 m away from Hebron tower were indeed higher than all others measured, when all power densities were referenced back to 30 m of their respective tower antenna positions. It is worth mentioning that FCC sets an average time of 30 minutes for public exposure to its safe limits and astonishingly no time periods for power densities less than the set thresholds. As far as the Hebron tower is concerned, its height of 111m provides a relative safe umbrella, from electromagnetic radiation hazard, away from the main radiation beam, over the area below it. However the real risk appears from a lack of genuine mesh grounding with ground inserted metal rods, round the tower base, together with the lack of required bonding along the tower

**Title: OPTIMIZATION OF WATER SUPPLY NETWORK FOR NABLUS MUNICIPALITY**

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Abstract Water supply of a city is very vital for inhabitants living in it. Effective management of water supply resources is of great importance due to shortage of these resources and the increasing pressures resulting from demographic and/or economic growth and ecological deterioration. Water distribution and storage allocation need to be carefully examined in order to satisfy water demands while minimizing the various types of associated costs. Technical and financial constraints compel the motivation to optimally manage the water supply network (WSN). Nablus city has many limited water resources that have to be optimally managed within a well-controlled system that collects, analyzes, and optimizes data for each demand node through the entire WSN. In this study, we model the drinking water distribution and allocation/usage problem over the entire WSN of Nablus city using Linear Programming (LP). We then optimize the model seeking for optimal water distribution and allocation/usage policies which maximize water availability and minimize the total incurred costs in the supply network. Such optimal policies will aid decision-makers at Nablus municipality in their short-, medium- and long-term planning to secure sufficient quantities with proper qualities of drinking water and to bridge the current and forecasted water supply-demand gap while keeping their technical (capacity) and financial constraints within their feasible limits. Initial solutions of the model resulted in better distribution and allocation policies compared to the current policies adopted by the Nablus municipality. Specifically, the new optimal policies resulted in 35% savings in water pumping costs in the WSN.

Keywords: urban water supply network, linear programming, drinking water, water allocation and usage policy.



Title:

TOWARDS A SUSTAINABLE BUILDING INDUSTRY IN PALESTINE

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Abstract:

Construction plays a vital role in economic growth and development, but it is also important in terms of satisfying basic physical and social needs, the first of which is shelter. However this sector is consuming a considerable amount of energy (US Buildings Account for 40% of Energy and Materials Use)[1]. On the other hand buildings are contributing activity in environmental pollution, due to the great dependence on conventional machines, material industry and transportation, in addition to the large quantity of wastes produced from the construction of building s, structures and infrastructures. A framework for the sustainable construction was created by the Agenda 21.

The main goal of the paper is to make an assessment of the current building practices concerning energy and resources. It also sheds light on the agenda 21 for sustainable construction in the developing countries, and finally applying the agenda 21 model to adapt the sustainable building through the whole life cycle within the Palestinian context. The model focuses on creating new value system enablers that is supported by technological and intuitional enablers in order to address the sustainable construction process.



Title:

دراسة مسحية لمحارق الخردة (الطقش) في جنوب الخليل (مناطق أذنا، دير سامت، بيت عوا)

Authors:

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Abstract:

تستعرض هذه الدراسة ظاهرة حرق الخردة (الطقش) في قرى أذنا، دير سامت، بيت عوا، حيث يتم إدخال كميات كبيرة من الخردة (الطقش) من داخل المناطق المحتلة عام 1948م إلى القرى المذكورة بهدف حرقها واستخراج بعض المعادن منها مثل الحديد والنحاس والألمنيوم وإعادة بيعها داخل المناطق المحتلة مقابل الحصول على المال.

اتباع المنهج الوصفي لدراسة هذه الظاهرة من كافة جوانبها، حيث تم عمل مسح شامل لمعظم المحارق الموجودة في تلك القرى والبالغ عددها (54) محرقاً. وتم جمع البيانات من مصادرها الأولية باستخدام أداتي الملاحظة المباشرة لتلك المحارق والمقابلة الشخصية للأشخاص القائمين عليها، وكذلك تم سحب عينة قسدية بلغ عددها (148) مفردة تمثل سكان المناطق المجاورين لتلك المحارق والتي لا تبعد مساكنهم مسافة 50م عن تلك المحارق.

أشارت نتائج الدراسة بوجود ضرر مباشر من جراء تلك المحارق على صحة السكان المجاورين لها حيث تبين أن 28.5% من الأشخاص المبحوثين مصابون بضيق التنفس و17.5% مصابون بالحكة والتهاب الجلد، و13% منهم مصابون بأزمة قلبية، هذا بالإضافة إلى تلوث الهواء والتربة، ووجود آثار سلبية على الحيوانات والنباتات، في حين كانت هذه الأعراض غير موجودة بشكل شبه كامل قبل وجود هذه المحارق.

وأخيراً خلصت الدراسة بمجموعة مقترحات تتمثل بزيادة الوعي البيئي حول مخاطر هذه الظاهرة، وضرورة تكامل كافة الجهود الرسمية والمحلية ومؤسسات المجمع المدني للحد منها ثم التخلص منها نهائياً، وذلك من أجل المحافظة على بيئة صحية آمنة وخالية من التلوث.

مصطلحات: خردة (طقش)، بيئة، أمراض مهنية، تقييم أثر بيئي، سنا متطايير.



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