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Trends in a tiny parabolic solar collector's use in agriculture during periods of inactive sunlight

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ABSTRACT-
The mode of operation of mini parabolic solar panels made of germanium, mild steel, and aluminum are investigated experimentally, as a means of providing heated water on farmland; the process is also modeled. Angular adjustments of the solar collectors from 70-90° are adopted in order to determine the material of construction for the parabolic solar collector and the angular orientation with the highest heat collection tendency and absorption rate. The highest quantity of adsorbed heat/best heating effect of the solar collector is obtained at an angular orientation of 80° for mild steel and aluminum. It is also observed that the parabolic solar collectors have optimum exposure time, after which the heating rate drops, or there is loss of heat from its surface. The experimental and model estimates, in terms of heat absorption for the mild steel solar collector at 70 and 90° angular tilts, shows that the optimum heating time is 40 min while at 80°, it is found to be 50 min.

1. Introduction

The use of heated water in a farm serves sterilization of equipment, cleaning animal hutches, and washing fruits and vegetables alongside processing milk products as well as administering drugs in the poultry [1]. In most site locations in developing countries, the application of electrical heating for farming is very minimal. Most farmers use liquefied propane (LP) or natural gas to heat water for agricultural applications. However, the disadvantage of the former is the likely increase in the release of carbon dioxide (CO_2) into the atmosphere. The continuous burning of this fossil fuel has caused a drastic rise in the earth's atmospheric CO_2 level by more than 25% over the past 150 years. The second disadvantage of the use of LP or natural gas for water heating is that they are non-renewable sources of energy, meaning that, they are limited in availability and could cease to exist after a period of time.

In recent times, farmers use heat recovery units, waste oil burners, solar, and/or geothermal energy to heat water and provide supplementary water heating. However, the prospects of waste oil burners and geothermal energy are limited by

Deep beam calculations using several international codes

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Abstract

A deep beam is a structural member whose behaviour is dominated by shear deformations. Until recently, the design of deep beams per U.S. design standards was based on empirically derived expressions and rules of thumb. For structural members exposed to public view or environmental elements, the serviceability performance of the structure is arguably as significant as its strength. Typically, the serviceability performance of reinforced concrete deep beams is quantified by the width and spacing of diagonal cracks that form under the application of service loads. In design, diagonal cracking in service can be limited by comparing the cracking load to the service load and adjusting the section as necessary. Also, web reinforcement can be provided to restrain the width of diagonal cracks if they do happen to form in service. Currently, the minimum web reinforcement provisions in various design specifications are inconsistent and in general, do not address whether the required reinforcement considers serviceability demand as well as strength demand. In this paper, the design of deep beam has been carried out using three codes namely the Indian standard code, the American Concrete Institute code and the Construction Industry Research and Information Association code. The results have been obtained on the various designs that have been done based on these methods and they have been tabulated and the graphs plotted.

Keywords — *ACI, CIRIA, IS Code, Deep Beam, Shear.*

1. Introduction

A deep beam is a beam having a depth comparable to the span length. Reinforced concrete deep beams have useful applications in tall buildings, offshore structures, and foundations. The transition from ordinary-beam behaviour to deep-beam behaviour is imprecise; for design purposes, it is often considered to occur at a span/depth ratio of about 2.5. The importance of the shear-span/depth ratio and for buckling and instability the depth/thickness ratio are very important. In practice, engineers typically encounter deep beams when designing transfer girders, pile supported foundations, or bridge bents. Until recently, the design of deep beams per U.S. design standards was based on empirically derived expressions and rules of thumb

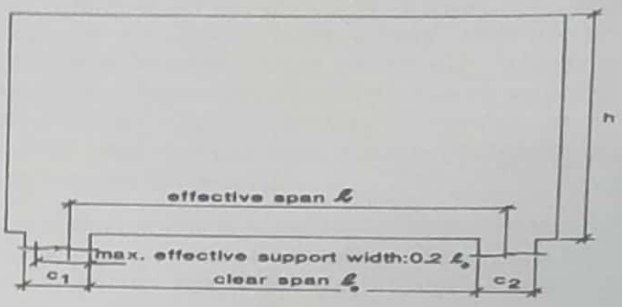

Fig.1: A typical cross section of deep beam.

The structural design standards, AASHTO LRFD (2008) and ACI 318-08, adopted the use of strut-and-tie modelling (STM) for the strength design of deep beams or other regions of discontinuity in 1994 and 2002, respectively. Based on the theory of plasticity, STM is a design method that idealizes stress fields as axial members of a truss. The primary advantage of STM is its versatility. It is valid for any given loading or geometry. However, the primary weakness of STM is also its versatility. The freedom associated with the method results in a vague and inconsistently defined set of guidelines. Because of the lack of a well-ordered design process, many practitioners are reluctant to use STM.

For structural members exposed to public view or environmental elements, the serviceability performance of the structure is arguably as significant as its strength. Typically, the serviceability performance of reinforced concrete deep beams is quantified by the width and spacing of diagonal cracks that form under the application of service loads. In design, diagonal cracking in service can be limited by comparing the cracking load to the service load and adjusting the section as necessary. Also, web reinforcement can be provided to restrain the width of diagonal cracks if they do happen to form in service. Currently, the minimum web reinforcement provisions in various design specifications are inconsistent and in general, do not address whether the required reinforcement considers serviceability demand as well as strength demand. Hence, another goal of the current research project is to improve the serviceability design provisions for deep beams by recommending an appropriate amount of minimum web reinforcement

Different Operating Systems' Effects on the Decision-Making Process

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Abstract—The diversity of operating systems offer users more options to choose. The point of this study is to understand the aspects that affect the decision with respect to user's background and what core factors drive their choice of operating system. There are five elements that need to be considered before making a decision. The following factors and model were developed based on literature reviews on convenience, capability, security, interface, and recovery. Those elements and model provide rich prospective on acquiring an operating system for an organization based on surveys and analysis. The market is affected by customer satisfaction. Meeting consumer needs is a way to improve business and they can be met through many aspects such as education, prices, simplicity, support, and security. We evaluate the factors, and mention several minor causes based on people's motivation and company philosophy. Reading the result, which lead people's choice of operating system, and suggest some ideas to help normal users to understand the point of view from the designer's perspective about the operating system. Manufacturing policy and market influence contribute to operating popularity and spread. The paper represents a general view about the most famous operation system, taking into consideration both advantages anddisadvantages.

Keywords—*Operating System (OS); performance; security; interface; capability.*

1. Introduction

An operating system is software which has a wide range of definition and is considered as a bridge between human command and hardware response. In layman's terms, an operating system may best be summarizes as the spirit and mindwhichmakesobjectsmadeofsiliconandwirecomealive on the screen. It can be as basic as software interacting with simple hardware installed in kids' toys. What complicates operating systems is that it has the capability to respond to human command which is called intelligent operating [1]. Since there are many operating systems invented to perform certain tasks, our paper focuses on operating systems which work on computers, whether it is a personal computer or a mainframe computer[2].

There are many operating systems developed in the world; some of them are for private at home or school, some are for government use, such as in the military, while others are distributed in the marketplace on a wider scale for businesses. The most well known released operating systems are Window, Mac, UNIX, and Linux. Users pick out the operating system they want based on experts' recommendation, their background experience, and their needs [3] .

Operatingsystemsarecategorizedinmanysublayersdueto the provider. As a consequence, each operating system has a strong and weak side which makes it unique and diverse; these minute elements of diversity distinguish them from their competitors. However, many elements play a major role that affect people's denervation. These factors generally include: user-friendliness, cost, support, confidentiality, integrity, capability, and availability[4].

I. RESEARCH METHOD

Research papers are assessed based on the source of information. University of Bridgeport provide its members whether, they are faculty members or students, access to thousands of digital resources via digital library [5]. Digital libraries have permission to access a collection of articles, journals, and books which gain access to secure databases, such as IEEE Xplore, ScienceDirect, and Routledge Encyclopedia of Philosophy. The academic needs of students and faculty are taken into account when considering which databases to purchase rights to and, then, make accessible to the University's population [6] .

This method of research has led to a precise understanding about comprehensive factors behind people's decisions toward an operating system after analyzing data according to technique suggested by LePine [7]. This paper represents the new vision-inspired user based on evaluating the elements according to Irani's example [8].

Managing Change and Resistance: A Study

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Abstract

For endurance and succeed change is compulsory. Without change no general public can create. In any event, realizing this the individuals is protection from change. To discover the reason for obstruction and how it tends to be overseen is the motivation behind this examination. The creators directed an essential examination by taking the interminable perspectives from 100 respondents of chief and non-leader classifications. The creators have considered different factors, for example, experience, instruction, laborers cooperation, and so on This paper closes the primary driver for the protection from change..

Keywords: Change management, Climate, Mankind, Resistance, Strategy.

1. Introduction

Change concerned with making things different. From womb to tomb change is our constant companion. Mankind noticed the ever presence of change centuries ago. Change is the process, tools and techniques to manage the people side of change processes, to achieve the required outcomes, and to realize the change effectively within the individual change agent, the inner team, and the wider system which includes the organization. (Nandeshwar, R.L (2007). Change is beneficial process for the human beings, even though why the people are easily not accepting any change, to know the reason is the foremost purpose of this study.

2. WHAT IS CHANGE MANAGEMENT?

'Change management' is a strategic activity aimed at getting the best outcomes from the change process. Making the connection between 'strategy' and 'change management' Mitchell (2002), in a review of effective strategy-making and change management for high-performing VET organizations, describes strategy as "making choices about which customers to focus on, which products to offer, and which activities to perform", and describes it as "a dynamic and ongoing activity". Strategic management is about identifying, choosing and implementing activities that will enhance the long term performance of an organization. 'Change management' is about managing the changes that are part of or a consequence of that strategy in such a way "to suit the particular organizations context and the type of change required". Change management is a sub-set of Strategy making.

2.1 PURPOSE OF CHANGE

Change is very essential for survival. Change plays an important role for development and growth of society as well as nation as a whole. We cannot predict the change as the need for change often is unpredictable; it tends to be reactive, discontinuous, ad hoc and often triggered by a situation of organizational crisis (Burnes, 2004); De Wit and Meyer, 2005; Luecke, 2003; Nelson, 2003). Although the successful management of change is accepted as a necessity in order to survive and succeed in today's highly competitive and continuously evolving environment (Luecke, 2003; Okumus and Hemmington, 1998), Balogun and Hope Hailey (2004).

3. METHODOLOGY

Selected three organizations randomly, one each from manufacturing, service and administration, collected data by distributing the questionnaire fifty each. Out of that only 100 responded on segregating it is known that 60 and 40 executives and non-executives have put their views against each question asked for the purpose.

3.1 ANALYSIS AND INTERPRETATION

For our study we have considered the individual and organizational factors for resistance to change. Under individual factors we have taken experience, social consequence, participation. Under the head of organizational factors sufficient resources, structure, climate,

An analysis of the air-driven engine's design

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Abstract

The excess exploitation of natural resources (especially in our contexts diesel and petrol) is the major cause of concern in the world. In the normal design engine diesel, petrol and natural gases are being utilized. It is also a fact that these natural resources are not unlimited and there is a need to maintain their exploitation for future. It is challenge for the scientific and the technical individuals to comment with certain fuels other than the above so that the available limited source of our natural resources are maintained. Keeping in the view above social responsibility, the following options are available-

- Naturalair
- Bio diesel
- Solarenergy
- Water

Keeping in the view the various pros and cons of the above, it has been decided to work with natural air due to abounds availability in the nature. The air driven engine may be the point of research. Air driven engine may help to reduce the demand of conventional fuels.

Thus the objective of this research is to design & modify the four stroke petrol engine into the compressed air engine by modification in the cam lobes and also evaluate the comparison of economic characteristics between compressed air engine four stroke SI engines. By experimental investigation it is found that compressed air engine can run per kilometre at expense of 60 to 70paisa.

Keywords: *Compressed air driven engine, Investigation, Cam.*

1. Introduction

It is very known that conventional fuels such as diesel and petrol are the main sources of energy for internal combustion engine but these are increasingly consumed. Continuous consumption of conventional fuels may cause huge problem of scarcity of sources of energy. Depletion of these fuels has led researchers to anticipate the need to search the alternative way to drive the vehicles. Present work utilizes the air as a alternative of petrol or diesel. As we know that air is non polluting and freely available in nature.The

Emission Characteristics of Vegetable Oil-Powered C.I Engines

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Abstract- The substitute to diesel fuels desires to be theoretically and environmentally adequate, and economically viable. Vegetable oil is one of several alternative fuels designed to extend the efficacy of petroleum, the flexibility and cleanliness of diesel engines. In this paper comparative experiments were carried out to measure the carbon monoxide, hydrocarbons, carbon dioxide and oxides of nitrogen emission level on Diesel engine with SCR technique using diesel fuel and Biodiesel blends of Jatropha, Pongamia and Neem (J20D80, P20D80 and N20D80) and the emission characteristics were analyzed. The results from the experiments prove that vegetable oil and its blends are potentially good substitute fuels for diesel engine in the near future when petroleum deposits become scarcer. The smart technologies deliver benefits to multiple interests, including an improved economy, and a positive impact on the environment and governmental policies. Continuous availability of the vegetable oils needs to be certain before embarking on the major use of it in I.C. engines. Domestically produced vegetable oil will help to reduce costly petroleum imports and the development of the vegetable oil based bio-diesel industry would strengthen the rural agricultural economy of agricultural based countries like India.

Keywords- Vegetable Oil, Biodiesel, Emissions, Catalyst, Diesel Engine.

1. Introduction

The idea of using vegetable oils instead of diesel fuel is not new and goes back to at least 1928 [2]. The concept was dropped due to cheap supply of petroleum-based fuels. The environmental concern, 1973 oil embargo and depletion of conventional sources have prompted research world-wide into alternative energy sources for internal combustion (IC) engines. Bio-fuels appear to be a potential alternative "greener" energy substitute for fossil fuels. It is renewable and available throughout the world. The sulphur content is negligibly small thus the issue of acid rain is therefore, ameliorated. The problem of using neat vegetable oils in diesel engines relates to their high viscosity. The performance of a direct injection (DI) diesel engine is affected by the spray characteristics of the fuel emerging through the injector holes [3].

Modern diesel engine injection systems have been designed to their level of performance by using diesel fuel with controlled properties. Some researchers reported that the most detrimental parameter in the use of vegetable oil as fuel is its higher viscosity [4]. Diesel engines have a vital role particularly for transportation systems. The exhaust emissions from diesel engines fueled with conventional diesel fuel have caused air pollution and global problems. There is a general agreement that biodiesel and its blends with diesel fuel can provide a substantial reduction in HC, CO, and smoke emissions with slight performance loss in diesel engine. In comparison with diesel fuel, exhaust gas analyses with biodiesel have generally resulted in an increase in NOx emissions that is dependent upon the fraction of biodiesel in the fuel blend [6-8]

1.1. Diesel Engine Emissions

Over the last 25 years or so there has been increasing public concern over the nature and composition of the combustion by-products that are emitted from engine exhaust pipes. Exhaust emissions as they are known are just the by-products of combustion of a fuel. For every 1kg of fuel burnt,

Comparative research using computational fluid dynamics on counterflow heat exchangers

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Abstract
This paper presents a comprehensive and exclusive thermodynamic analysis of counter flow heat exchanger under various operating and geometrical conditions. Analysis system workbench 14.0 is used for computational analysis, and comparison with previous literature is carried out in view of variable temperature and mass flow rate of hot and cold fluids. Analytical and statistical methods of computational fluid dynamics analysis are used for simulation and validation of the heat exchanger under steady and dynamic operating conditions. A 3-D model of a heat exchanger having 1000 mm and 1200 mm outside and inside tube lengths with diameter 12.7 mm is designed in the analysis system environment using the Renormalization Group k-ε approach in order to get better effectiveness of the system. The variable effects of the steady-state temperature and mass flow rate are investigated. The influence of turbulence over temperature and pressure profiles is also studied. Moreover, the analytical outcome of the present investigation is compared with that of previous existing literature and found to be in agreement with the previous one. The proposed analysis presents an in-depth perspective and simulation of the temperature gradient profile through the length of the heat exchanger. The proposed modified design of the heat exchanger along with changing flow direction yields much better results with small computational error 0.66% to 1.004% and 0.83% to 1.05% with respect to change in temperature and mass flow rate, respectively.

Key word- Heat Exchnager ,pressure, Heat & temperature

1. Introduction

Today's demand of higher energy consumption ~~and reduced availability of fossil fuel resources~~ increase the impact of thermal performance of heat exchanger day by day. Heat exchangers are very effective for the transfer of heat from one medium to another without even intermixing one fluid with another. One of the most promising devices for heat transfer is the counter flow heat exchanger mostly adapted by the chemical plants, petrochemical plants, oil refineries etc.

A refrigerator's non-adiabatic capillary tube is used in a numerical simulation of the flow and transfer of refrigerant.

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I. INTRODUCTION

Capillary tube is an expansion device used in refrigeration and air conditioning. Refrigerant undergoes expansion in capillary tube connected between condenser and evaporator. A capillary tube without heat exchanger arrangement is called Adiabatic Capillary Tube (ACT). In ACT, refrigerant expands adiabatically and enters the two-phase domain with higher vapor content. In alternate arrangement, suction line of compressor is in contact with capillary tube forming a Non-Adiabatic Capillary Tube (NACT) heat exchanger. NACT results in lower vapor quality at the outlet of the refrigerator due to heat loss to suction line fluid. This results in improvement in COP of the system due to reduced enthalpy at evaporator inlet. Design and verification of a NACT heat exchanger performance through prototyping & testinginvolveslead time for physical hardware, scheduling and running the tests apart fromthe cost implications in the respective activities. Therefore, a digital prototype of NACT heat exchanger is developed to accelerate product design and gain physical insights. Initially a 3D numerical simulation model is developed in commercial analysis software ANSYS Fluent®; however, it is later replaced with an in-house 1D solver to reduce turnaround time. Literature study is carried out for validating developed model before deploying it for design of heat exchanger. Mendoncaet. al. [1] experimentally measured the temperature profile in capillary tube and suction line in lateral heat exchanger arrangement. Meloet. al. [2] measured the same from experimental study where capillary tube was concentrically inside the suction line. Prajapati et al. [3] applied three-dimensional computational fluid dynamics (CFD) approach to find the onset of vaporization with R-134 refrigerant in an adiabatic capillary tube and observed the location for flashing.Chen and Lin [4] experimentally observed metastable flow of R-134a refrigerant. Garcia-Valladares [5] studied numerically the effect of metastability in the flow and heat transfer with the help of correlation of metastable pressure of vaporization given by Chen and Lin [4].

In this present study, fluid flow and heat transfer in NACT is modeled from conservation equations considering the effect of metastability. Model results are validated with test data published in literature with good accuracy. A parametric study is performed to determine effect of design parameters on heat exchange process. This helped to determine design parameters to achieve desired heat exchanger performance and specified quality of refrigerant at capillary tube outlet. Concentric and lateral capillary tube heat exchanger arrangement is analyzed with the developed model. The lateral capillary tube arrangement gives better heat transfer performance which is in line with published literature.

II. MATHEMATICAL MODELING OF NACT

NACThasa heat exchanger arrangement with suction line as shown in Fig. 1. Heat transfer from capillary tube to suction line results in enthalpy drop of the liquidrefrigerant. Based on the configuration of heat transfer, NACT heat exchanger is divided in three sub domains as below

(i) Adiabatic entry region (A-B in Fig. 2)
(ii) Heat exchanger region (B-C in Fig.2)

A novel method for the MANET node monitoring Fellowship Model to prevent black hole attacks

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Abstract

In mobile ad-hoc network one of the vulnerable threat is the security issues ad in the absence of any centralized controller, now a day's these issues are increasing at a high speed. The packet drop attacks are one of those attacks which degrade the network performance. This paper describes a novel node monitoring mechanism with a fellowship model against packet drop attacks by setting up an observance zone where suspected nodes are observed for their performance and behavior. Threshold limits are set to monitor the equivalence ratio of number of packets received at the node and transmitted by node inside mobile ad hoc networks. The proposed fellowship model enforces a binding on the nodes to deliver essential services in order to receive services from neighboring nodes thus improving the overall network performance.

Keywords— ***Black-hole attack, equivalence ratio, fair-chance scheme, observance zone, fellowship model*1.**

1.Introduction

Mobile ad-hoc networks are infrastructure less and self organized or configured network of mobile devices connected with radio signals. There is no centralized controller for the networking activities like monitoring, modifications and updating of the nodes inside the network as shown in figure 1. Each node is independent to move in any direction and hence have the freedom to change the links to other nodes frequently. There have been serious security threats in MANET in recent years. These usually lead to performance degradation, less throughput, congestion, delayed response time, buffer overflow etc. Among them is a famous attack on packets known as black-hole attack which is also a part of DoS(Denial of service) attacks. In this, a router relays packets to different nodes but due to presence of malicious nodes these packets are susceptible to packet drop attacks. Due to this, there is hindrance is secure and reliable communication inside network.

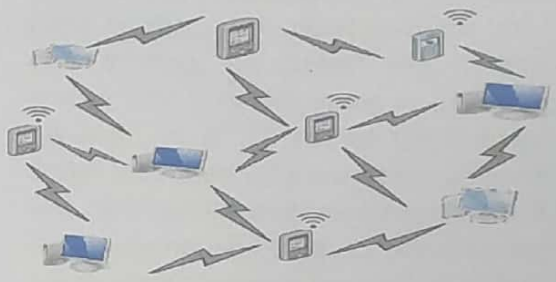

Figure 1. MANET Scenario

Section 2 addresses the seriousness of packet drop attacks and related work done so far in this area. Section 3 elaborates our proposal and defending scheme for packet drop attacks. Section 4 provides concluding remarks.

2. Literature Survey

The packet drop loss in ad-hoc network gained importance because of self-serving nodes which fail to provide the basic facility of forwarding the packets to neighboring nodes. This causes an occupational hazard in the functionality of network. Generally there are two types of nodes-selfish and malicious nodes. Selfish nodes are those nodes which act in the context of enhancing its performance while malicious nodes are those which mortifies the functions of network through its continual activity. The WATCHERS [1] from UC Davis was presented to detect and remove routers that maliciously drop or misroute packets. A WATCHER was based on the "principle of packet flow

Diagonally stiffened steel plate shear walls' shear strength

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Abstract

In this study, non-linear behavior of diagonally stiffened steel plate shear walls as a seismic resisting system has been investigated, and theoretical formulas for estimating shear strength capacity of the system have been proposed. Several validated analytical finite element models of steel shear walls with various stiffener dimensions are generated to verify and compare the analytical and theoretical outcomes. Non-linear transient analysis under monotonic loading are carried out and the pushover curves of the models are obtained. It is observed that the diagonal stiffeners have been able to reduce the buckling effects of the infill steel plate, and they have increased the elastic shear buckling strength and the ultimate shear capacity of the system in comparison with the un-stiffened thin steel plate shear walls, and there are good agreements between the propounded theoretical method and the analytical results.

Keywords *Steel Plate Shear Walls, Diagonal Stiffeners, Shear Strength, Non-Linear Analysis*

1. Introduction

During the last three decades many researches have been carried out on steel plate shear walls, SPSWs, and consequently they have been classified as reliable seismic load resisting systems in the high risk zones. SPSWs have been used in structural design and retrofitting of existing buildings with different configurations and philosophies, stiffened and un-stiffened. The first approach utilizes heavily stiffened steel plate shear walls with horizontal and vertical stiffeners to ensure that the infill steel plate reaches its full plastic strength prior to the elastic out-of plane buckling, and stiffening of the steel plate improves its strength and prevents tension field from developing in the plate. Takahashi, et al [1], studied the stiffened SPSWs with usual light and heavy stiffeners and their experimental results showed that this system has high capability of earthquake input-energy dissipation and stable hysteresis loop with spindle shape instead of S shape. It has also high lateral stiffness, which limits its elastic shear displacement. SabouriGhomi, et al [2], however, believe that construction of the numerous horizontal and vertical stiffeners is very time consuming and causes high-fabrication cost. The second approach is to use un-stiffened thin SPSWs, which relies on post-buckling strength of infill steel plate due to tension field action development in the steel plate after the elastic outof-plane buckling and dissipation of seismic energy through the cyclic yielding of the infill in tension. Hence, nonlinear behavior exhibits at relatively small story drifts and the significant pinching in the hysteresis loops appears specially when the boundary elements are not relatively so strong, pinching phenomenon occurs due to reduction in stiffness and capacities of the infill steel plate upon load reversal until the tension field action can develop in the opposite direction, however, a well-designed un-stiffened SPSWs can reach ultimate wall capacity and sustains it through

A Comparison Study of the SMulticast Routing Protocol in MANET

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Abstract

Mobile ad-hoc network (MANET) is a network of mobile nodes and the nodes communicate through radio signals. Multicasting plays significant role in MANET. Many protocols are designed in order to deal with the communication through mobile nodes. This paper presents comparative performance of five multicast routing protocol used in mobile ad-hoc network environment such as MAODV, AMRIS, CAMP, ODMRP and MZRP.

Keywords :*MAODV, AMRIS, CAMP, ODMRP, MZRP, MANET, Multicasting.*

1. Introduction

Wireless network is very much popular day by day because of its advances and benefits. There are two types of Wireless network, one is infrastructured wireless network, where nodes (devices) can communicate via centralized administrator and other is infrastructureless wireless network which is also called mobile ad-hoc network (MANET). In MANET nodes are mobile and topology changes frequently. Because of this decentralized nature, it is not possible to use access point or router in MANET environment, so mobile nodes can act as a router as well as host and they can make direct communication between them. Here if receiver is unreachable from source using single hop it can use multiple hop. The characteristics of MANET are limited bandwidth due to radio waves, limited battery power and dynamic. Multicasting is a major challenge of mobile ad-hoc network. Multicasting means sending same packets from group of one or more sender to group of one or more receiver. It can minimize transmission cost while transmitting same packet from single sender to multiple receiver and also minimizes link bandwidth and reducing the power consumption. Multicasting is used in video/audio conferencing, battlefield,andsearch and rescue operation for sharing information among mobile nodes. In MANET there may be the possibility of packet loss during multicast routing because of higher mobility of nodes. So using an efficient routing protocol is also another challenging task in MANET environment. There are so many protocol were developed for wired network like Distance Vector Multicast Routing Protocol(DSMRP), Multicast Open Shortest Path First(MOSPF), Core Based Tree(CBT) etc. but they are not suitable for Mobile ad-hoc network. So here we present some protocol that can be used in MANET. Depending on when the route is computed, multicast routing protocol in MANET can be divided into three categories, Proactive, Reactive and Hybrid. In proactive routing protocol, route to destination from source must be exists in advance but in case of reactive (also called on demand) routing protocol route to the destination is only created when route discovery process initiates the route request. Hybrid protocol is a combination of proactive and reactive protocol. Multicast routing protocols are also classified based on topology of network like, tree- based and mesh-based. Tree based protocols uses single path between source and destination and mesh based protocols there are more than one routeinbetween source and destination. This paper organized as follows. Operations of five multicast routing protocols we summarized in section II. Section III gives the comparison among routing protocols. Section IV presents conclusion.

2. Protocol Description

A. Multicast extension for Ad-hoc On-demand Distance Vector(MAODV)

MAODV uses two processes, route discovery and route maintenance.

Route discovery process use route request (RREQ) and route reply (RREP) query. When a node wishes to join the multicast tree or if it has data to send to the node it broadcasts RREQ packet across the network. If a node is sending the join query then only the member of the multicast group will respond otherwise any node of the multicast tree can respond. After receiving the RREQ packet by a node, it can send the RREP

Modulation of Sinusoidal Pulse Width (SPWM) Using Variable Carrier Synchronization in Multi-Level Inverter Controllers

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Abstract

Voltage or current converters produce discrete yield waveforms, which require huge inductances associated in arrangement with the separate burden to create the ideal current waveform. Generally, neither the voltage nor the current waveforms are true to form and furthermore have mutilated voltages and flows waveforms produces consonant defilement, extra force misfortunes, and high recurrence commotion. In this paper a strategy for minimization of THD with close to reference

current age is proposed dependent on staggered inverter. A sinusoidal heartbeat width balance conspire is produced for the staggered inverter.

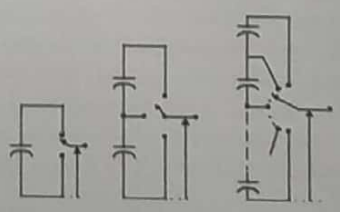
Keywords: Multilevel Inverter, THD, sinusoidal pulse width modulation, PWM converter.

I. Introduction

Power electronics devices contribute important part of harmonics in all kind of applications, such as power rectifiers, thyristor converters, and static var compensators (SVC). Even updated PWM techniques used to control modern static converters such as machine drives, power factor compensators or active power filters, do not produce perfect sinusoidal waveforms, which strongly depend on the semiconductors switching frequency. Normally, with voltage or current converters, as they generate discrete output waveforms, forcing the use of machines with special isolation, and in some applications large inductances connected in series with the respective load are required. In other words, neither the voltage nor the current waveforms are as expected. Also, it is well known that distorted voltages and currents waveforms produce harmonic contamination, additional power losses, and high frequency noise that can affect not only the power load but also the associated controllers. All these unwanted operating characteristics associated with PWM converters can be overcome with multi-level converters, with the addition that higher voltage levels can be achieved [1-5]. Multi- level inverters can operate not only with PWM techniques but also with Space Vector Control (SVC), improving significantly the quality of the output voltage waveform. With the use of amplitude modulation, low frequency voltage harmonics are perfectly eliminated, generating almost perfect sinusoidal waveforms, with a THD lower than 5%. Another important characteristic is that each converter operated at a low switching frequency, reducing the semiconductor stresses, and therefore reducing the switching losses [6, 7].

II. Multilevel Inverter

Multilevel inverters include an array of power semiconductors and capacitor voltage sources, the output of which generate voltages with stepped waveforms. The commutation of the switches permits the addition of the capacitor voltages, which reach high voltage at the output, while the power semiconductors must withstand only reduced voltages. Fig.1 shows a schematic diagram of one phase leg of inverters with different numbers of levels, for which the action of the power semiconductors is represented by an ideal switch with several positions



Mechanical Characteristics of Self-compacting Concretes with the Use of Glass Fiber and Aluminium Oxide Nanoparticles

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ABSTRACT

T he presence of fibers in concrete specimens has an effective role on how the specimens were failed. In this study, the effects of aluminium oxide nanoparticles on the workability, mechanical and, durability properties of SCCs containing glass fibers were investigated. Glass fibers contents of 0, 0.5, 1, and 1.5
by volume of concrete and aluminium oxide nanoparticles contents of 0, 0.5, 1, 1.5, 2, and 3 % by weight of cement were used. T he properties of fresh concrete were evaluated according to EFNARC consideartions. T he mechanical properties were evaluated by compressive strength, splitting tensile strength, and ultrasonic pulse velocity tests. The durability of the specimens was also measured using water absorption tests, water penetration depth and, electrical resistivity. Combined use of 2% aluminium oxide nanoparticles and 1% glass fiber has increased the compressive and tensile strengths of SCCs by 59% and 119.2%, respectively. Aluminium nanoparticles have a very high specific surface area and their reactivity causes them to react rapidly with calcium hydroxide to produce silicate -hydrate gels. T herefore, calcium hydroxide crystals are reduced and the cavities in the cement gel are filled and the compressive strength is increased. T he use of aluminium oxide nanoparticles along with glass fibers reduces the water absorption rate compared to the sample without these materials. This is one of the effective properties of aluminium oxide nanoparticles, which increases the resistance to adverse environmental factors by reducing water absorption

1. INTRODUCTION

Today, the use of nanotechnology in the construction of concrete has good practical potential and has different features [1-4]. Brittleness of concrete limits its use for parts that are completely or locally under tension . In practice, this fundamental defect of concrete is resolved by reinforcing it by installing steel rebars in the direction of tensile forces . In order to create isotropic conditions and reduce the brittleness of concrete, glass fibers can be used in concrete [5].

On the other hand, the use of nanoparticles in concrete has attracted the attention of many researchers in recent years. Silva et al. (2016) examined the effect of silica and aluminium oxide nanoparticle additives with steel fibers on the behaviour of RC beams. They showed that nanoparticles can improve the performance of RC beams Joshaghani et al. (2020) showed that titanium, aluminium, and iron oxide nanoparticles can improve mechanical and durability and reduce workability [7]. Mohammed et al. (2020) investigated calcium and aluminium oxide on the physical attributes of cementitious mortar. For this purpose, different percentages of calcined eggshell powder were used along with 1% of aluminium oxide nanoparticles . The experiments showed that the combined use of aluminiu m oxide nanoparticles and eggshell powder reduced the compressive strength and density, but increased the percentage of water absorption [8]. Ansari rad et al. (2020) studied the properties of basalt fiber reinforced concrete containing silica nanoparticles and aluminiu m nanoparticles . Basalt fibers reduced the flowability of self-compacting specimens and have little effect on improving compressive strength [9]. Zin al-Abedini et al. (2020) showed that the concrete made of nanolime showed higher resistance than nano-silica and this type of concrete can be considered in the group of high performance and high strength concrete [10].

There have also been several studies on the use of fibers in concrete. Ganesh (2016) examined self-compacting concrete containing glass fibers . The length of fibers added to the mixture was 1.2, 1.8, and 2.4 mm, respectively, and the percentage of fibers were 0%, 0.25, 0.5%, 0.75%, and 1%. The highest compressive strength was obtained in a specimen containing 1% fiber [11]. Soratur et al. (2018) stated that glass fiber and foundry sand can lead to a significant improvement in mechanical characteristics of concrete [12]. Alex and Arunachalam (2018) conducted an experimental study of steel fibers and glass fibers on the attributes of lightweight concrete. The use of glass fibers and steel fibers improved tensile and flexural strength of specimens [13]. Vasu et al. (2019) used 0.1, 0.2 and 0.3% of glass fibers . They indicated that glass fibers could improve the mechanical characteristics of concrete [14]. Hemavathi et al. (2020) examined the properties of concrete reinforced with glass fibers containing silica fume. For this purpose, different percentages of "manufactured sand" (30, 40, 70, and 100%) were replaced with natural sand. It was shown that glass fiber and silica fume in concrete containing 30% sand and 70% natural sand can be effective [15]. Kwan et al. (2018) examined the durability of high -

MARBLE FILLED ALLOY COMPOSITES' MECHANICAL

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Abstract— In our present study the fabrication of marble ($CaCO_3$) filled copper based alloy C93200 composites is focused with the aid of liquid metal stir casting techniques at different weight percentages (0wt%, 1.5wt%, 3wt%, 4.5 wt% and 6wt% of marble).unreinforced C93200 matrix alloy sample is also prepared to compare with fabricated composites. The microhardness, tension test and 3 point bending test followed by void fraction of fabricated composites are also evaluated and compared with unreinforced C93200 base matrix alloy. During the experiment it is observed that tensile strength, flexural strength and hardness of C93200-Marble composites increases (but the toughness of composites was adversely affected) as weight % of Marble particles increases up to certain limit then decreases. Also it is seen that the void fraction of fabricated composites decreases from 0.785% to 0.497% for 0wt% to 4.5wt% of marble ($CaCO_3$). Similarly the hardness value of marble filled C93200 copper based alloy composites initially increases from 115.49 Hv to 128.97 Hv for 0wt% to 4.5wt% of marble but on further addition of marble particulates (6wt%) the hardness value decreases to 121.51 Hv.

Keywords— Bearing Material, C93200, Marble, MMCs, Stir Casting, Mechanical Properties.

Strength to Support Load of a Reinforced Concrete Frame

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Abstract

Numerous strategies have been created so as to consider the effect conduct of solids and structures. Two basic strategies are limited component and exploratory technique. The nonlinear limited component technique is one the best strategies for foreseeing the conduct of RC bars from zero-burden to disappointment and its crack, yield and extreme qualities. The benefit of this technique is its capacity to make this expectation for all segments of the surveyed RC bar and all phases of stacking. This paper thinks about the test results acquired for a RC outline with the numerical outcomes determined by ABAQUS programming, and plots the two arrangements of results as hysteresis–dislodging charts. This examination shows that the numerical FEM actualized by means of ABAQUS programming produce legitimate and dependable outcomes for load bearing limit of RC outlines exposed to cyclic burdens, and hence has noteworthy expense and time productivity favorable circumstances over the elective methodology

***KeyWords**: ABAQUS; Reinforced Concrete Frame; Displacement Force Diagrams; Pushover Analysis.*

1. Introduction

Earthquakes around the world have shown the importance of the rehabilitation of existing buildings; especially those were built before the modern codes of seismic design were issued [1]. Many traditional methods have been used for strengthening the RC structures such as adding of RC infill walls, precast panels, steel bracing, and concrete jacketing of the frame member [2]. Simulation of impact behaviour of solids and structures still poses significant difficulties on computational methods and constitutive models [3]. Finite element method is the numerical approach which is used to solve approximately partial differential equations[4]. The reinforced concrete (RC) moment-resisting frames with masonry infill walls are widely used in buildings. It has been well recognized that the arrangement and constructional detail of infill walls have significant effects on the seismic performance of RC frames [5]. The "behavior factor" is widely recognized as the most important parameter of seismic design. The nonlinear finite element method is one the most popular and effective methods of assessing the exact behavior of RC beams from zero load until failure, and obtaining its fracture, yield and ultimate strengths. The advantage of this method is its ability to predict the behavior of all sections of the assessed RC beam at all stages of loading [6]. ABAQUS is finite element software with extensive use in engineering applications, mostly because it lacks the flaws of other software developed for this purpose. This software consists of three main components: i) static and dynamic problems, ii) ABAQUS / Explicit for modeling the transient dynamic problems such as collisions, impacts as well as quasi-static problems, and iii) ABAQUS/CAE, which is a GUI designed to facilitate the procedure of defining the model, the boundary conditions, and the loading process. In a study by Bolea (2016), author used the laboratory of University of Bucharest to examine the seismic response of RC frames with masonry infill panels [7]. Jiang et al. (2015) studied the seismic behavior of RC frames with masonry infill panels under cyclic loads. They analyzed the influence of constructional details of infill walls on the seismic behavior of RC frames. It is found that with the addition of masonry infill wall rigidly connected to the frame, the lateral strength, the stiffness and the energy-dissipation capacity of the bare RC frame increase significantly while the displacement ductility ratio decreases significantly [5]. The study conducted by Shafei et al. (2013) assessed the effects of flexible joints on the lateral response of reinforced RC frames. Seismic effects were modelled in the OpenSees software framework and a modified joint element for analysis of multi-storey frames was used [8]. In the study conducted by Mondal et al. (2013), authors assessed the behavior factor of 2, 4, 8 and 12 story RC structures. Their research focuses on estimating the actual values of 'response reduction/modification factor' (R) for realistic RC moment frame buildings designed and detailed following the Indian standards for seismic and RC designs and for ductile detailing, and comparing these values with the value suggested in the design code [9]. Piera. (2005), also studied the Performance evaluation of masonry-infilled RC frames under cyclic loading based on damage mechanics. Damage model is proposed in his paper for the characterization of masonry walls submitted to lateral cyclic loads. The model includes the simulation of phenomena such as stiffness and strength degradation and pinching behavior. The macromodel has been incorporated in a nonlinear structural analysis program for analysis of masonry-infilled RC frames [10].

Experimental modeling, detailed analysis, and numerical solution methods are some of the most effective methods of solving physical problems. The major weakness of experimental methods is the costly and time consuming nature of their procedures, but numerical methods have proven to be great alternatives in this respect. Conventional numerical methods have also shown great potential in solving the problems with complicated boundary conditions, something that detailed analyses often fail to accomplish. In this study, we will compare the experimental and numerical

Service-Oriented Architecture to Cloud Computing Transition

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Abstract

Cloud computing is one of the emerging technology which is used to deploring essential services without getting the knowledge regarding the infrastructure behind it. It also provides flexibility to releases the burden of maintaining an adequate environment and quality and focusing on the business competency. Service-Oriented Architecture (SOA) is a technology that enables various functions of cloud computing. This paper focuses the main features of SOA. The migration from SOA to cloud computing is discussed. This paper also represents the main features and characteristics of cloud computing

Keywords— **SOA; cloud computing.**

1. Introduction

In the world where everyone is using computers in day today life, Information Technology plays a crucial role in personal and the business environment. As much as they are used in fulfilling personal needs, they are deployed in the management, operational and the supporting processes in an organization, and hence it became technology centric organization [1]. IT suggests dealing with growing issues such as complexity, flexibility, and maintenance. These numerous issues led clients and vendors to adapt skills to handle various responsibilities that support the requirement for their business technologies.

Service-Oriented Architecture (SOA) is a paradigm of modernized Information Technology. The design of SOA corresponds suggests shifting towards IT and its applications. As such, SOA is a referenced architecture adopted as a standard architecture [2]. In any organization the architecture can be scheme into two ways, one using the scope of the system and the other is using generalization. Figure [1] describes the relationship between the architecture types, where SOA represents the reference architecture which guides and constraints to the solution architecture. The way the reference architecture differs from others by its behavior; which is generic. On the other hand, the architecture points to the specific solution to solve the problem. The figure highlights the reference architecture of different scopes like Enterprise architecture, Project Architecture, Software Architecture, etc.

Each architecture is summarized as

- *Enterprise Architecture:* Where the architecture deals with the business process and the IT infrastructure focusing on the integration and standardization needs of the organization operating model.
- *Project Architecture:* Where the architecture states which module of solution architecture has to be considered depending on the project and its scope.

  Software Architecture: Where the architecture defines the formation of the software. It is mapped into a particular kind of solution architecture, project architecture.

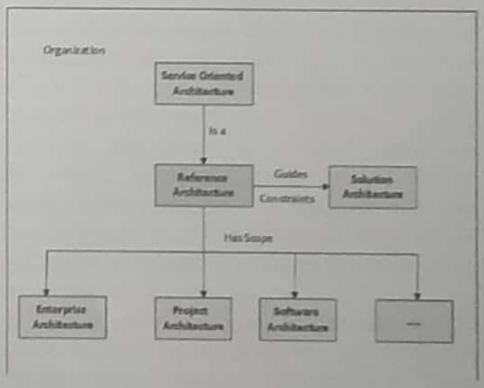

Figure 1: Architecture Model

Examining several routing protocols in MANETs

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Abstract

Computer Networks has played a major role in the evolution of most modern technology especially in engineering stream. Computer Networks has set a path breaking leap in data communication and the application domain of the same is prominently increasing the day by day. Introduction of wireless network in the data communication has made tremendous changes in human history and now wireless communication has become a part of everyone's life. The wide acceptance of the wireless communication is due to its efficiency and effectiveness in routing [1]. The wireless routing protocols [8] plays a big role in this. The routing protocols in wireless networks can be broadly classified into Table Driven [4][6][7][9] and On Demand[4][9][10] protocols according to how the route is being discovered. Table driven routing protocols maintain the updated information about the routes in each node where as in on demand protocols will calculate the route when it is needed. In this paper the analysis of the working principle of Table Driven wireless routing protocols like Fisheye State Routing [2], Hierarchical State Routing [3] and Zone-based Hierarchical Link State Routing Protocol [5] are compared according to the various versatile networking strategies and environment.

Keywords: *MANETs, Routing Protocols, Fisheye State Routing Protocol, Hirachical State Based Routing Protocols, Zone Based Routing Protocols*

1. Introduction

The Wireless computer networks has wide range of application in areas like military, security systems, traffic analysis etc.. With the advancement in the technology information can be transmitted faster with great speed and security. The installation and maintenance cost of wireless network has considerably reduced which is one of the main reason why the method is becoming prominent in data communication segment.

The wirelesses networks can be broadly classified into infra structured and infra structure less (Adhoc). Infra structured wireless networks are those the mobile nodes are connected a base station (fixed) within the range. Once the mobile node has come out of the base stations range it will be re registered to another base station. While in adhoc network all nodes are mobile. Any node can be connected or disconnected to other dynamically. Each and every node plays vital role in route discovery and forwarding.

The wide acceptance of wireless networks is due to the efficiency of the routing protocols working underneath. The wireless routing protocols can be classified into proactive (Table Driven) [6][9] and reactive (On demand) [7]. The proactive routing protocols maintain the updated tabular information about the routing information on other nodes in the network. Whenever the topology changes, the affected nodes will propagate the update information to others so that consistent and updated information about the network topology can be maintained as a whole. Upon receiving such and update the nodes will either accept or discard according to the validity of the information. But the proactive protocols will calculate/recalculate the routing information whenever it is needed. A route discovery mechanism is invoked when the source and to send data to some destination. The routing information will be updated with this discovery and it will be kept as long as the destination is reachable or the path is invalid for some reason.

This paper mainly focuses on the working of Adhoc wireless proactive routing protocols like Fisheye State Routing, Hierarchical State

Risk Associated with Interest Rate Swap Financial Management

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Abstract

The financial derivative itself is merely a contract between two or more parties and its value is determined by fluctuations in the underlying assets. Derivatives are agreements between future buyer and future seller (for a thing called "underlier") which can be or must be sold at a future date. The various concepts of financial derivatives include Forward, Future, Swap, and Options. The most common underlying assets include stocks, bonds, commodities, currencies, interest rates and indexes. Most derivatives are characterized by high leverages. This paper focuses to interest rate swap, which is a sub classification of Swap. The objective of the research article is to investigate the role of interest rate swap for managing risk.

Keywords: *Derivatives, Interest Rate Swap, Risk Management, Notional Principal, Hedge.*

1. Introduction

A derivative security is a security or contract designed in such a way that its price is derived from the price of an underlying asset. Derivatives help to transfer risk from risk adverse people to risk oriented people. They increase the volume traded in markets because of participation of risk adverse people in greater numbers. The "Underlier" is a form of derivative that specifies future price at which some item or commodity must be or can be sold. Underlier can be a physical thing like wheat or oil etc., or it can be abstract thing like "price index". The Derivatives can be used for speculation or to hedge. To hedge this risk, the investor could purchase currency futures to lock in a specified exchange rate for the future stock sale and currency conversion back into different global currencies.

2. Types of Derivatives

(A) The Forward Contracts: A forward contract is simply an agreement between two parties to buy or sell, as the case may be, a commodity (or financial instrument or currency) at a pre-determined future date at a price agreed when the contract is entered into.

The key elements are:

(i) The date on which the commodity will be bought or sold is determined in advance.
(ii) The price to be paid or received at a future date is determined at present.

(B) The Future Contracts: A future contracts is a contract to buy or sell a standard amount of a standardized or pre-determined grade of a certain commodity at a pre-determined location, on a pre-determined future date at a pre agreed price.

(C) Options: An option is a contract between two parties in which one party acquires the right but not the obligation, to buy or sell a particular commodity or interment or asset, at a specified price, on or before a specified date.

i) The person who acquires the right is known as the option buyer or holder

ii) The counterparty is known as the seller or write.

(D) Swaps: Swaps are private agreements between the two parties to exchange cash flows in the future according to a prearranged formula. They can be regarded as portfolios of forward contracts.

Effect of pulse shape on Si3N4-TiN ceramic composite's EDM performance

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ABSTRACT

This paper describes the influence of the EDM discharge pulse shape on the machining performances and material removal mechanisms of Si_3N_4–TiN. Dramatic differences of material removal, ranging from classical melting to chemical decomposition, are observed by applying different pulse shapes such as the iso-energetic or relaxation type discharge pulses. It not just leads to the change of surface texture and machining performances, but also has influences on the ceramic properties. An EDM strategy is developed for the production of ceramic components in Si_3N_4–TiN and validated through the fabrication of a high temperature mesoscopic gas turbine.

1. Introduction

Electrical Discharge Machiningofadvancedengineeringceramics is increasingly being investigated in recent years [1–4]. EDM allows to machine complex shaped ceramic parts in a flexible and accurate way. Among various ceramic materials (Al_2O_3, ZrO_2, B_4C, SiC, ...), Si_3N_4 based materials are the most interested engineering ceramics because of their outstanding mechanical, physical and chemical properties. Therefore, this material is especially used for high temperature applications in mechanical and aerospace engineering. EDM of Si_3N_4 is made possible by adding an electrical conductive secondary phase [5]. An introduction of 30–40 vol.% TiN into Si_3N_4 proves to be a successful result, which not just dramatically decreases the electrical resistivity (around 10^{-3} V cm) of this composite, but also enhances the mechanical properties for instance fracture toughness, strength and wear resistance [6].

Si_3N_4–TiN and its machining by EDM has been chosen within this research to fabricate a ceramic based micro gas turbine impeller (Fig. 1). This is a key component of an innovative mesoscopic hydrogen-based power generation system, developed at K.U.Leuven [7]. The impeller has a diameter of 20 mm, yields to bear an inlet temperature at 1200 K, high rotational speed up to 500,000 rpm and maximum principle stress of 500 MPa in order to provide sufficient power output (1 kW) and efficiency (20%). The complex three-dimensional geometry of the turbine and high accuracy requirements make it difficult to be manufactured by conventional ceramic processing techniques.

EDM machining of Si_3N_4–TiN has already been investigated by several researchers. Wire EDM and die sinking EDM of hot pressed Si_3N_4–TiN has been investigated respectively in [8,9], but results on occurring material removal mechanisms are not presented. In [10,11] Lauwers et al. investigated the EDM machining of Si_3N_4–TiN for various EDM techniques (sinking EDM, wire EDM and milling EDM) and besides melting/evaporation, chemical reactions (oxidation, decomposition) were identified as other important material removal mechanisms. Initial research on micro EDM of Si_3N_4–TiN by K.U.Leuven [12] also showed that chemical reaction is the dominant removal mechanism. These chemical reactions result however in a foamy and rough surface texture [10], which is not acceptable for the envisaged application.

In this paper, a detailed investigation of the EDM performance (material removal mechanism, surface roughness) of Si_3N_4–TiN by varying the discharge pulse shape (relaxation, iso-energetic) is presented. The reasons for dramatic changes in the material removal behaviour and related surface texture are explained. Based on the obtained results, an EDM strategy is developed for the fabrication of micro ceramic components, applied within this paper on the above mentioned gas turbine impeller.

2. Investigation of EDM performance

2.1. Experimental procedure

The Si_3N_4–TiN ceramic composite used in this research is obtained from a commercial ceramic supplier Saint-Gobain (Kersit 601 [1]). Experiments are performed, both on Milling EDM (M-EDM) and Sinking EDM (S-EDM), because they are two potential EDM techniques to produce the micro turbine impeller. For M-EDM, a SARIX SX-100-HPM micro EDM machine is used. This machine uses a relaxation type generator, able to produce low energy discharge pulses ($t_e \sim 20$ ns, $i_e < 0.5$ A), aimed for micro-scale manufacturing. For S-EDM, a Roboform 350g is used, having a generator capable to produce various pulse shapes varying from iso-energetic to relaxation type.

Table 1 lists the investigated regimes, representing a variety of pulse shapes. The listed generator parameters ($\hat{u}_i$, i_e, t_e, t_0) are measured values which are based on oscilloscope measurements. Fig. 2 (2nd column) shows the voltage and current waveforms for the different regimes.

Effects of AI-based Black Hole Attack on MANET

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Abstract

Black hole attack is one of the security threats in the Mobile Ad-hoc Network (MANET). Black hole occurs because of the malicious nodes that draw the data packet with the false route. This paper describes the AODV routing protocol for the detection of Black hole attack in such network.In this paper author uses Genetic algorithm for the optimization of the route from the source to the destination with the neural network that detects and prevents the network from the black hole attack. This paper also shows the simulation in MATLAB environment and uses the performance calculation parameters like, Throughput, PDR, Delay and energyconsumption.

Keywords : *MANET, AODV routing protocol, GA (Genetic algorithm), NN*

1. Introduction

MANET (Mobile ad hoc network) is known as infrastructure less IP (internet protocol) network for wireless and mobile machine nodes integrated with the nodes [1]. In the experiment, the MANET nodes do not contain a mechanism of centralized administration. MANET is considered for the routable network in which every node behaves as a router for forwarding the traffic to another particular network node[2].

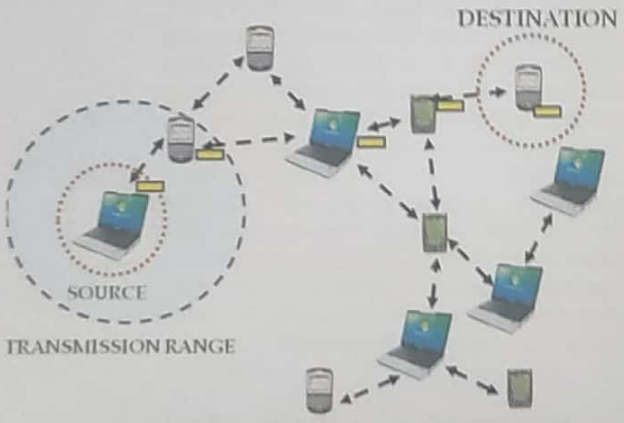

Figure 1 : MANET (Mobile ad hoc network)

Generally, MANET is consisted of three types, termed as InVANET (Intelligent Vehicular ad hoc network), VANET (Vehicular ad hoc network) and iMANET (Internet based MANET)[3].

InVANEThas AI (Artificial intelligence) for tackling the unanticipated circumstances such as vehicle accident and collision.

VANET let the efficient communication with other vehicle and assists for the communication with roadside equipments.

iMANETsupport to link static and the mobile nodes.

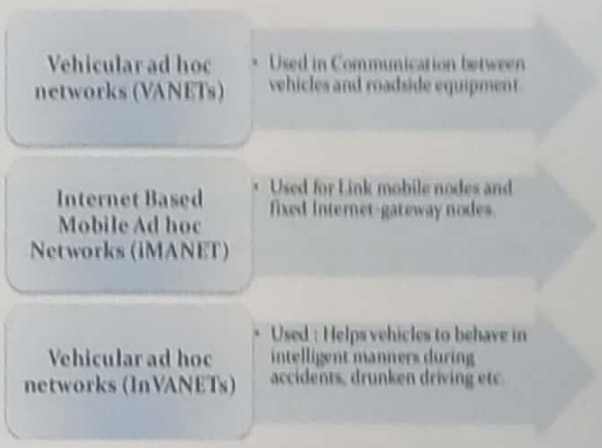

Figure 2 : MANET types

MANET communication is consisted of two phases, route discovery and data transmission. These phases are susceptible for number of attacks. Initially, the rival might interrupt the route discovery by copying the control traffic being forged. Accordingly, the attackers may block the legitimate route control traffic propagation and wrongly manipulate the benign nodes general knowledge [4].

For providing the complete security, the discussed MANET phase communication should be guarded safe. It is to be notice that the secure routing protocols guarantee that the accuracy of the information of discovered topology cannot by itself sure the safety and the undisrupted transmitted data delivery [5]. The approach to secure the network at the network layer is by securing the routing protocol for the prevention of probable attacks.

ROLE OF HR IN INDIA AREA OF RETAIL

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Abstract

Consistently changing nature of retail market has made accessibility of ability unavoidable for presence. HR is acquiring significance in the worth chain and turning into a deliberately significant for the Industry. Today retail area requests recruiting gifted ability, holding basic ability and connecting with and rousing representatives which were generally seen as a help capacities in retail however today has become a flat out need.

1. Introduction

India is witnessing a boom in retail industry over the past few years due to changing life style, rising consumerism, enhanced buying power of the middle class, relaxation of FDI in retail sector and government encouragement for local retailers. The pattern of retailing has changed tremendously during last six to seven years which can be called as short period. The industry is expected to rise 12% p.a. and will generate about 2 million jobs in the next 5/6 years. However the industry has no planned setup to check with. So the industry is evolving with experimentation, risk-taking and trial-and-error methods. The industry requires huge supply of qualified, future-ready talent which can sustain high performance and retain key talent. The industry is battling with economic challenges as well as talent shortages.

2 KEY FEATURES OF INDIAN RETAIL INDUSTRY

- Government's FDI policy changes, likely entry of major global players like Walmart
- Expansion of markets beyond metros and Tier 1 cities, huge potential in rural areas
- Growing popularity of modern retail formats
- Thrust on profitable growth with improved manpower and cost optimization
- Greater use of technology
- Efficient supply chain management
- Effective store management and improving availability
- High attrition rates and low employee commitment

HR in Retail

The constant changes in Indian retail sector have also changed the functioning of HR department. Earlier HR was seen in a supplementary role primarily functioned for recruiting and managing present employees, making sure there are people to perform functions required for running the organization. Hiring people was the key performance indicator of HR since attrition is very high in this sector. As retail is one of the fast growing sectors in India, the key business focus was also on expansion, thus, having HR focus on recruiting and getting people on the floor on time. However dynamic business environment and evolving HR functions has made HR business partner. Some retailers, evaluate the performance of HR annually based on key

HEAT TRANSFER IN A REFRIGERATOR NON-ADIABATIC CAPILLARY TUBE

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Abstract - A numerical simulation model is developed to design an efficient Non-Adiabatic Capillary Tube (NACT) heat exchanger to obtain specific vapor quality at its outlet. Refrigerant flow and heat transfer inside heat exchanger has been modeled through a set of governing equation by conserving mass, momentum and energy. The model analyses three discrete regions of capillary tube namely i) adiabatic inlet region, ii) heat exchanger region and iii) adiabatic exit region. Governing physical equations are considered in these regions based on single-phase or two-phase flow inside capillary tube. The effect of metastability has been incorporated in the model. Finite difference method is used for solution of governing equations to obtain pressure, temperature and vapor volume fraction in capillary tube and temperature of suction line. The model is validated with experimental results available in the literature. Parametric analysis has been performed to study the effect of diameter of capillary tube and the degree of sub-cooling on performance parameters. Concentric and lateral capillary tube heat exchanger configurations are compared. It has been found that lateral heat exchanger configuration gives better heat transfer performance.

Keywords - Refrigeration, Capillary Tube Heat Exchanger, Nact, Metastability

I. INTRODUCTION

Capillary tube is an expansion device used in refrigeration and air conditioning. Refrigerant undergoes expansion in capillary tube connected between condenser and evaporator. A capillary tube without heat exchanger arrangement is called Adiabatic Capillary Tube (ACT). In ACT, refrigerant expands adiabatically and enters the two-phase domain with higher vapor content. In alternate arrangement, suction line of compressor is in contact with capillary tube forming a Non-Adiabatic Capillary Tube (NACT) heat exchanger. NACT results in lower vapor quality at the outlet of the refrigerator due to heat loss to suction line fluid. This results in improvement in COP of the system due to reduced enthalpy at evaporator inlet. Design and verification of a NACT heat exchanger performance through prototyping & testinginvolveslead time for physical hardware, scheduling and running the tests apart fromthe cost implications in the respective activities. Therefore, a digital prototype of NACT heat exchanger is developed to accelerate product design and gain physical insights. Initially a 3D numerical simulation model is developed in commercial analysis software ANSYS Fluent®; however, it is later replaced with an in-house 1D solver to reduce turnaround time. Literature study is carried out for validating developed model before deploying it for design of heat exchanger. Mendoncaet. al. [1] experimentally measured the temperature profile in capillary tube and suction line in lateral heat exchanger arrangement. Meloet. al. [2] measured the same from experimental study where capillary tube was concentrically inside the suction line. Prajapati et al. [3] applied three-dimensional

Utilizing D- STATCOM, DFIG-based wind farm energy storage

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Abstract

To oblige the consistency of wind energy; a capacity gadget is needed for the breeze turbine. This paper proposesa steady force control for wind ranch based Doubly Fed Induction Generator, the recommended stockpiling gadget is supercapacitor which is associated with each wind turbine of the breeze ranch, it gives yield power steadiness and repays the deviations between the accessible breeze energy input and the ideal dynamic force yield. A Distribution – Static Synchronous Compensator (D-STATCOM) is associated at the purpose of association of the breeze ranch, it controls the dynamic and responsive force as per the interest from orpower age to the electrical matrix. The planned methodology between the supercapacitors and the D-STATCOM mitigates the voltage extent changes of the breeze ranch and offers help to the dynamic force. Reenactment contemplates are done inMATLAB/Simulink..

Keywords: Antenna gain improvement CPW-fed antenna Packaging technique Satellite communications Stacked antenna

1.Introduction

In recent years, renewable energy has gained much attention; it has achieved rapid development and growth. It provides many benefits to the environment, renewable energy is a clean source and has lower impacts on the environments, and lower cost than the conventional energy technologies. For electricity production by wind power, the Doubly Fed Induction Generator (DFIG) is frequently used because of its various advantages; it provides attractive solutions and benefits [1]; the DFIG can operate in wide range of speed variation and generate maximum power [2].

However, like other renewable energy sources, wind energy turns to be unsteady due to the intermittent nature of wind power; the wind speed is influenced by natural and meteorological conditions; the fluctuation of the output power of the wind farm affects frequency, voltage stability, power quality, protection and power dispatching [3]. Wind energy prediction is not always possible; due to the wind speed variation; so, to optimize the performance of the system; power must be supported by reserves, which is more expensive than the electricity market price.

To allow to wind turbines to participate in power regulation, system performance optimization, unit commitment and electricity market movement; energy storage devices are required. Many recent studies have focused on the performance of DFIG wind turbine connected to the Energy Storage System (ESS), this paper proposes a new technique which is connecting the D-STATCOM and the ESS at the same time to the wind farm.The organization of this paper is as follows:

1. Section 2 discusses briefly the different energy storage types for wind power.
2. Section 3 focuses on the DFIG and the supercapacitors as an ESS.
3. Section 4 describes shortly the D-STATCOM as one of the important facts devices.

Finally; in the last section, a comparison between 2 simulations which are carried out in the

Using discharge locations and discharge delay time to simulate EDM

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ABSTRACT

This paper describes the development of a sinking EDM simulation method by determining discharge locations. The simulation repeats the routine modelling of the process of each discharge consisting of determination of discharge location, removal of electrodes, generation and displacement of debris particles, and tool electrode feeding. The spot with the shortest discharge delay time calculated probabilistically assuming that an exponential distribution applies is searched for and this is determined to be the discharge location. The tool electrode feed is also determined based on discharge delay time like actual feed control. Electrode shapes and gap width distributions simulated for different working surface areas agreed with experimental results.

1. Introduction

In sinking electrical discharge machining (EDM), due to the occurrence of discharge through debris particles, localized distribution of debris particles results in uneven gap width. Furthermore, tool electrode wear disables accurate replication of the tool electrode shape to the workpiece. Hence, the development of a sinking EDM simulation method which can simulate tool electrode wear and gap width distribution is required to improve machining accuracy. Tricarico et al. [1] and Kunieda and Mori [2] repeatedly calculated the thickness of the removal layer on the tool electrode and workpiece for every small feed step taking into account the dependence of the material removal rate on the local gap width. In these simulations however, it is difficult to reproduce gap phenomena per pulse discharge.

The authors [3–5] thus developed a simulation method based on the discharge location searching algorithm where routine steps of determination of discharge location, removal of electrodes, generation of debris particles, and servo feed of tool electrode are repeated as long as the machining continues. In the first step, the discharge location is determined based on the rule that the probability of discharge occurrence is higher where the gap width is narrower or the concentration of debris particles is higher. However, it has been difficult to quantify the probability as a function of the gap width and concentration of debris particles. Furthermore, in the actual EDM process, the discharge probability increases with increasing machining area [6], resulting in a shorter discharge delay time. In former reports [3–5] however, this area effect was not taken into consideration.

The discharge delay time is directly related to the local values of the gap width and concentration of debris particles at the discharge location, but not to the average over the machining surface. Therefore, it is necessary to obtain discharge delay time

The impact of bi-directional fibreglass grid reinforcement on the mechanical properties and drying shrinkage of foamed concrete

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Abstract

This experimental work is about the study of drying shrinkage followed by strength testing of lightweight foamed concrete (LFC) specimens with the confinement of woven fiberglass mesh (FGM) at three different densities. The LFC specimens were wrapped with 1-layer to 3-layer(s) of FGM for cube and cylinder specimens and in beam specimens, it was centrally spread along the longitudinal axis. The specimens were cured under air storage conditions and the drying shrinkage test was carried following ASTM C157/C 157M specification on three prism-shaped '75mmx75mmx285mm' specimens. NORAITE PA-1 foaming agent was used to produce the desired density of LFC. All of 324 specimens were cast and tested for mechanical properties at 7days, 28days and 56days respectively. In compression strength test, cube dimensions of 100mm side following BS EN 12390-3:2009 was adopted. The flexural strength was conducted on '100mmx100mmx500mm' beam specimens following BS ISO 1920-8:2009. The specimens '100mm in diameter and 200mm in height' were tested for split tensile strength considering ASTM C496/ C496M-04e1 specifications. The results showed that confinement with 160g/m^2 (GSM) of FGM significantly restricts the drying shrinkage of LFC specimens compared to control specimens and it decreased with the increases in layer(s) from 1-layer to 3-layer(s) and density of LFC. The testing of the mechanical properties of LFC showed a direct proportionality between strength and LFC density and confinement layer(s). The failure pattern observed in all specimens was either by debonding or splitting of fibers of FGM. Thus, LFC at 1600kg/m^3 density confined/reinforced with 3-layers of FGM conquers the good performance in drying shrinkage and strength properties while the poor performance was shown by the unconfined LFC at 600kg/m^3 density.

1. Introduction

Lightweight foamed concrete (LFC) is a cellular concrete prepared by combination of foam of desired density in a cement-based slurry. The foam enriches the workability property of slurry due to the thixotropic behaviour of the foam bubbles, allowing it to be easily poured and transported into the desired moulds of any shape. The technical terms used for labelling LFC include reduced self-weight for lower densities [1, 2], which is essential for restoration or to reduce the dead loads on structural elements of buildings, thermal and acoustic insulation [3], partition walls, enhance fire resistance [4], sub-base in highways, insulation of floor and roof screeds, bridge approaches/embankments [5], prefabricated structures and many more.

Choi and Ma [6] engaged LFC to serve in tunnel drainage and it was implemented in a two-lane highway tunnel in South Korea. LFC results in sustainable [7, 8] and economical construction due to use of less labour, easy transportation and low operating costs [2, 6]. In addition to this, the provision of partial replacement of traditional aggregates used in foamed-concrete by fly ash and silica fumes [9, 10] or recycled ingredients like glass and foundry or electric arc furnace slag [11, 12] is possible which can further reduce the cost. In practice, the LFC has found numerous application in the construction field in countries like UK, Turkey, Philippines, Canada, Malaysia, Korea and Thailand [13, 14].

One of the prevalent downsides of LFC is its early age drying shrinkage [15]. The reason being the expulsion of

The Role of Collars and Bars in Reducing Local Scour Around Cylindrical Bridge Piers and Its Effects

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Abstract

In the present work, the efficiency of single and double collar in reducing scour rate and depth around cylindrical bridge piers was studied experimentally. In order to reduce the strength of wake vortices, different numbers of bars were also installed at the downstream face of the pier in combination with a single collar. The best result was achieved for double collar when the collars were installed at the streambed level and one pier diameter below bed level. With this arrangement the lower collar was not undermined after 80 hours of experiment, showing about 56 % reduction in scouring compared with an unprotected pier. It was also shown that by using collars, the rate of scouring decreased considerably. Though installation of bars did not significantly reduce the

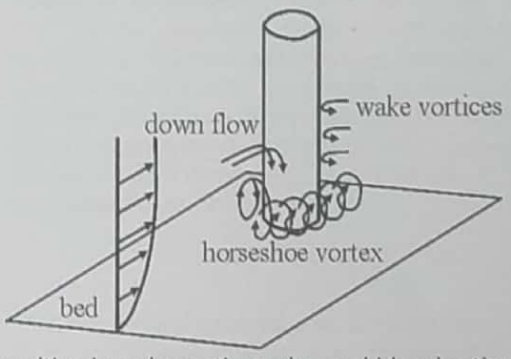
maximum depth of scour, it postponed the beginning of scouring at the upstream face of the pier. Keywords Bridge Pier, Bar, Collar, Scouring, Time Development

1. Introduction

There are many bridges over waterways in the world. At many of these bridges, erosion of river bed is developed around the pier foundations. As a result, a high percentage of bridge failures in

recent years have been attributed to scouring [1]. Pier scour is the erosion of the streambed in the vicinity of pier foundations due to complex vortex system. Mechanism of scouring has been extensively studied in the past [2-5]. Briefly, approach velocity stagnates at the upstream face of the pier, which this cause formation of a down flow parallel to the pier face (Figure 1). When down flow impinges the streambed, it digs a hole in front of the pier and rolls up and by interaction with the approach flow forms a complex vortex system [6]. This vortex extends downstream and passes the sides of the pier. Owing to its similarity to a horseshoe this vortex is called horseshoe vortex . The horseshoe vortex deepens the scour hole in front of the pier until the shear stress on the bed material becomes less than their critical shear stress. The accelerating flow at two sides of the pier creates two slots in the streambed, which facilitate the transport of removed sediment from the scour hole at the upstream perimeter of the pier [6].

At the sides of the pier, flow separation occurs,



resulting in wake vortices whose whirlpool action sucks up sediment from the bed. These vortices are unstable and shed alternatively. These vortices form their own scour hole downstream of the pier.

Figure 1. Vortex system around a cylindrical bridge pier.

To protect piers against local scour, researchers have suggested different methods in the past years. There are basically two methods to control scouring around bridge piers: 1-armoring the streambed around the piers to withstand shear stresses during high flow events such as: using riprap [7-9], grout-filled bags, gabions [1], etc. 2-altering the flow alignment to break up vortices and reduce velocities in the vicinity of the piers, such techniques include the use of sacrificial piles

Effective Community Development Leadership

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Abstract

Unity and effective leadership are perquisite to sustainable community development. The paper argued that, no society education, credible electoral system etc. Blessing, E (2012).

According to Achebe (1983) in Ngwube (2010), the trouble with Nigeria is simply and squarely a failure of leadership. There is the inability of Nigerian leaders to rise to the challenge of personal example which according to Achebe, the hallmark of true leadership. In fairness to Achebe, our leaders have not led by example. Ngwube affirmed that, sycophancy; and mere oratories have not helped the situation but have rather compounded it. The quality and ingenuity of a country's leadership can make or mar a country's development or growth. Leadership can decisively influence the quality of life of her people and her national power.

addressed and leaders should be patriotic, transparent and dedicated and that leadership and followership relationship should always be harmonized as to enable the society or group to achieve her vision and set goal.

Keywords: *Unity, Leadership, Community Development.*

Introduction

Unity and effective Leadership are mutual activities of great influence to both community and national developments in all parts of the world. In Nigeria, after her independence in 1960, Nigeria has moved from Parliamentary system of government to Presidential system of government, she has experienced both civilian and military regimes yet, her leaders have been unable to deliver to her citizens the quality of life commensurate with her numerous endowed resources. In Nigeria, government has failed to provide portable drinking water, electricity, good roads, effective service delivery, employment, housing scheme, quality health care, quality education, credible electoral system etc. Blessing, E (2012).

According to Achebe (1983) in Ngwube (2010), the trouble with Nigeria is simply and squarely a failure of leadership. There is the inability of Nigerian leaders to rise to the challenge of personal example which according to Achebe, the hallmark of true leadership. In fairness to Achebe, our leaders have not led by example. Ngwube affirmed that, sycophancy; and mere oratories have not helped the situation but have rather compounded it. The quality and ingenuity of a country's leadership can make or mar a country's development or growth. Leadership can decisively influence the quality of life of her people and her national power.

Unity or national integration on the other hand, has to do with coming together of people regardless of ethnic, cultural, religious and other differences to fight for development but what we see today is that Nigerians rather, than integrating into a cohesive community with a common sense of national identity and destiny, citizens of Nigeria are returning more and more to primordial affiliations for identify, loyalty and security. Instead of forging a united front and presenting a concerted effort to face the challenges of development in an increasingly competitive and globalize world, Nigeria's are busy waging ethnic and religious wars, struggling for control over resources, resisting marginalization by

Vacuum Evaporation Deposition of Cds Thin Films: Hall Effect

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Abstract

Cadmium Sulfide thin films have been deposited on to well cleaned glass substrate in a vacuum of 10-6 Torr. The thickness of the films has been determined by quartz crystal monitor method. The Hall Effect and the electrical resistivity have been and continue to be the key parameters used in the investigations of the basic electrical conduction processes in semiconductor materials.

Keywords: *CdS thin film, Electrical resistivity, Vacuum evaporation, Hall Effect.*

1. Introduction

The wide energy gap of CdS semiconductor is one of the most important properties leading to the great experimental interest in these materials. CdS is a suitable window layer for solar cells [1-2] and also finds applications as optical filters and multilayer light emitting diodes [3-4], photo detectors [5-7], TFETs [8-9], gas sensors and transparent conducting semiconductors for optoelectronic devices [10-11]. Various methods are used to deposit CdS thin films [12-14]. Among the vacuum evaporation is an attractive, effective method and the application at enables the deposition of thin films of larger area with good uniformity. The present study reveals the variation of electrical properties of CdS thin films.

2. Experimental Methods

Using the conventional 12A4 hind highvac coating unit pure (99.999%) aluminium was evaporated from tungsten filament on to well cleaned glass substrates through suitable masks to form to the base electrodes. Pure (99.99%) CdS (Alrich chemicals company, USA) was then evaporated from molybdenum boat to form the dielectric layer. A working pressure of 10-6 Torr was maintained in all the evaporation processes. Hall Effect Measurement System- 7600 Series is designed to provide totally automatic measurements of resistivity, mobility and carrier concentration of a wide range of samples over a temperature range from 70K to 730K.

3. Result And Discussion

Hall Effect measurements have been valuable tools for material characterization essentially; the Hall Effect can be observed when the combination of a magnetic field through a sample and a current along the length of the sample creates an electrical current perpendicular to both the magnetic field and thecurrent.

The Hall Effect is the characteristic property of semiconducting materials caused

Study of the mechanical characteristics of recycled concrete with fibre reinforcement

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Abstract

The flexural quality of customary solid material is known to be improved by fusing a moderate volume-portion of haphazardly conveyed strands. In any case, there is constrained data on depicting the impact of fiber volume-part on the compressive and flexural quality of reused coarse total cement (RCA-C) material. This paper gives an account of exploratory test consequences of the RCA-C material supplanted with 0, 30, 50 and 100% reused total and 0, 0.5, 1 and 1.5% steel fiber volume part. Three-point flexural trial of indented crystal examples were finished. The mechanical properties in pressure were described utilizing solid shape examples. Critical improvement in compressive and flexural quality of RCA-C was found as fiber content expanded from 0 to 1.5%. The test aftereffects of RCA-C were additionally assessed to research the impact of fiber content on flexural durability. As indicated by test results, the expansion of steel filaments to CA-C material obviously expanded the flexural durability.

Keywords:Recycled Concrete, Recycled Aggregate, Steel Fiber, Compressive Strength, Flexural Strength, Toughness.

1. Introduction

The use of recycled coarse aggregate concrete in buildings and bridges has received significant attention over the recent years. However, there has not been enough research to characterize the mechanical properties of this material in compression, flexure, and tension. Some standards prohibit the structural use of recycled coarse aggregate concrete, as the mechanical response of this type of concrete is not well established [1]. However, the British Standard Code allows replacing 20% of the total aggregate in the concrete with crushed aggregate [2]. Likewise, the German code allows the use of 25% to 40% recycled aggregate as replacement. However, aggregate size less than 2 mm is not allowed [3].

Past researches has indicated that, compared to conventional concrete (CC), the recycled aggregates feature more porous texture, lower density, smaller modulus of elasticity, higher shrinkage and water absorption as well as reduced resistance to freezing and thawing [4, 5]. The response of RCA-C concrete material is primarily affected by the crushed aggregate material quality and quantity [6]. Thus special care shall be taken

to ensure a high quality crushed aggregate is used in the RCA-C material.

According to Li and Limbachiya [7, 8] slight changes in the mechanical properties of RCA-C with 20% to 30% aggregate replacement were observed. However, the higher recycled coarse

aggregates content would significantly result in loss in the compressive strength of the RCA-C [9, 10]. This is most probably attributed to the increased porosity in the concrete texture and the weak transitional zone between the recycled aggregate and cement matrix [11].

The addition of steel fibers to CC and RCA-C is reported to enhance the mechanical properties of normal concrete in flexure, compression, tension, and shear. In addition, the use of steel fiber would significantly improve the permeability of concrete by retarding the crack initiation and propagation rate. However, no clear relationship is provided to quantify the influence of steel fibers.

There is currently limited research on the effect of steel fibers in recycled concrete, most of which dealing merely with mechanical behavior at a limited level of replacement materials [12,13,14] or at a certain level of fiber addition [15,16]. However, the effect of substituting different proportions of recycled coarse-aggregate materials and steel fibers simultaneously has been rarely subjected to scrutiny

Study of Self-Healing Concrete's Flexural Behavior

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Abstract— This investigation experimentally deals with the crack healing ability of bacteria, like a small cut in our body can be healed by a simple treatment. The cracks in the concrete is the major problem in construction industry. The repair of cracks is usually carried out by means of some kind of human intervention. As regular and manual maintenance of cracks repair in construction industry is costly and in some cases not at all possible. To solve this problem, insertion of bacteria can be highly favorable as it could both reduce maintenance and increase the durability of concrete. In this study a specific group of alkali resistant spore farming bacteria Bacillus Substilis were selected and added in different proportions with silica gel and calcium carbonate in a glass tube and is kept in the concrete during casting. The M20 grade concrete was used. The cube and cylinder specimens were tested for compressive and split tensile strength test up to the initial cracks at the age of 7, 14 and 28 days. The optimum quantity of bacteria was found from the test results. Beam specimens were casted for the optimum mix and tested for flexural behavior. The Load carrying capacity, Energy absorption capacity, Stiffness and Ductility characteristics of Self-Healing Concrete beam were found and compared with the conventional concrete beam. The test results shows Self -Healing Concrete beam attained higher load carrying capacity, energy absorption capacity and deflection and lesser stiffness and ductility when compared to the conventional concrete beam.

Keywords—*Self heal, Bacillus substilis, Bacteria, Calcite precipitation, Compressive strength, Split tensile strength, Flexural behaviour.*

1. Introduction

Concrete is a strong and relatively cheap construction material and therefore presently used all over the planet and generally measured as imperishable because of their longer service life as compared with the most constructional products. It is a composite material inclusive of cement, fine aggregate, coarse aggregate and water. However, they can get destroyed for exposure conditions, material quality, improper design and low construction practices.

The Self-healing Concrete is the one which senses crack formation and treat itself without human intrusion. Self-healing concrete can produce limestone biologically to repaircracks that appear on the surface of concrete structures. Specially selected types of the bacteria Bacillus is added to the ingredients of the concrete when it is being mixed. These self-healing content can lie inactive within the concrete up to 200 years. The bacterial concrete can be made by injecting bacteria in the concrete that are able to constantly precipitate calcite. Bacillus is a soil bacterium, can continuously precipitate a new highly impermeable calcite layer over the surface of an already existing concrete layer. The encouraging conditions do not openly exist in a concrete but have to be created.

I. Material Properties

A. Cement

Ordinary Portland Cement of grade 53 was used in this investigation. The property of cement was represented in Table-1.

TABLE -1: PROPERTIES OF CEMENT

Property	Values
Specific Gravity	3.15
Initial Setting Time	37 minutes
Final Setting Time	570 minutes

B. Fine Aggregate

Locally available river sand was used which is passing through 4.75mm sieve. Physical properties of aggregates are found per IS :2386 -1968 and the results are shown in Table-2.

TABLE -2: PROPERTIES OF FINE AGGREGATE

Property	Values
Specific gravity	2.67
Grading Zone	II
Water Absorption (%)	2.55%
Fineness modulus	2.87
Bulk Density (kg/m3)	1678

Effect of Modifying Mixer Mixing Time on M-20 Grade Concrete

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Abstract
On actual construction site at the time of concrete production, mixing time of concrete mixer is kept as 2 minutes. This study was carried out on concrete properties by changing its mixing time. Ten concrete samples were prepared and tested with mixing time of mixture 1 minute, 2 minutes, and 3 minutes up to 10 minutes. Concrete of M-20 grade was prepared as per IS 456-2000. Using Nominal mix (guide lines of IS 456-2000) concrete was manufactured. Wet and dry density, workability and compressive strength were recorded for ten concrete mixes. Results obtained were presented in this paper.

Keywords— Mixing Time, Compressive Strength, Density Of Concrete

1. Introduction

The compressive strength ,weight and dry density and workability of concrete depends upon many factors, e.g. quality and quantity of cement, water and aggregates; batching and mixing; type of mixture, mixing time, placing, and compaction and curing. Concrete was produced in laboratory using pan type mixture. Concrete properties – weight density, dry density workability and compressive strength was studied by carrying out experimental study.

Researcher worked on mixing time and compressive strength of concrete and established some relation for 7 Day's compressive strength, 28 Day's compressive strength and 2 months compressive strength. Refer Figure 1 for relation between mixing time and compressive strength of concrete. The graph showing the relationship between the compressive

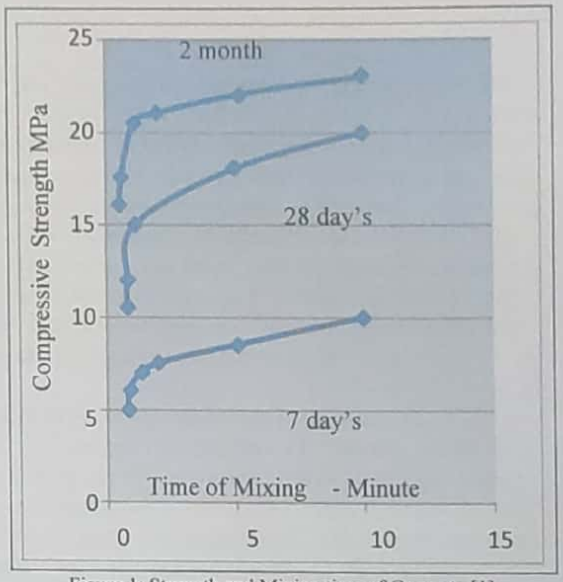

Figure 1: Strength and Mixing time of Concrete [1]

Strength of concrete and mixing time of concrete mixer in minutes is parabolic in nature.

Properties of concrete depend on

1. Proper Mixing of concrete,
2. mixing time,
3. Type of concrete mixture.

In construction activities on site, general practice adopted by engineer is use nominal mix and mixer for concrete production. No importance is given for mixing time in spite of it has direct impact on properties of concrete. There is need to study effect of change in mixing time on properties of concrete. In present research work main thrust was given to mixing time. Study was carried out by changing mixing time from 1 minute to 10 minutes without changing mix proportion, concrete is produced. The effect of mixing time on wet density, dry density, workability and compressive strength of concrete was experimentally studied and reported.

At the time of production of concrete slump and compaction factor was recorded for measurement of workability of concrete.

An Experimental Investigation of the Effect of High Temperature on Fly Ash Concrete

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Abstract

In this experimental study, an attempt has been made to determine the behaviour of Multi-blended Ordinary Portland Cement concrete with 10% and 20% fly ash of M30 grade of concrete at higher temperatures ranging from 100^0C to 600^0C. The specimens after single cycle of heating and cooling were tested for their residual compressive strength.. The changes in physical state were also studied by measuring UPV. The cubes casted of conventional and with 10% and 20% fly ash of M30 grade of concrete after exposure to higher temperatures are showing gradual decrease up to 300^0C and drastic retardation in the compressive strength and pulse velocity at higher temperatures beyond 500^0C. It is observed from the results that cubes with higher concentrations of fly ash show higher rates of decrease in compressive strength, pulse velocity and much lower concentrations, i.e. dehydration and complete decomposition of cement hydration compounds like CSH, CH etc.

Keywords: concrete, fly Ash, high temperature, multiblended concrete, fire damage, residual strength, compressive strength, pulse velocity.

I. Introduction

Concretes containing mineral admixtures are used extensively throughout the world for their good performance and for ecological and economic reason. Pozzolanic concretes are used wide throughout the world and theapplications of such concretes are increasing day by day attributable to their superior structural performance, environmental friendliness, and energy conserving implications.

For the most part cement is associated as a brilliant insulating material, yet there is serious harm or maybe sudden failure at high temperatures. At high temperatures, chemical change of the gel happens bringing on shortcoming in the matrix bonding, resulting in reduction in strength of fly ash concrete. The effect of high temperature on concrete containing ash or natural pozzolans has not been investigated very well. There are changes in the properties of concretes, particularly in temp. ranging from 100–300°C. Above 300°C, there is decrease in mechanical characteristics. However, there is a decrease in strength attributable to the range of heat condition tested, and the type of constituent materials of concrete used. The behaviour of concrete subjected to high temperatures is a results of many factors; like heating rate, peak temperatures, dehydration of C–S–H gel, phase transformations, and thermal incompatibility between aggregates and cement paste.

A. Effect of Temperature on Concrete:

Damage Mechanisms of Concrete under Fire The effects of high temperatures on Ordinary cement concrete have also been studied since the past decade. Although there are significant differences between ordinary and fly ash concretes in fire performance, their thermal damages (crack formation, explosive spalling, and degradation of mechanical/durability properties) are almost similar and mainly arise from (i) thermal mismatch, (ii) decomposition of hydrates, and (iii) pore pressure.

After a fire, concrete structure requires damage assessment. The aim of a post-fire investigation is to determine the extent of the damage and the thickness of the degraded concrete. As the duration of the actual fire is limited and concrete structures are usually not completely destroyed in a fire, according to[1] most of the fire affected structures can be efficiently repaired. However the assessment of condition and safety analysis of the structure after the fire is necessary to make the right decision on a strategy of repair, strengthening of the structure as an alternative to demolition. Most of the in situ techniques usedto assess the condition of concrete after being exposed to fire are well-known methods, widely used to assess the properties of concrete in structures [1, 2, 3]. In case of fire damage, laboratory techniques are also used to examine concrete integrity. These tests require the sampling of material and laboratory testing. Recently, micro structural changes of heated cement pastes have been studied by neutron diffraction [Castellote et al.(2004)]..

Emissions of C.I. Engines Operating at Various Injection Pressures with Blends of Biodiesel and Diesel

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Abstract - In recent years, much research has been carried to find suitable alternative fuel to petroleum products. In the present investigation experimental work has been carried out to analyze the performance and emissions characteristics of a single cylinder compression ignition DI engine fuelled with the blends of mineral diesel and biodiesel at the different injection pressures. The optimal value of the injection pressure was observed as 200 bar in the range of 180 to 220 bar. The performance parameters evaluated were brake thermal efficiency, break specific fuel consumption and the emissions measured were carbon monoxide (CO), carbon dioxide (CO_2), hydrocarbon (HC), and oxides of nitrogen (NO_x). The results of experimental investigation with biodiesel blends with diesel are compared with that of diesel. The results indicated that the CO emissions are slightly less, HC emissions were also observed to be less for B10 and B20, and NOx emissions decreased by 39 % for B10 and 28 % for B20 compared with B100. The brake thermal efficiency of the engine decreased around 6% for all blends in comparison with diesel, and the break specific fuel consumption was slightly more for B10 and B20.

Keywords *- biodiesel; diesel engine; karanja; neem oil methyl ester; injection pressure; performance; exhaust emissions*

I. INTRODUCTION

In recent times, the world is confronted with the twin crisis of fossil fuel depletion and environmental degradations. The situations have led to the search for an alternative fuel which should be not only sustainable but also environment friendly without sacrificing the performance. The different sources for alternative fuels are edible- and non-edible vegetable oils, animal fats and waste oil (triglycerides). Vegetable oils, being renewable, are widely available from variety of sources have low sulfur contents close to zero and hence cause less environmental damage (lower green house effect) than diesel[1-4]. In the context of India, non edible vegetable oil can be the most viable alternative for petroleum fuels since there is shortage of edible oils to meet the domestic requirements [5, 6]. It has been found that neat vegetable oil can be used as a fuel in conventional diesel engines. However, unmodified vegetable oils are glycerol esters, and when used in diesel engines the glycerol poses engine wear and performance problems due to higher viscosity and lower volatility. To mitigate these problems, a variety of processes have been demonstrated for conversion of oil glycerides to molecular forms similar to petroleum based diesel fuels. Biodiesel is chemically defined as mono

$$\text{Triglycerides} + \text{ROH} \xrightarrow[65^{0}C]{} \text{diglycerides} + R^{1}COOR$$

$$\text{Diglycerides} + \text{ROH} \xrightarrow[65^{0}C]{NaOH} \text{Monoglycerides} + R^{2}COOR$$

$$\text{Monoglycerides} + \text{ROH} \xrightarrow[65^{0}C]{NaOH} \text{Glycerin} + R^{3}COOR \text{ (Biodiesel)}$$

alkyl esters of FAME (Fatty Acid Methyl Ester) type derived from renewable lipid sources obtained from transesterification [7] reaction as representedfollowing.
where R^1, R^2, R^1 are long chain hydrocarbons (same or different) and R =CH_3

II. LITERATUREREVIEW

Researchers from various parts of the world have carried large number of experiments with biodiesel as a replacement fuel for internal combustion engines. The name biodiesel was introduced in the United States during 1992 by National Biodiesel Board (NBB) which pioneered its commercialization. Biodiesel is currently defined in the technical regulations EN 14214 or ASTM6751-02[7].

Goering et al [12] studied the properties of different vegetable oils and modified fuels for automotive applications and reported that vegetable oils have acceptable cetane numbers (35-45), high viscosity (50 Cst) high flash points (220-285^{0}C) and high pour points (-6 to 12^{0}C) and appreciable heating values (about 90 %of diesel) and low sulfur content (< 0.02%).

Ziejwski et al (1984) fueled engine with sunflower derived biodiesel. Shrinivasa & Gopalkrishnan (1984) used karanja based bio-diesel. Bio diesel's ability to reduce emission was recognized by Schumacher et al (1992) and reported reductions in smoke density when fueling biodiesel of Soybean oil. Christopher (1997) conducted two tests in Chicago using biodiesel as fuel. The testing proved that the biodiesel could be used as a feasible alternative fuel.

Test Karanja Oil Using Shell and Tube Heat Exchanger as a Fuel for Diesel Engine

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Abstract—This paper presents experimental investigation carried out on an unmodified four stroke diesel engine running with preheated straight vegetable oil (SVO) of Karanja. The viscosity of straight karanja oil was reduced by preheating the oil up to 1600C under different load condition. The preheating was done with the help of a Shell and Tube heat exchanger equipment without using any external power source. The heat exchanger was designed in the lab and the heating source was by waste exhaust gas from engine. The experimental results data were analyzed by using 20% blends of svo of Karanja with 80% diesel by volume and 100% preheated svo of karanja for various parameters like specific fuel consumption, brake thermal efficiency and emission of exhaust gas like CO, CO_2, HC and NOx. The results indicated that by using straight karanja oil, the emission parameter increases as compared to diesel but regarding engine performance it was found to be very close to that of diesel. All total it can be a replacement of diesel with a small efficiency drop.

Keywords—Karanja oil, Performance analysis, Shell &Tube heat exchanger, SVO.

I. Introduction

At the 5th OPEC International Seminar in Vienna the report said that between 2010-2011 and 2011-2012, India the world's fourth largest oil importer saw its average cost of imported crude oil rising by $27 per barrel, "making India's oil import bill rise from $100 billion to $140 billion dollars".

This higher international oil prices lead to domestic inflation increased input costs, an increase in the budget deficit which invariably drives up interest rates and slows down the economic growth. Current position of India's crude oil import bill jumps 40% to $140 billion in FY 12, resulting 1.5% reduction in the GDP. According to 5th Renewable Energy India 2011 Expo report 75% of crude liquid fuels were imported resulting in a larger import bill.

Diesel is one of the main liquid fuels used in India. The consumption of diesel is many times higher than that of petrol as the prime use of diesel is in agriculture and transport. Efforts are being made to develop a sustainable alternative fuels which can be a replacement of diesel. Much research activity has been carried out in this area and researchers are going for renewable energy source for a alternative fuel which will reduce the gap between the demand and import of hydrocarbons. India is endowed with a number of vegetable oils like groundnut, cotton seed, sunflower, coconut etc. and many non-edible vegetable oil producing trees like karanja, neem, jatropha, mahua which are renewable sources of energy can be used as an alternative fuels. These trees can thrive in heat, low water, sandy and rocky areas [1]. As there is a high demand of edible oils for food, so it is justified to concern on non –food based feedstock.

It has been found that non edible vegetable oils have properties similar to that of diesel which can be easily extracted from their seeds. In the present investigation fuel was prepared from karanja seeds.

Experiments study shows that, Navindgi M. C. et al. [2] have carried an investigation with non-edible straight vegetable oils of Neem, Mahua, Linseed and Castor oil on a C.I. Engine and concluded that these neat oils with preheating can be substituted as fuel for diesel engine. Rampure P. B. et al. [3] have tested non-edible Rice bran oil in a diesel engine and found that by using rice bran oil the engine runs on without any problem, the nozzle orifices were not clogged and no major carbon deposits were observed on the combustion chamber. Acharya S. K. et al. [4] have tested Kusum oil as fuel for small horse power diesel engine and concluded that the preheated oil's performance was slightly inferior in efficiency but pollution point of view it can perform well for the unmodified engine for a long period of operation without any ignition problem. The Use of Vegetable oils results in increased volumetric fuel consumption and BSFC [5]-[7]. Some fuels can be used directly to the engine while others need to be formulated to bring it to the relevant properties close to conventional fuels [8], [9].

A. Karanja Oil

Karanja oil is derives from the seeds of *Pongamia pinnata* tree, is common throughout India. Karanja is a legume tree that grown to about 15-25 meters in height with a large canopy which spreads equally wide. Flowering starts generally after 3-4 years. Cropping of brown seed pods and single almond sized

The Performance of a CNG Engine as Affected by Compression Ratio

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1. Abstract - *The compression ratio is a factor that influences the performance characteristics of internal combustion engines. This work is an experimental investigation of the influence of the compression ratio on the engine performance, brake thermal efficiency, and specific fuel consumption of a* **BACKGROUND**

In recent years, CNG has been promoted as a promising clean fuel alternative to spark ignition engines because of its relatively higher octane level. It also offers much lower greenhouse gas emissions than those from the burning of other hydrocarbons as a result of its very simple carbon chain structure and higher hydrogen to carbon ratio.

Current CNG engines are predominantly bi-fuel (Petrol + CNG) and are run at compression ratio around 9:1. But now CNG is easily available in cities and hence dedicated CNG engines can be thought of more aggressively. CNG has higher octane rating and so it can run at higher compression ratios compared to petrol. A high compression ratio is desirable because it allows an engine to extract more mechanical energy from a given mass of air-fuel mixture due to its higher thermal efficiency. High ratios place the available oxygen and fuel molecules into a reduced space along with the adiabatic heat of compression, causing better mixing and evaporation of the fuel droplets. Thus, they allow increased power at the moment of ignition and the extraction of more useful work from that power by expanding the hot gas to a greater degree.

variable compression ratio CNG fueled engine. Compression ratios of 8, 9, 10, 11, 12 and 13 and engine speeds of 1200 to 1800 rpm, in increments of 100 rpm, were utilized. In the present study, the effect of different compression ratios was studied and optimum compression ratio was established for a dedicated CNG engine. The results show that with the increase in compression ratio, the performance characteristics viz. power, torque, brake thermal efficiency and brake specific fuel consumption are improved. The emission characteristics except nitrogen oxides are found to be better for CNG.

***Key Words*: Compression Ratio, Thermal Efficiency, Dedicated CNG, VCR Engine**

2. INTRODUCTION

Compressed Natural Gas (CNG) engine has proved itself to be worthy replacement for diesel in heavy commercial and passenger transport application. Development of CNG distribution infrastructure and stringent emission regulations has increased the efforts by Original Equipment Manufacturers (OEM) to concentrate on development of CNG vehicles across all the segments. Indian cities are facing air quality degradation due to high vehicle density and since contribution of light commercial vehicles in intra city application is enormous, application of CNG vehicle has been made mandatory in some cities.

As a fossil fuel, natural gas is formed from the decaying remains of pre-historic plant and animal life. It has higher octane number (120) than petrol (91-97). The use of CNG in internal combustion engines yields higher thermal efficiency and better fuel economy compared to gasoline. This is due to mainly the higher octane rating which permits greater engine compression ratio without the occurrence of knock.

CNG fueled engines have been used in automotive field, in all combination as an alternate fuel. The advantages of CNG are – clean burning fuel because it produces lower reactive hydrocarbons, improved efficiency because it allows higher compression ratio due to high octane rating, and lower CO_2 emission, due to high H/C ratio.

degree.

3. COMPRESSION RATIO AND ITS SIGNIFICANCE

Compression ratio is the ratio of the total volume of the combustion chamber when the piston is at the bottom dead center (BDC) to the total volume of the combustion chamber when piston is at the top dead center (TDC). Theoretically, increasing the compression ratio of an engine can improve the overall efficiency of the engine by producing more power output. The ideal cycle analysis for SI engine show that indicated thermal efficiency increased continuously with compression ratio according to Equation 1

$$\eta_T = \left(1 - \frac{1}{r_C^{\gamma-1}}\right) \quad \ldots\ldots (1)$$