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COMMITTED TO RESEARCH, INNOVATION AND EDUCATION

44 years

3.4.3.1: Number of research papers in the Journals notified on UGC website during the last five years

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Principal
Chaitanya Bharathi Institute of Technology
(Autonomous)
Gandipet, Hyderabad-500 075.

Study of Various Column Geometries Influence on Structural Design

Touseeq Anwar Wasif[1], A. Vimala[2], M Koti Reddy[3]

[1]*Assistant Professor, Civil Engineering Department, ISL Engineering College, Hyderabad, India.*
[2]*Professor, Head, Civil Engineering Department, Anurag Group of Institutions, Hyderabad, India.*
[3]*Professor, Head, Civil Engineering Department, C.B.I.T., Hyderabad, India.*

[1]`touseeqwasif@gmail.com,` [2]`vimlareddy@gmail.com,` [3]`m.kotireddy@gmail.com`

Abstract--Column is the most critical member of a structure as its failure may lead to collapse of the whole structure. Present research is carried out to study the effect of column cross section geometry on various design control parameters. A 10 storey structure is designed for gravity loads and seismic loads using square shaped columns. The same structure is analyzed and designed using circular, rectangular and a combination of +, L and T shaped columns with same cross sectional area as that of square shaped columns. A comparative study is made to check the variation in base shear, deflection and stiffness of the structure with various column geometries. Study is also made to compare various parameters for individual column.

Keywords—**Column cross section, Base shear, Stiffness, Moment of inertia, Deflection.**

I. INTRODUCTION

A structure is subjected to gravity load which include the dead load and live load acting on it and also lateral loads like wind load and seismic load. These loads increase as the height of the structure increases resulting in requirement of larger cross section of column. These larger sections reduce the working space and hence are uneconomical. Moreover the aesthetic view of the spaces will be lost due to presence of these protruding columns. In the present scenario all the metropolitan cities need to construct high rise structures to meet the requirements of growing population. Hence there is a greater need for proper designing of structure which is safe and economical. To ensure this the conventional construction and design practices should be modified with the new techniques which provide a solution to present day challenges.

Some of the special construction techniques such as adopting special shaped columns behave safe and economical than compared with the conventional square or rectangular or circular shaped columns. In case of special shaped columns, the cross sectional area can be dispersed away from the neutral axis can help in increasing the moment of inertia thereby increasing the flexural stiffness.

L-shaped, T-shaped and + shaped columns are some specially shaped columns which have equivalent area as that of conventional column section but an increased moment of inertia about the centroidal axis.

In the multi-storey structure and high rise residential system, the application of specially shaped columns has the many advantages such as avoiding the prominent corners in the rooms, providing convenience in construction layout, increasing the usable area and more economy. The + shaped column can be used at the cross intersections of beams which is capable of carrying more loads than compared with conventional square, rectangular or circular columns. The choice of column shape depends upon on various factors such as the loading condition, adequacy for space, architectural requirements etc. It has been often found that to make the column safe, larger dimensions than actually required are provided to account for all the loading conditions. But the fact is that if we properly adjust the cross section of the column according to the requirement, much economy can be achieved.

To study the displacement capacity of a single column with various cross sections, a single column is modelled in SAP-2000. The area of cross section and the reinforcement in all the geometries (+, L, T, square, circular and rectangular) is kept constant. The support conditions provided are, the base is fixed and top end if free. An incremental lateral load was applied at the top end and the displacement capacity is studied for all the cross sections.

To compare various design control parameters under gravity and seismic loads a case study is carried out by considering a 10 storey shown in figure 8 and response spectrum analysis is carried out by using SAP 2000. The study concludes by comparing the parameters such as base shear, stiffness, area of reinforcement and top storey displacement of the structures with various column cross sections. In the case of + shaped columns more area is dispersed away from centroidal axis which increase the moment of inertia, table G shows the comparison with conventional square shaped column.

Studies on SCC Using Processed and Unprocessed Recycled Aggregate

N Srikanth, N R Dakshina Murthy, M V Seshagiri Rao

Abstract

Self Compacting Concrete (SCC) is a special type of concrete which flows and consolidates by its self weight, thereby eliminates the problems of placing in difficult situations such as congested reinforcement and thinner sections. In recent years the demand for construction materials has grown tremendously and a large amount of demolition waste is being generated, which is creating an environmental pollution. The major component of concrete is aggregate which constitutes about 70-80% of total components so it will be beneficial to recycle the aggregate for construction works and also to solve the environmental problems. It is estimated that the construction industry in India generates about 10-12 million tonnes of demolished concrete annually. This has encouraged the use of recycled coarse aggregate which reduces environmental pollution to a greater extent on one hand and saving of natural resources on other hand. By using the recycled aggregate the consumption of natural aggregate can also be reduced. An attempt has been made to produce SCC using RCA. In the present study the experiments were carried out on M35 and M45 grade of concrete under self compacting conditions. The self compacting properties for the present grades of concrete were evaluated using EFNARC 2005 specifications. The natural coarse aggregate was replaced at 0%, 25%, 50%, 75% and 100% by recycled coarse aggregate (RCA) in unprocessed and processed (500 and 1000 revolutions in Deval's Abrasion)state. Fresh properties such as Slump, V-funnel and L-box for SCC were determined for various percentage replacement levels of recycled coarse aggregate. The hardened properties such as compressive strength, split tensile strength were determined. The non-destructive test such as rebound hammer was used to evaluate compressive strength. The unprocessed and processed (500 revolutions and 1000 revolutions) test results were compared to get the optimum replacement level of recycled coarse aggregate (RCA).

Keywords : Self Compacting Concrete (SCC), Recycled coarse aggregate (RCA), Superplasticizers (SP), viscosity modifying agents (VMA), Natural Coarse Aggregate (NCA).

Introduction

Concrete is the premier construction material used across the world and it is mostly widely used in all types of civil engineering works including infrastructures, low and high rise buildings, defence installations, environmental protection structures etc,. Presently construction industry is making strides all around the globe. New materials and new construction techniques are coming up in order to reduce the manpower in construction industry. Self compacting concrete (SCC) is a special concrete tailored to overcome the problems of compacting in case of dense reinforcement and thin sections. The Concrete can able to flow by its self weight and thereby filling the form work achieving full compaction. The hardened SCC has similar properties as that of traditional vibrated concrete from strength and durability aspects. Thus SCC is proved to be a good concrete which improves the overall performance of the concrete structure. As far as Indian scenario is concerned lack of specifications in terms of SCC production is also creating confusion among the researchers and structural engineers who are working in this specified area.

It is estimated that the construction industry in India generates about 10-12 million tonnes of demolished concrete annually. The quantum of demolished concrete has increased by a greater extent due to urbanization and this has created a need to use the coarse aggregate which is the major component in the concrete material. Akbari et al [1] investigated on Self Compacting Concrete Using Recycled Coarse Aggregate and concluded that the mixes containing recycled coarse aggregate gains quick early strength due to presence of partially hydrated cement adhered to coarse aggregate which accelerates the hydration process. Most of the research was carried out on the use of recycled coarse aggregate in unprocessed state. Shahil M.Bandi et al [2] in their technical paper discussed that RCA show higher water absorption compared with conventional NCA due to old mortar attached with original concrete and has relatively lower specific gravity. Sai Krishna Mohan Chowdary[3]

Seismic Performance of A Retrofitted Building Using Various Numerical Models – A Comparative Study

Anil Kummitha [1], Sreenivas Sarma Paraitham[2]

[1]*Former Post-graduate student, Civil Engineering Department,CBIT,Hyderabad-75(TS)*
[2]*Professor,Civil Engineering Department,CBIT,Hyderabad-75(TS)*

Abstract—**More often, the actual practices adopted in local or global retrofitting procedures are not reflected in modeling a retrofitted structure. Realising this need of the practicing structural engineering field, a comparative study is taken up in the present work on a five storeyed RC framed building, using the popular ETABS software and adopting response spectrum method of analysis. The building is assumed to be in zone -3 and the members were so designed that some/all of those in the ground floor fail due to the possible up gradation of the building to resist zone-4 forces, requiring retrofitting. One local retrofitting measure (Column Jacketing) and one global retrofitting measure (Braces) are chosen for the study and in each of these cases, representative models reflecting the practices adopted in design offices were tried and compared with those incorporating the executional aspects. Response of each model was observed in terms of Bending moments , shears , axial forces , displacements and mode shapes for the identified columns (corner , intermediate and interior) and in identified floors (1st , 3rd and 5th) . Results indicate that there is considerable difference in the axial forces between various models while differences were revealed in moments and shears also in some cases. Small differences were noted even in displacements and mode shapes.**

Keywords : Seismic retrofitting , Seismic Performance , Retrofitted building ,Numerical Models , Response spectrum method , Column jacketing , Bracing

I. INTRODUCTION

Indian subcontinent has suffered some of the greatest earthquakes[8], in the world with magnitude exceeding 8.0. For instance, in a short span of about 50 years, four such earthquakes occurred: Assam earthquake of 1897 (magnitude 8.7) (Oldham, 1899), Kangra earthquake of 1905 (magnitude 8.6) (Middlemiss, 1910), Bihar-Nepal earthquake of 1934 (magnitude 8.4) (GSI, 1939), and the Assam-Tibet earthquake of 1950 (magnitude 8.7) (CBG, 1953). The most tragic earthquakes of last 50 years in India are , the Latur earthquake (which caused about 8000 deaths) and the Bhuj earthquake of 2001(about 25000 deaths) . While the former caused an intensive damage to masonry buildings in many rural areas, the latter struck in a widespread area causing extensive damage to many RC framed buildings besides grounding many villages to debris.

RC framed buildings are the most commonly found in Indian scenario[2], constituting to a major percentage among the total buildings in the country. This may be due to the ease in construction and vertical expansion of such buildings, in addition to the superior seismic performance as compared to the masonry buildings. Even in the rural parts of India, RC construction is clearly on the rise due to the increased awareness and access to raw materials.

Influence of Modelling on the Effectiveness of Column Jacketing in the Seismic Performance of A RC Framed Building - A Comparitive Study Using Three Alternative Materials (RCC, Steel, FRP)

Kolli Pavan[1*], Sreenivas Sarma Paraitham[2]

[1]*Former post-graduate student, Civil Engineering Department, CBIT, Hyderabad-75*
[2]*Professor, Civil Engineering Department, CBIT, Hyderabad-75*
Corresponding Author mail:[1]*pavankolli29@gmail.com*
[2]*sreenivassarma.p@cbit.ac.in*

Abstract— Column jacketing is one of the most common methods practiced as a part of seismic retrofitting strategies. Different materials are in use for strengthening the columns and among them RCC, Steel and FRP are more popular. The choice of any of these three materials has so far been notional and is left most of the times to the discretion of practicing engineers and execution teams, giving priority to the availability of the materials and skills of field force. However, much depends on the actual interaction of these materials with the existing materials of columns, which is often ignored in the design offices while modelling the structures. RC framed buildings of five to six storeys are most commonly found in all the seismic zones, in Indian scenario. Therefore, there is a strong need to look into the lapses and ignorances in modelling the retrofitting aspects such as column strengthening, in these types of buildings.

Realising this need, a six (G+5) storeyed reinforced concrete framed building is taken up as a case study in the present work. The building is assumed to be originally in a location in zone 3 which is upgraded to zone 4, requiring retrofitting of columns. Three alternative materials are tried for column strengthening viz., RCC, Steel and FRP. For each of these materials two models are tried; one normally adopted in the design offices and the other proposed in the present work to go closer to the actual practice. Response spectrum method of analysis is adopted using ETABS software.

Results indicate that there is considerable influence of proper modelling in case of steel and concrete jacketing. With the proposed modelling, moments are hugely coming down in the concrete jacketing. Although shears and axial forces are increasing in concrete jacketing with the proposed modelling, they are found to be still less than those found in steel and FRP jacketing.

Hence, the study revealed that reinforced concrete jacketing, if properly modelled, yields good results.

Keywords— Column jacketing, Seismic retrofitting, RC framed building, RCC, Steel, FRP.

I. INTRODUCTION

There has been an increase in the occurrence of the natural disasters globally, in the recent past. Earthquakes are leading among these in terms of loss of life, property and extensive damages to structures. As such, seismic retrofitting has evolved as a subject of modern context and engineering importance [1].

The most tragic earthquakes of last 50 years in India are, the Latur earthquake (which caused about 8000 deaths) and the Bhuj earthquake of 2001 (about 25000 deaths). While the former caused an intensive damage to masonry buildings in many rural areas, the latter struck in a wide spread area causing extensive damage to many RC framed buildings .RC framed buildings of five to six storeys are most commonly found in all the seismic zones, in Indian scenario. Therefore, retrofitting of these buildings can be viewed as a subject of national importance [2].

Column jacketing is one of the most common methods practiced as a part of seismic retrofitting strategies. Different materials are in use for strengthening the columns and among them RCC, Steel and FRP are more popular [3]. The choice of any of these three materials has so far been notional and is left most of the times to the discretion of practicing engineers and execution teams, giving priority to the availability of the materials and skills of field force. The fact that much depends on the actual interaction between the existing structural elements and the proposed new jacketing elements / materials, is often ignored in the design offices [4].

Effect of Different Curing Methods on the Strength of Recycled Aggregate Self Compacting Concrete (RASCC)

Srinivas Vasam[1], K. Jaganaadharao[2], M. V. Seshagirirao[3]

[1]Research scholar, [3]Professor, Department of Civil Engineering, JNTUH Hyderabad –Kukatpally Hyd.-85., India
[2]HoD & Professor, Department of Civil Engineering, CBIT, Gandipet, Hyd -75, India

[1]nivas.vasam@gmail.com, [2]kjagannadharao@yahoo.com, [3]rao_vs_meduri@yahoo.com

Abstract—**Self-compacting concrete is high performance concrete that can flow under its own weight through restricted sections without segregation and bleeding.SCC is achieved by reducing the volume ratio of aggregate to cementetious material, increasing the paste volume and using viscosity enhancing admixtures and super plasticizers.Growing demands of effective construction waste management techniques to cater for the shortage of construction resources has compelled research on recycled aggregates in concrete. In this paper, the effect of different curing techniques on strength ofRecycled Aggregate Self Compacting Concrete(RASCC) is studied by using three different curing methods; normal water curing, site curing by sprinkling water and self-curing are the three methods employed. The variables of study include grade of concrete, percentage of Recycled Concrete Aggregate (RCA) and curing period (3, 7 and 28 days). Two grades of concrete M30 and M50 and five different percentages of RCA from 0 to 100% with an increment of 25% are used in this study. It is observed from the experimental results that site curing and membrane curing are giving strengths comparable to that of conventional water curing though there is a marginal reduction in the strengths.**

Keywords—**Self-Compacting Concrete(SCC), Recycled aggregates, Field Curing, Membrane Curing, Compressive strength.**

I. INTRODUCTION

One of the major challenges of our present society is the protection of environment. Some of the important elements in this respect are the reduction of the consumption of energy and natural raw materials, and consumption of waste materials. These topics are getting considerable attention nowadays under sustainable development. The use of recycled aggregates from construction and demolition wastes is showing prospective application in construction as alternative to primary (natural) aggregates. It conserves natural resources and reduces the space required for the landfill disposal. The physical properties of recycled aggregates depend on both adhered mortar quantity and quality.

The adhered mortar is a porous material; its porosity depends upon the w/c ratio of the recycled concrete employed.Crushing C&D waste concrete to produce coarse aggregate for the production of new concrete is a common means for achieving an environment-friendly concrete. The crushing procedure and the dimension of the recycled aggregate influence the quantity of adhered mortar. The density and absorption capacity of recycled aggregates are affected by adhered mortar, and they must be known before utilization of recycled aggregates to control properties of fresh and hardened concrete.

The objective of this paper is to study the compressive strength of M30 and M50 grades of concrete using recycled aggregate self-compacted concrete with three different types of curing methods i.e. normal curing, site curing and self-curing.

II. LITERATURE REVIEW

Hajime okamura and Masahiro ouch [1] discussed about the properties of self-compacted concrete and tests that should be conducted in detailed manner. **Engelson.J.C** adopted NAN-SU method of mix design for his work and is based on packing factor (PF) of aggregate. PF is the ratio of mass of aggregate of tightly packed state in SCC to that of loosely packed state. And the workability tests performed in this research were as per **EFNARC [12]. Mohd Nadeem and SomnathGhosh[2]** presented the results of the effect of curing method on the strength development of alkali- activated blast cement paste. In this study, alkali activation was done using a combination of potassium hydroxide and sodium silicate. The test parameters include the curing methods (water curing at 27°C, heat curing at 50°C and controlled curing with relative humidity 50%, 70% and 90% at 27° C), alkali content with 6.41%, 8.41%, 10.41% and 12.41% of the mass of GGBS.**Mohammed Shafeeque[3]** in their study, compared compressive strength and split tensile strength of concrete with curing agent with those of the conventionally curedself-compacting concrete.

5th International Conference of Materials Processing and Characterization
(ICMPC 2016)

Role of Viscosity in Hydro-forming Process

R.Uday Kumar[1], P.Ravinder Reddy[2], A.V.SitaRamaraju[3]

[1]Associate Professor, Dept.of Mechanical Engineering, Mahatma Gandhi Institute of Technology, Gandipet, Hyderabad. 500075.Telangana. India.
[2]Professor& Head, Dept.of Mechanical Engineering, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad. 500075.Telangana. India.
[3]Professor & Director of Admissions, Dept .of Mechanical Engg., JNTUH College of Engineering, Kukatpally, Hyderabad. 500085. Telangana. India.

ABSTRACT

Hydro forming is new development in the manufacturing of various products in the field of engineering. In the manufacturing area one of the hydro forming process is Hydro forming deep drawing. Hydro forming deep drawing is one of sheet metal forming process to produce seamless shells, cups and boxes of various shapes. In this forming process, an additional element such as fluid pressure is to be contributes positively in several ways. In hydro forming deep drawing process, applying the hydraulic pressure on blank periphery in radial direction. It is obtained through the punch movement within the fluid chamber, which is provided in punch and die chambers. These two chambers are connected with the bypass path and it is provided in the die. During the process punch movement within the fluid chamber the pressure is generated in fluid and it is directed through the bypass path to blank periphery, the fluid film is created on the upper and lower surfaces of the blank and subsequently reduces frictional resistance and is to reduce tensile stresses acting on the wall of the semi drawn blank. The blank is taking at centre place in between blank holder and die surface with supporting of high pressurized viscous fluid. The radial stresses are produced in the blank in radial direction due to punch force applied on it. The shear stresses acted by viscous fluid on the both sides of blank, so apply viscosity phenomenon to this analysis. Due to the viscosity of fluid the shears stresses and shear forces acted on blank during drawing process. This viscosity used for determination of radial, hoop and drawing stresses in this process. The viscosity is maintained major role in hydro forming process. The blank holder pressure is controlled by the radial pressure of fluid and these are equal for uniform deformation of blank to obtained required shape and also elimination of failure of blank in deformation. Newton's law of viscosity is applied for this process for evaluation of stresses. The radial stresses are determined in terms of viscosity of castor oil, shear stresses, blank geometry and process parameters for magnesium alloy. The study on these stresses in castor oil medium with consideration of its viscosity.

E-mail address: u_kumar2003@yahoo.co.in.

EFFECT OF WELDING PARAMETERS ON MECHANICAL PROPERTIES OF FRICTION STIR WELDED JOINTS OF AA6082 AND AA6061 ALUMINIUM ALLOYS

P. Radha Krishna Prasad and P. Ravinder Reddy
Department of Mechanical Engineering,
CBIT - Chaitanya Bharathi Institute of Technology, Hyderabad, India

K. Eshwar Prasad
JNTU - Jawaharlal NehruL Technological University Hyderabad, India

ABSTRACT

The need of the hour in aerospace and military structures is the joints between dissimilar aluminium alloys. Friction stir welding (FSW) is a novel solid state joining technology especially developed for joining low melting temperature alloys like aluminium and magnesium. In this present investigation, AA6082 Aluminium alloy is friction stir welded with AA6061 Aluminium alloy for different combination of tool rotation speed, tool feed and tool tilt angle. A cylindrical tool with a square frustum probe is employed for friction stir welding. For each of the three factors rotational speed, tool feed and tool tilt angle two levels are selected. Eight experiments are designed on full factorial concept and FSW carried out for 8 runs. The tensile properties and microhardness were measured by UTM and Vickers hardness tester respectively. Using analysis of variance (ANOVA) optimum parameters are obtained and presented.

Key words: Friction stir welding, Dissimilar alloys, AA6082, AA6061, ANOVA.

1. INTRODUCTION

Recent trend in the automotive world has been transition from conventional   materials to light materials like Aluminium[1]. Due to the demands for a lower environmental impact through improved fuel efficiency, weight reduction and load capacity Aluminium is being used more widely in the auto industry, aerospace and marine structures [2] because of its light weight. Modern structural concepts demand reductions in both the weight as well as the cost of production. Fabrication of Aluminium alloys by riveting results in stress concentration and

FINITE ELEMENT ANALYSIS OF A FRACTURED MANDIBLE FIXED WITH MICRO PLATES

L Siva Rama Krishna[1]

[1]Department of Mechanical Engineering, University College of Engineering,
OsmaniaUniversity, Hyderabad, Telangana State, India – 500007
lsrkou@gmail.com

B Karthik Anand[2]

[2]Department of Mechanical Engineering, University College of Engineering,
OsmaniaUniversity, Hyderabad, Telangana State, India – 500007
karthikanand.mech@gmail.com

Ritesh Rajan[3]

[3]Department of Oral and Maxillofacial Surgery, SVS Institute of Dental Sciences,
Mahbubnagar, Telangana State, India – 509001
riteshrajan2000@yahoo.co.in

T Hima Bindu[4]

[4]Department of Mechanical Engineering, University College of Engineering,
OsmaniaUniversity, Hyderabad, Telangana State, India – 500007
bindu233@gmail.com

P.Ravinder Reddy[5]

[5]Department of Mechanical Engineering,
Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana State, India – 500075
reddy_prr@yahoo.com

Abstract:

It is observed that most of facial injuries occur due to accidents like falling from a height, assaults, different sport injuries, gunshot wounds and other traumatic injuries. These cases have been considered as challenging task for medical treatments. They are treated by Oral and Maxillofacial surgeon. For this type of injuries, a plating system is used, which is inserted into the affected victim's mandible and operated to the fractured mandible. This process is known as Osteosynthesis. The aim of this research work is to do Finite Element Analysis across the fracture line of a mandible fixed with conventional and locking micro plate. The stability of two types of plating systems such as conventional and locking type are analyzed using finite element analysis. Thus, the operated micro plates should withstand the forces acting on it. Plating system purpose is to regenerate and reconstruct the mandible to work naturally.

Keywords: 3D modeling, Micro Plating System, Osteosynthesis, Mandible, Finite Element Analysis

1. Introduction

The largest and strongest bone of the face, which serves for the movement of the lower teeth, is known as a mandible. It has a curved portion, body, and two perpendicular features called as the ramus, which joins with the ends of the body nearly at right angles. Mandible fractures (Lovald .T, 2006) are among the most common bone injuries in facial part. Treatment for mandible fractures (Gandhi and Haranal, 2012) has made significant advances over the years due to improved understanding of biomechanics principles, advances in bio materials and scientifically based research of treatment outcomes. However plating techniques involve rigid fixations (Oguz *et al.,* 2009) and incorporate good results in patient's case.

Three Dimensional Modeling and Finite Element Analysis of Conventional Type Miniplates Fixed at Mandibular Fractures

T. HIMA BINDU[1], L. SIVA RAMAKRISHNA[2], P. RAVINDER REDDY[3], M.TEJDEEP[4],
B. KARTHIK ANAND[5]
[1]Dept. of Mechanical Engineering, University College of Engineering, Osmania university, Hyderabad, Telangana, INDIA, hima23382@gmail.com
[2]Dept. of Mechanical Engineering, University College of Engineering, Osmania university, Hyderabad, Telangana, INDIA, lsrkou@gmail.com
[3]Dept. of Mechanical Engineering, ChaitanyaBharathi Institute of Technology (CBIT), Gandipet, Hyderabad, Telangana, INDIA, reddy_prr@yahoo.com
[4]Dept.of Oral and Maxillofacial Surgery, SVS Institute of Dental Sciences, Mahabubnagar, Telangana, INDIA, tejdeep.muthuluri@gmail.com
[5]Dept. of Mechanical Engineering, Vignana Bharathi Institute of Technology (VBIT), Ghatkesar, Hyderabad, Telangana, INDIA, karthikanand.mech@gmail.com

Abstract:-Mandibular fractures mostly consist of the traumatic injuries occurring at the mandible, treating these fractures by Oral and Maxillofacial surgeons is one of the most challenging tasks for them. The aim of this paper is to do Finite Element Analysis (FEA) on the conventional type miniplate and screws which are fixed to join fracture occurring at the symphysis (mid-line) area of the mandibular bone subjected to uniform loading. The Computer Tomography (CT) scanned images of a patient are collected in Digital Imaging and Communications in Medicine (DICOM) format. These images are then imported into image processing software MIMICS to develop the 3D surface model of the mandible and importinto the 3-Matic software for modifying the surface model and then finally saved in .STL file format. The saved .STL file format is imported into Solidworks software to develop 3D CAD model consisting assembly of the mandible, conventional type of miniplate and screws.The 3D CAD model of the assembled file was imported into ANSYS workbench and analyzed by applying uniformly distributed load (UDL) on the teeth area of mandible. The input given for Finite Element Analysis was the material properties of the cortical bone of the mandible andfor miniplates and screws the material properties of titanium alloy Ti-6Al-4V ELI (Grade 5) of the ASTM standard F136. In this paper, five different cases were considered and analyzed under static structural loading conditions by applying UDL.

Influence of Tool Coatings on Distortion of 2014A T651 Aluminum Alloy during Machining

S.V.Prasad[1], Dr.P.Laxmi Narayana[2], Dr.P.Ravinder Reddy[3]

Chief Manager, Designs, HAL, Hyderabad, India [1]

Professor, Dept. of ME, Osmania University, Hyderabad, India[2]

Professor &Head, Dept. of ME., CBIT, Hyderabad, India[3]

ABSTRACT: This paper investigates the influence of coated and uncoated H.S.S and Carbide endmills on machining induced distortion in milling thin-wall, thin-floor components. The endmills are coated with Titanium Nitride (TiN), Titanium Aluminum Nitride (TiAlN), and Diamond like Carbon (DLC).The effect of each of the coated H.S.S and carbide end mills is studied by calculating residual stresses using indentation method. The present article also suggests the optimum coating and the tool material for minimizing distortion. Results show that coatings on the tool has significant effect on the residual stress distribution and distortion of components. It is also observed that machining induced stresses by using DLC coating are minimum leading to minimum distortion.

KEYWORDS: Machining, Distortion, Residual stress, Indentation Method, Aluminum Alloy, TiN, TiAlN, DLC, H.S.S, Carbide.

I.   INTRODUCTION

Dimensional and form accuracy of machined component in aerospace industry is one of the challenging tasks for manufacturer. In the aerospace industry, machining process is widely used for fabrication of monolithic component that contains a thin-walled structure. Stresses and part distortion have a major cost impact in many machining applications since they can affect scrap rates and processing times. For example, in Avionic monolithic components they may produce distortions which hamper assembly operations. Stresses in machined parts could be either bulk residual stresses from primary processes such as rolling or forging or the stresses induced by the machining process, which are a result from differential plastic deformation and surface temperature gradients [1]. During machining, the cutting forces create thermal and mechanical stresses causing deflection to the thin-wall section, leading to dimensional form errors. Most of the existing research for machining thin-wall component and its correlation to distortion, concentrated on the process parameters (speed, feed, depth of cut, width of cut, material removal rate, volume of material removal, type of cutting fluid, tool path layout, etc) [2,3,4,5] and tool parameters (axial and radial rake angles, helix angle, gash angle, dish angle and clearance angles)[6,7,8,9,10]. The effects of coatings on the tool are often neglected. Coating on the cutting tool has a direct influence on the cutting performance and stress induced and hence should not be neglected in the machining consideration.

High Speed Steel is a high carbon tool steel, containing a large dose of tungsten. A typical HSS composition is 18% tungsten, 4% Chromium, 1% Vanadium, 0.7% carbon and the rest, Iron. HSS tools have a hardness of 62-64 Rc. The addition of 5 to 8% cobalt to HSS imparts higher strength and wear resistance. The advantage of HSS over carbide is its strength to withstand cutting forces and the low cost of the tools. From the tool life point of view, HSS performs very well at intermittent cutting applications. But the greatest limitation of HSS is that its usable cutting speed range is far lower when compared to Carbide. For enhancement in productivity, carbide tools are generally preferred to H.S.S tools in machining. Carbides have high hardness over a wide range of temperatures, high thermal conductivity, high Young's

STUDY OF INFLUENCE OF TOOL GEOMETRY ON MATERIAL

FLOW PATTERN IN FRICTION STIR WELDING PROCESS

USING FINITE ELEMENT SIMULATION

PAVAN KUMAR THIMMARAJU[1],KRISHNAIAH ARAKANTI[2]
& G.CHANDRA MOHAN REDDY[3]

[1] Departmemt of Mechanical Engineering,NNRG,Hyderabad India

[2] Department of Mechanical Engineering,Osmania University,Hyderabad, India

[3] Department of Mechanical Engineering, MGIT, Hyderabad, India

ABSTRACT

Material flow pattern studies are conducted during the friction stir welding process, to evaluate the influence of tool geometry on the flow characteristics. This is done considering the material movement in the case of friction stir welding is happening by material flow around the rotating tool and is considered as a viscous flow exhibiting laminar flow characteristics exhibiting non-Newtonian properties. Velocity field and the viscosity fields are considered as the criteria to differentiate the various weld zone viz. Weld nugget zone, HAZ & TMAZ. To compare the influence of tool geometry on the material flow behavior various tool pin profiles are considered and the resulting velocity distributions are compared. the results obtained revealed the tool pin geometry has a considerable effect on the weld nugget zone.

KEYWORDS: Friction Stir Welding, Material Flow, Fem, Velocity field & Tool Geometry

INTRODUCTION

Friction Stir welding process has been a significant metal joining process since its invention by The Welding Institute(TWI) in 1991[1].Friction Stir welding process is a joining process which employs a tool which rotates and travels along the joining surfaces which are clamped together. The tool is non-consumable and many types of tool profiles are employed for the welding purpose. Tool geometry is defined by the diameter of the shoulder, diameter of the pin, shape of the pin and the pin length. The pin length is usually shorter than then the thickness of the plates to be welded. The pin is penetrated into the work pieces and the tool rotates and transverses along the centerline. The interaction between the work piece and the tool results in friction generating heat which in turn creates plastic deformation and the flow of the work piece material takes place in plasticized state as the tool traverses forward [2].the process is illustrated in the Figure 1.

The material flow in friction stir welding is complex in nature and mainly depends on the tool geometry, process parameters such as tool rotation speed, welding speed, tool tilt angle, axial force and properties of the material to be welded. The weld formation depends on the material flow behaviour of the materials, to be welded.

Experimental Investigations on Di Diesel Engine with High Grade Insulated Combustion Chamber with Varied Injection Pressure

N. Janardhan

Mechanical Engineering Department, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad

Abstract -- *To evaluate the performance of diesel engine with high grade low heat rejection combustion chamber which consisting of air gap insulated piston with 3 mm air gap, with superni (an alloy of nickel) crown, air gap insulated liner with superni insert and ceramic coated cylinder head with neat diesel with varied injection pressure experiments were carried out. Performance parameters brake thermal efficiency, exhaust gas temperature, coolant load, volumetric efficiency and sound levels were determined at different values of brake mean effective pressure (BMEP) of the LHR–3 combustion chamber and compared with neat diesel operation on conventional engine (CE) at similar operating conditions. It is also found that Engine with LHR–3 combustion chamber with neat diesel operation showed deteriorated performance at manufacturer's recommended injection timing of 27o bTDC. The Injection pressure changed from 190bar to 270bar with an increment of 40bar.*

Index Terms: *Conservation of diesel, conventional engine, LHR combustion chamber, Performance*

I. INTRODUCTION

The advancement of civilization causes increase of vehicle population at speed rate and increase in usage of diesel fuel in transport and agriculture sector leading to depletion of diesel fuels. Increase in prices of diesel fuel in International market has become another burden on economic sector of India. The conservation of diesel fuel has become inevitable for the engine, users and researchers involved in the combustion research. [Matthias Lamping et al, 2008].

Dr. Diesel had made a remarkable invention of the diesel engine, as their excellent fuel efficiency and durability, became popular power plant for automotive industry. It has got global acceptance as it is used in agricultural sector, industrial applications and construction equipment and marine propulsion. [Cummins et al, 1993; Avinash Kumar Agarwal et al, 2013].

Low Heat combustion chamber concept is to reduce coolant losses by incorporating the thermal barriers in the path of heat flow to the coolant that make the gaining thermal efficiency. There are different methods to achieve this by coating the cylinder head with ceramic and maintaining the air gaps in piston and in the liner. Pistons and liners are made with low thermal conductivity materials like superni(an alloy of nickel), cast iron and steel.

Low Heat combustion(LHR) chamber were classified as low grade Low Heat Rejection Combustion chamber which is engine with ceramic coated cylinder head, medium grade Low Heat Rejection Engine which is having air gap in piston and air gap in the liner and high grade Low Heat Rejection combustion chamber which is combined arrangement of low grade and high grade.

Experiments were already carried out with engine with low grade Low Heat Rejection combustion chamber diesel engine[Paralak et al, 2005; Ekrem et al, 2006; Ciniviz et al, 2008; Janardhan et al, 2014; Janardhan et al, 2015]. They revealed that brake specific fuel consumption decreased by 3-4% in comparison with conventional engine. Tests were carried out by keeping the air gap in piston [Parker et al, 1987]. However, they fixed up the crown with bolted joint, which had become a failure concept as it was not sealed air completely in the gap. It was become a successful by screwing the crown to the piston, by keeping a gasket, made of superni in between these two parts [Rammohan et al, 1999; Janardhan et al, 2015].

Experiments were conducted on high grade Low Heat Rejection engine with injection pressure at recommended injection timing to study the pollution levels of smoke and NOx levels. They came to know that drastically increased in the NOx levels. It was known clearly from literature survey that hot combustion chamber is suitable for high viscous vegetable oils.

Experimental investigations on pollution levels of low heat rejection diesel engine with varied air gap thickness

D. Srikanth[1], M.V.S. Murali Krishna[2] P. Usha Sri[3] , M.Ravi Chandra[4]

[1]Department of Mechanical Engineering, K G Reddy College of Engineering & Technology, Chilkur, Moinabad- 501504,

Telangana State, India

[2]Department of Mechanical Engineering , Chaitanya Bharathi Institute of Technology, Hyderabad- 500 075, Telangana India,

[3]Department of Mechanical Engineering, College of Engineering, Osmania University, Hyderabad- 500007, Telangana State,

India,

[4]Mechanical Engineering Department, Gayatri Vidyaparishad College of Engineering, Madhuravada, Visakhapatnam- 530048

Andhra Pradesh, India,

ABSTRACT
Conservation of fossil fuels is gaining momentum along with adapting alternative fuel technology methods for the researchers and manufacturers involved in combustion research. The concept of low heat rejection (LHR) engine is to minimize heat flow to the coolant by providing thermal resistance in the path of heat flow to the coolant and thus increase thermal efficiency. It has significant characteristics of higher operating temperature, maximum heat release, and ability to handle low calorific value fuel. Investigations were carried out to determine exhaust emissions of diesel engine withair gap insulated low heat rejection (LHR–3) engine consisting of air gap insulated piston with superni crown, air gap insulated liner with superni insert and ceramic coated cylinder head with neat diesel with varied air gap thickness and injection timing. Exhaust emission of particulate emissions and nitrogen oxide levels were determined at various values of brake power.The optimum air gap thickness was found to be 2.8 mm withLHR–3engine with diesel operation.LHR engine with neat diesel operation showed deteriorated performance at manufacturer's recommended injection timing of27° bTDC (before top dead center) in comparison with CE.Exhaust emissions reduced with advanced injection timing of 28.5°bTDC with LHR engine in comparison withsame configuration of the engine at 27°bTDC.

Keywords:-Conventional engine, LHR engine, Performance, Exhaust emissions.

1.INTRODUCTION

In the scenario of i) increase of vehicle population at an alarming rate due to advancement of civilization, ii) use of diesel fuel in not only transport sector but also in agriculture sector leading to fast depletion of diesel fuels and iii) increase of fuel prices in International market leading to burden on economic sector of Govt. of India, the conservation of diesel fuel has become pertinent for the engine manufacturers, users and researchers involved in the combustion research. [1].

The nation should pay gratitude towards Dr. Diesel for his remarkable invention of diesel engine. Compression ignition (CI) engines, due to their excellent fuel efficiency and durability, have become popular power plants for automotive applications. This is globally the most accepted type of internal combustion engine used for powering agricultural implements, industrial applications, and construction equipment along with marine propulsion. [2–3].

The concept of LHR combustion chamber is to reduce coolant losses by providing thermal resistance in the path of heat flow to the coolant, there by gaining thermal efficiency. Several methods adopted for achieving LHR to the coolant are ceramic coated engines and air gap insulated engines with creating air gap in the piston and other components with low-thermal conductivity materials like superni (an alloy of nickel), cast iron and mild steel etc.

LHR combustion chambers were classified as ceramic coated (LHR–1), air gap insulated (LHR–2) and combination of ceramic coated and air gap insulated engines(LHR–3) combustion chambers depending on degree of insulations. Experiments were conducted with neat diesel operation with ceramic coated diesel engine [4–9]. They reported that brake specific fuel consumption decreased by 3-4% with ceramic coated diesel engine in comparison with conventional engine. Creating an air gap in the piston involved the complications of joining two different metals. Investigations were

International Journal for Research in Science Engineering and Technology

INFLUENCE OF INJECTION PRESSURE ON PERFORMANCE PARAMETERS OF SEMI ADIABATIC DIESEL ENGINE WITH CRUDE VEGETABLE OIL WITH MAGNETIC INDUCTION

[1] D.S.Madhuri, [2] M.Ravi Chandra, [3] M.V.S. Murali Krishna
[1, 3] Department of Mechanical Engineering , Chaitanya Bharathi Institute of Technology, Hyderabad- 500 075, Telangana India.
[2] Mechanical Engineering Department, Gayatri Vidyaparishad College of Engineering, Madhuravada, Visakhapatnam- 530048 Andhra Pradesh, India,

ABSTRACT: Increase of injector opening pressure has a significance effect on performance and formation of pollutants inside the direct injection diesel engine combustion. Compression ignition (CI) engines are used to move major portion of the world's goods, power much of the world's equipment, and generate electricity more economically than any other device in their size range. Increasing industrialization of developing countries is resulting in increased demand for diesel worldwide. Substitution of this demand with straight vegetable oils (SVOs) is comparatively environmentally benign compared to diesel and biodiesel. However, drawbacks associated with crude vegetable oil of high viscosity and low volatility, which cause combustion problems, call for low heat rejection (LHR) engine or semi adiabatic diesel engine with its significant characteristics of maximum heat release and ability to handle the low calorific value fuel. LHR engine consisted of ceramic coated cylinder head. A hydrocarbon fuel was polarized by exposure to external force such as magnetism. The result of which is of course, more complete and rapid burning of the hydrocarbon fuel. Investigations were carried out to determine performance parameters of brake thermal efficiency, brake specific energy consumption, exhaust gas temperature, coolant load and volumetric efficiency with conventional engine (CE) and LHR engine with and without magnetic induction with vegetable oil operation with varied injector opening pressure. With vegetable oil with LHR engine with magnetic induction improved performance, when compared with CE.

Keywords: [Vegetable oils, Low heat rejection, Ceramic coating, Performance parameters, Injector opening pressure]

1. INTRODUCTION

Fossil fuels are limited resources; hence, search for renewable fuels is becoming more and more prominent for ensuring energy security and environmental protection. It has been found that the vegetable oils are promising substitute for diesel fuel, because of their properties are comparable to those of diesel fuel. They are renewable and can be easily produced. When Rudolph Diesel, first invented the diesel engine, about a century ago, he demonstrated the principle by employing peanut oil. He hinted that vegetable oil would be the future fuel in diesel engine [1]. Several researchers experimented the use of vegetable oils as fuel on conventional engines (CE) and reported that the performance was poor, citing the problems of high viscosity, low volatility and their polyunsaturated character. It caused the problems of piston ring sticking, injector and combustion chamber deposits, fuel system deposits, reduced power, reduced fuel economy and increased exhaust emissions [1–5]. Increased injector opening pressure may also result in efficient combustion in

Research Article

Experimental Investigations on Low Grade Low Heat Rejection Diesel Engine with Crude Cottonseed Oil Blended with Butanol

R.Chanakya[1], D.Srikanth[2], M. Ravi Chandra[3] and M.V.S. Murali Krishna[4*]

[1,4] Mechanical Engineering Department, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad-India
[2] Department of Mechanical Engineering, K G Reddy College of Engineering & Technology, Chilkur, Moinabad, Telangana State, India
[3] Mechanical Engineering Department, Gayatri Vidyaparishat College of Engineering, Madhuravada, Visakhapatnam, Andhra Pradesh, India

Abstract

In the scenario of fast depletion of fossil fuels, search for alternative fuels has become pertinent. Alcohols and vegetable oils are important substitutes for diesel fuel as they are renewable in nature. However, drawbacks of alcohols (low cetane number and low energy content) and vegetable oils (high viscosity and low volatile in nature) cause combustion problems in diesel engine and hence call for low heat rejection (LHR) engine, which can burn low calorific value fuel and give high heat release rate. They are many methods to induct alcohol in diesel engine out of which blending of alcohol with vegetable oil is simple technique. Neat vegetable oils produce high particulate emissions in diesel engine as they contain fatty acids. Neat alcohol causes combustion problems as it has low cetane number. Hence blending of alcohol with vegetable oils is a promising technique. Butanol has higher calorific value than ethanol and methanol. Hence use of butanol is finding favor in diesel engine. Investigations were carried out to evaluate the performance parameters of a low grade low heat rejection (LHR) diesel engine or LHR–1 engine consisting of ceramic coated cylinder head with crude cottonseed oil blended with butanol with varied injector opening pressure. Performance parameters of brake thermal efficiency (BTE), exhaust gas temperature (EGT), coolant load and volumetric efficiency (VE) were determined at various values of brake mean effective pressure (BMEP). Conventional engine (CE) showed deteriorated performance, while LHR engine showed compatible performance with crude cottonseed oil. (CSO) operation when compared with neat diesel operation at recommended injection timing and pressure. The performance of both version of the engine improved with vegetable oil blended with butanol with varied injector opening pressure.

Keywords: *Vegetable oil, Injector opening pressure, LHR engine, Classification, Fuel Performance.*

1. Introduction

The civilization of a particular country has come to be measured on the basis of the number of automotive vehicles being used by the public of the country. The tremendous rate at which population explosion is taking place imposes expansion of the cities to larger areas and common man is forced, these days to travel long distances even for their routine works. This in turn is causing an increase in vehicle population at an alarm rate thus bringing in pressure in Government to spend huge foreign currency for importing crude petroleum to meet the fuel needs of the automotive vehicles. The large amount of pollutants emitting out from the exhaust of the automotive vehicles run on fossil fuels is also increasing as this is proportional to number of vehicles. In view of heavy consumption of diesel fuel involved in not only transport sector but also in agricultural sector and also fast depletion of fossil fuels, the search for alternate fuels has become pertinent apart from effective fuel utilization which has been the concern of the engine manufacturers, users and researchers involved in combustion & alternate fuel research.

Vegetable oils and alcohols are promising substitutes for diesel fuel as they are renewable in nature. Out of many techniques available, blending is simple technique, to induct alcohol into diesel engine [Wang *et al*, 2008; Lalit Kumar *et al*, 2012; Satish Kumar *et al*, 2013]. Alcohols have low cetane number and hence engine modification is necessary for use as fuel in diesel engine [Murali Krishna *et al*, 2014; Murali Krishna *et al*, 2015]. On the other hand, vegetable oils have comparable properties in comparison with diesel fuel. The idea of using vegetable oil as fuel has been around from the birth of diesel engine. Rudolph diesel, the inventor of the engine that bears his name, experimented with fuels ranging from powdered coal to peanut oil. [Cummins, 1993]. Several researchers experimented the use of vegetable oils as fuel on

*Corresponding author's ORCID ID: 0000-0002-2165-8106

Research Article

Experimental Investigations on Performance Parameters with Low Heat Rejection Diesel Engine with Varied Air Gap Thickness

D. Srikanth[1], M.V.S. Murali Krishna[2]*, P. Usha Sri[3] and M. Ravi Chandra[4]

[1]Department of Mechanical Engineering, K G Reddy College of Engineering & Technology, Chilkur, Moinabad, Telangana State, India
[2]Department of Mechanical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana India
[3]Department of Mechanical Engineering, College of Engineering, Osmania University, Hyderabad- 500007, Telangana State, India
[4]Mechanical Engineering Department, Gayatri Vidyaparishad College of Engineering, Madhuravada, Visakhapatnam, Andhra Pradesh, india

Abstract

Conservation of fossil fuels is gaining momentum along with adapting alternative fuel technology methods for the researchers and manufacturers involved in combustion research. The concept of low heat rejection (LHR) engine is to minimize heat flow to the coolant by providing thermal resistance in the path of heat flow to the coolant and thus increase thermal efficiency. It has significant characteristics of higher operating temperature, maximum heat release, and ability to handle low calorific value fuel. Investigations were carried out to evaluate the performance of diesel engine with air gap insulated low heat rejection (LHR–3) engine consisting of air gap insulated piston with superni crown , air gap insulated liner with superni insert and ceramic coated cylinder head with neat diesel with varied air gap thickness and injection timing. Performance parameters of brake thermal efficiency, brake specific fuel consumption, exhaust gas temperature, coolant load and volumetric efficiency were determined at various values of brake power. The optimum air gap thickness was found to be 2.8 mm with LHR–3engine with diesel operation. LHR engine with neat diesel operation showed deteriorated performance at manufacturer's recommended injection timing of 27° bTDC (before top dead center) and the performance improved marginally with advanced injection timing of 28.5° bTDC in comparison with conventional engine (CE) at 27°bTDC.

Keywords: Conservation of diesel, conventional engine, LHR engine, Performance.

1. Introduction

In the scenario of i) increase of vehicle population at an alarming rate due to advancement of civilization, ii) use of diesel fuel in not only transport sector but also in agriculture sector leading to fast depletion of diesel fuels and iii) increase of fuel prices in International market leading to burden on economic sector of Govt. of India, the conservation of diesel fuel has become pertinent for the engine manufacturers, users and researchers involved in the combustion research. [Matthias Lamping et al, 2008].

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The concept of LHR combustion chamber is to reduce coolant losses by providing thermal resistance in the path of heat flow to the coolant, there by gaining thermal efficiency. Several methods adopted for achieving LHR to the coolant are ceramic coated engines and air gap insulated engines with creating air gap in the piston and other components with low-thermal conductivity materials like superni (an alloy of nickel), cast iron and mild steel etc.

LHR combustion chambers were classified as ceramic coated (LHR–1), air gap insulated (LHR–2) and combination of ceramic coated and air gap insulated engines(LHR–3) combustion chambers depending on degree of insulations. Experiments were conducted with neat diesel operation with ceramic coated diesel engine [Paralak *et al*, 2005; Ekrem *et al,* 2006; Ciniviz *et al,* 2008; Janardhan et al, 2014; Janardhan et al, 2015]. They reported that brake specific fuel consumption decreased by 3-4% with ceramic coated diesel engine in comparison with conventional engine. Creating an air gap in the piston involved the complications of joining two different metals. Investigations were carried out on air gap insulated piston with neat diesel operation [Parker et al, 1987].

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*Corresponding author's ORCID ID: 0000-0002-2165-8106

2nd International Conference on Materials Manufacturing and Design Engineering

Non-Destructive Analysis of FSW Process and Comparison With Simulation and Microstructural Analysis

T. Pavan kumar[1*], P. Prabhakar Reddy[2]

[1],Rayalaseema University,Kurnool,Indua
[2]Department of Mechanical Engineering,CBIT,Hyderabad,India.

Abstract

Friction Stir Welding is an evolving metal joining technique and is mostly used in joining materials which cannot be easily joined by other available welding techniques. It is a technique which can be used for welding dissimilar materials also. The strength of the weld joint is determined by the way in which these material are mixing with each other, since we are not using any filler material for the welding process the intermixing has a significant importance. The complication with the friction stir welding process is that there are many process parameters which effect this intermixing process such as tool geometry, rotating speed of the tool, transverse speed etc.,In this study an attempt is made to compare the material flow and weld quality of various weldments by changing the parameters. Thermographic analysis is used to characterize the microstructure of the elements. Thermography is a non destructive, accurate and fast way of measurement of temperature of the welding process which influences the formation of microstructure and also material flow and strength of the formed weldment.. In this study the relationship between microstructures and temperatures are evaluated. Simulation studies are also conducted and compared with experimental studies . the study resulted in good correlation between the experimental and simulation studies.the study involved use of different tool profiles and a comparative study is done with resulted mechanical and microstructural properties.

Keywords: Friction Stir Welding, non-Destructive Testing, mechanical properties, simulation

* Corresponding author. Tel.: +040-29705282; fax: +040-29705284.
  E-mail address:pavanaries2010@gmail.com

Parametric Simulation and Optimization of FSW Process

T.Pavan Kumar[1], Dr.P.Prabhakar Reddy

[1]Research Scholar, Rayalaseema University

[2.]Professor,Department of Mechanical Engineering,CBIT,Hyderabad

Abstract

This thesis research implemented an existing thermo mechanical model of friction stir welding process, and studied the surrogate model-based optimization approach to obtain optimal process parameters for the modelled friction stir welding process. As an initial step, the thermo mechanical model developed by Zhu and Chao for friction stir welding of 304L stainless steel was replicated using ANSYS. The developed model was then used to conduct parametric studies to understand the effect of various input parameters like total rate of heat input, welding speed and clamping location on temperature distribution and residual stress in the work piece. With the data from the simulated model, linear and nonlinear surrogate models were constructed using regression analysis to relate the selected input process parameters with response variables. Constrained optimization models were formulated using surrogate models and optimization of process parameters for minimizing cost and maximizing throughput was carried out using improved harmony search algorithm. To handle the constraints, Deb's parameter-less penalty method was used and implemented in the algorithm. It is learned from this research that: (1) heat input is mainly constrained by the lower bound of the temperature for making good welds; (2) the optimal welding speed must balance the loss of heat input and the gain in productivity; (3) clamping closer to the weld is better than away from the weld in terms of lowering the peak residual stresses. Moreover, the nonlinear surrogate models resulted in a slightly better optimal solution than the linear models when wide temperature range was used. However, for tight temperature constraints, optimization on

Velocity Effect On Wind Turbine Blade Using Cfd

[1]Ch.Indira Priyadarsini, [2]V.Lakshmi Shilpa, [3]A.Akhil
[1]Faculty, Mechanical Engg.Dept., Chaitanya Bharathi Institute of Technology, Hyderabad
[2]M.E Student, Mechanical Engg.Dept., Chaitanya Bharathi Institute of Technology, Hyderabad
[3]M.E Student, Mechanical Engg.Dept., Chaitanya Bharathi Institute of Technology, Hyderabad

Abstract : Wind turbine blades are subjected to various aerodynamic loads; at present much research has focused on improving the aerodynamic performance of wind turbine blade through wind tunnel testing and analytical studies. These are much time consuming andrequire expensive laboratory resources. However, simulation through Computational FluidDynamics (CFD) software offers inexpensive solutions to aerodynamic blade analysis. Analysisis done in CFD code FLUENT to study the wind velocity effect on blade. A detailed coupledanalysis also performed to predict the structural stability of turbine blade using finite elementanalysis. Structural analysis has done on turbine blade using different materials. The resultsshown with the increase in wind velocity, the variation of the wind turbine's total torquecoefficient tended to be smooth when the rotational speed is constant.The objective of this report describesanalysis of symmetric airfoils of a vertical axis wind turbine using analytical and numerical techniques using FLUENT 15.0.

IndexTerms – **Wind turbine, wind velocity, CFD.**

I. INTRODUCTION

Whole world is slowly switching to alternative energy sources due to its varied advantages over the limited stock, global warming and health hazards of non-renewable energy sources. Amongst which wind energy is promising with current technology, the low cost of wind energy is competitive with more conventional sources of energy which is abundantly available and more at high altitudes. Energy is a fundamental thing to grow economically and socially. On beginning of 21st era we will face challenging problems to supply energy, energy utilization increasing day to day, we are depending on fossil fuels heavily these are giving pollution threat to climate and also an economic threat [1]. To solve this problem so many developed countries are investing largely in renewable energy resources, as part of the internationalco2 emission decreasing policy Australia was established strategies to produce power from renewable energy of atleast 20 % by the year 2020 [2] .Wind energy is an effective resource to generate power, it is readily available and it is clean, safe. Particularly in Europe it has a share of 70 % of the international wind energy industry [1]. The efforts have been put to analyze the aerodynamic models employed forthe performance of vertical axis wind turbine. The main advantages of Vertical axis wind turbines are quiet, omnidirectional, and create less stress on support structure, self-starting. They require less wind to produce power, the large blades of vertical axis wind turbines with high aspectratio's exposed to a very large value of bending moments due to centrifugal forces, these causes the failure of blades[kragten 2004]. Even small blades of vertical axis wind turbines are dangerous because of the blades spins or rotate very quickly and give acceleration due to lack of stall. The high rotational speeds causes the high centrifugal forces and torque, which normally supports the blades but have a probability of increasing structural failures at that time[Jain 2011].This paper describes the analysis of symmetric airfoils of a vertical axis wind turbine using analytical and numerical techniques and naca0012 airfoil is selected for the same.

II. THE AIRFOIL

An airfoil is a 2D shape capable of producing a reactive lift force when in motion relative to the surrounding air. Figure 1 gives an overview of the basic airfoil terminology.
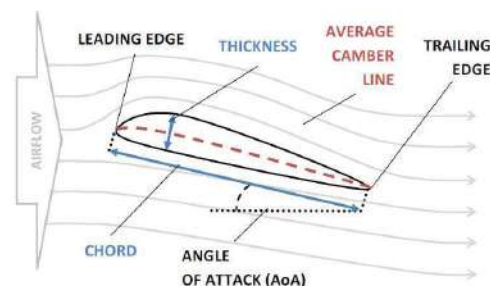
Fig. 1: Airfoil terminology

As the air travels over the top of airfoil, it accelerates and consequently pressure decreases in this area. Lower pressure on the top of the airfoil than the bottom creates a suction force called lift as shown in figure 2. Lift is the force that keeps aeroplanes in the sky. Drag on the other hand, acts in the same direction to the airflow and is generally considered a nuisance, as for example in an aeroplane, extra fuel must be used to overcome the drag forces. Drag forces arise mainly fromfriction between the viscous fluid and the surface of the aerofoil (skin friction drag) and thedifference in pressure between the leading and trailing edges of the aerofoil (form drag).

Flow Analysis Of Cooling Tower Using Cfd

[1]Ch.Indira Priyadarsini, [2]A.Akhil[2], [3]V.Lakshmi Shilpa
[1]Faculty, Mechanical Engg.Dept., Chaitanya Bharathi Institute of Technology, Hydearabad
[2]M.E Student, Mechanical Engg.Dept., Chaitanya Bharathi Institute of Technology, Hydearabad
[3]M.E Student, Mechanical Engg.Dept., Chaitanya Bharathi Institute of Technology, Hydearabad

Abstract : This paper deals with a natural draft wet-cooling tower with various inlet conditions. A commercial code FLUENT has been used to simulate the transport phenomena inside the tower. In this a 50 tons cooling capacity model has been taken as reference model. The developed model is analyzed with two air flow rates in vertical direction and by combining air inlet temperature and water inlet temperature. The developed model has been updated and the height of the water inlet is increased from the basin height and the same analysis is done by using the two flowrates of air and water into the system. It is observed that the temperature and humidity inside the tower are the main influence factors on the performance of cooling tower. It is also observed that due to increase in height to an optimum condition the performance of the cooling tower is increased and further increase in the height decreased its performance. Analysis shown that due to temperature of fluid inlet, cooling capacity of the tower has been improved with increase in air airflow rate when compared with natural aspirated air. A turbulence model of k-ε with energy equation is used for simulation

IndexTerms **– Cooling tower, CFD, FLUENT**

I. INTRODUCTION

Cooling tower operation is based on evaporative cooling as well as exchange of sensible heat. During evaporative cooling in a cooling tower, a small quantity of the water that is being cooled is evaporated in a moving stream of air to cool the rest of the water. Also when warm water comes in contact with cooler air, there is sensible heat transfer whereby the water is cooled. The major quantity heat transfer to the air is through evaporative cooling while only about 25% of the heat transfer is through sensible heat. Figure 1. taken from Mulyandasari [4] shows the schematic of a cooling tower. In 1925, Merkel [7] was one of the first to propose a theory to quantify thecomplex heat transfer phenomena in a counterflow cooling tower. Merkel made severalsimplifying assumptions so that the relationships governing a counterflow cooling towercould be solved much more easily. Benton [2] and Kloppers and Kroger [8] list theassumptions of the Merkel theory as follows:The saturated air film is at the temperature of bulk water, The saturated air film offers no resistance to heat transfer, The vapor content of the air is proportional to the partial pressure of water vapor, The force driving heat transfer is the differential enthalpy between saturated andbulk air. Baker and Shryock[9] give a detailed explanation of the procedure of arriving at the final equations of theMerkel theory and also list some of the shortcomings of the Merkel theory and suggestsome corrections. Bourillot [10] developed a program called TEFERI to predict theperformance of an evaporative cooling tower in 1983. Benton [11] developed the FACTSmodel in 1983 and compared it to test data. Benton [2] states that the FACTS model iswidely used by the utilities to model cooling tower performance. Majumdar [12] reviewed the then existing methods of cooling tower performance evaluation and developed a new mathematical model that is embodied in a computer code called VERA2D. Majumdar [12] also gives a more detailed list of available mathematical models for analyzing wet cooling towers. In 1989 Jaber and Webb [13] developed equations to apply the ϵ–NTU method of heat exchanger design to design cooling towers. The Merkel method and ϵ–NTU method with modifications are the methods generally used to predict tower performance. Bergsten [14] states that the ϵ–NTU method (with some modifications) is used in well known and wide spread building simulation programs such as TRNSYS, Energy Plus and the ASHRAE Primary HVAC Toolkit package. Poppe and Roegener [15] came up with the Poppe model also known as the exact model in 1991 which does not make the simplifying assumptions of Merkel's theory and is therefore more accurate. Kloppers and Kroeger [16] critically evaluate the Merkel theory by comparing it with the Poppe method. Kloppers and Kroger [8] give a detailed derivation of the Merkel, Poppe and Entu methods, their comparison and how to solve the governing equations in each of the methods. They conclude that the Poppe method is more accurate than the Merkel and ϵ– NTU methods and that the Merkel and ϵ–NTU methods give identical results since they are based on the same simplifying assumptions. With the advancement of computing power, computational Fluid Dynamics (CFD) models have been created to simulate performance of cooling towers [17].

Impact of Drawing Ratio and Shape on Thickness Distribution along the Walls of Deep Drawn Cups

B. V. S. Rao

Abstract

Deep drawing is the process of converting a flat blank into cup shaped articles. In this process a punch forces the blank to take the shape of die cavity. Different shapes and sizes of products for automotive bodies, structural parts, utensils and beverage cans are manufactured by this process. Using bimetallic strip in preparing the various products by deep drawing has become the recent trend in manufacturing process. The main reason to carry out such a process is taking the advantages of different materials such as high strength, low density and corrosion resistibility, at the same time and in a single component. The cost of the component gets reduced too. In the deep drawn cups the thickness of the sheet metal varies throughout the walls of cup. This is undesirable as non uniform thickness leads to defects like cracks or failures. As thickness variation depends upon several parameters like limit drawing ratio, drawing force, sheet material, geometry of blank etc. it can be minimized by selecting optimum process parameters.

This work is related to deep drawing of cups which are made using bimetallic strip. The objective of this work is to study the variation in thickness along the side walls of deep drawn cups which are made using bimetallic material i.e. Cu-Al and also to determine the optimum drawing ratio for producing a cup of specific size. The study was carried out in Amba Bhavani tool crafts and Metal Forming lab of CBIT. In this work the variation in thickness along the walls of cup for three different shapes, i.e: circular, square, heart. were investigated. The studies reveal that the variation in thickness is different for different shaped cups and also the variation in sheet thickness is different when Copper and Aluminium are in turn made as inside surfaces of bimetallic cups.

Influence Of Varied Injection Timing On Exhaust Emissions With Crude Jatroph Oil On Di Diesel Engine With High Grade Insulated Combustion

Dr. N. Janardhan

Mechanical Engineering Department, Chaitanya Bharathi Institute of Technology, Hyderabad, India.

Abstract -- Depletion of fossil fuels and increase of pollution levels with fossil fuels, search for alternative fuels has become Inevitable. Increased the importance of vegetable oils as their properties are comparable to diesel fuel. Experiments were conducted to study performance of diesel engine with crude jatropha oil with 3mm air gap insulated piston, 3mm air gap insulated liner and ceramic coated cylinder head. Air gap of 3mm were maintained by screwing the crown to the piston body. Crown was made of superni-90 whose thermal conductivity is poor. Air gap of 3mm was maintained by inserting the suprni-90 insert into the liner. Exhaust emissions [particulate emissions and nitrogen oxide levels] were determined at various values of brake mean effective pressure (BMEP) of the high grade Low Heat Rejection Combustion chamber (LHR–3) with crude jatropha oil at varied injection timing and compared with neat diesel operation at a injector pressure of 190 bar.

Index Terms: Alternative fuels, Vegetable oil, Exhasut emissions, Particulate Emissions, Nitrogen oxide levels, Conventional engine, LHR engine, Injection pressure

I.   INTRODUCTION

Increasing population of vehicles at an faster rate and use of diesel fuel in transport sector agriculture sector...etc, leading to fast depletion of diesel fuels. Increase of fuel prices is an another burden on economic sector of Govt. of India. The users and researchers were involved in the area of combustion research. [Matthias Lamping et al, 2008] for the conservation of diesel fuel.

Dr. Diesel who made a mark for his invention of diesel engine, used in applications like power plants for automotive applications as it is having their excellent fuel efficiency and durability. Internal combustion engine which is used for powering agricultural implements, industrial applications, and construction equipment along with marine propulsion. [Cummins et al, 1993; Avinash Kumar Agarwal et al, 2013].

The concept of Low Heat Rejection Combustion chamber is to burn the high viscous and low cetane number vegetable oils, thereby gaining the thermal efficiency. Various other techniques can be used for achieving LHR ceramic coated engines inside the head and air gap insulated engines with creating air gap in the piston and other components with low-thermal conductivity materials like superni (an alloy of nickel), cast iron and mild steel etc.

Ceramic coating with 500 microns inside the cylinder is said to be engine low grade Low Heat Rejection (LHR1) Combustion chamber. Air gap of 3mm in the piston by means of screwing the crown to piston body and air gap of 3mm in the liner by inserting the superni-90 insert in the liner is called medium grade Low Heat Rejection (LHR2) combustion chamber. The combined insulation of LHR1 and LHR2 is called high grade Low Heat Rejection combustion chamber. Authors conducted with neat diesel operation with ceramic coated diesel engine [Paralak et al, 2005; Ekrem et al, 2006; Ciniviz et al, 2008; Janardhan et al, 2014; Janardhan et al, 2015]. They revealed that brake specific fuel consumption decreased by 3-4% with ceramic coated diesel engine in comparison with conventional engine. Air gap in the piston has not become successful as it given the complications [Parker et al, 1987].

Screwing the crown to the piston has become a successful in providing the complete seal. [Ramamohan et al, 1999; Janardhan et al, 2015]. The optimum injection timing was found to be 29.5o bTDC. BSFC decreased by 12% at part–load and 4% at full load at an injection timing of 29.5° bTDC with the optimized insulated piston engine in comparison with CE operating at an injection timing of 27° bTDC. Experiments were conducted with LHR3 with varied injection timing and injector pressure to study pollution levels of particulate emissions and nitrogen oxides levels. [Janardhan et al, 2013].

Investigations were carried out engine with air gap insulated piston, air gap insulated liner and ceramic coated cylinder head(LHR-3) with varied injection

Experimental Investigations on Di Diesel Engine with High Grade Insulated Combustion Chamber with Varied Injection Pressure

N. Janardhan

Mechanical Engineering Department, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad

Abstract -- To evaluate the performance of diesel engine with high grade low heat rejection combustion chamber which consisting of air gap insulated piston with 3 mm air gap, with superni (an alloy of nickel) crown, air gap insulated liner with superni insert and ceramic coated cylinder head with neat diesel with varied injection pressure experiments were carried out. Performance parameters brake thermal efficiency, exhaust gas temperature, coolant load, volumetric efficiency and sound levels were determined at different values of brake mean effective pressure (BMEP) of the LHR–3 combustion chamber and compared with neat diesel operation on conventional engine (CE) at similar operating conditions. It is also found that Engine with LHR–3 combustion chamber with neat diesel operation showed deteriorated performance at manufacturer's recommended injection timing of 27o bTDC. The Injection pressure changed from 190bar to 270bar with an increment of 40bar.

Index Terms: Conservation of diesel, conventional engine, LHR combustion chamber, Performance

I.   INTRODUCTION

The advancement of civilization causes increase of vehicle population at speed rate and increase in usage of diesel fuel in transport and agriculture sector leading to depletion of diesel fuels. Increase in prices of diesel fuel in International market has become another burden on economic sector of India. The conservation of diesel fuel has become inevitable for the engine, users and researchers involved in the combustion research. [Matthias Lamping et al, 2008].

Dr. Diesel had made a remarkable invention of the diesel engine, as their excellent fuel efficiency and durability, became popular power plant for automotive industry. It has got global acceptance as it is used in agricultural sector, industrial applications and construction equipment and marine propulsion. [Cummins et al, 1993; Avinash Kumar Agarwal et al, 2013].

Low Heat combustion chamber concept is to reduce coolant losses by incorporating the thermal barriers in the path of heat flow to the coolant that make the gaining thermal efficiency. There are different methods to achieve this by coating the cylinder head with ceramic and maintaining the air gaps in piston and in the liner. Pistons and liners are made with low thermal conductivity materials like superni(an alloy of nickel) , cast iron and steel.

Low Heat combustion(LHR) chamber were classified as low grade Low Heat Rejection Combustion chamber which is engine with ceramic coated cylinder head, medium grade Low Heat Rejection Engine which is having air gap in piston and air gap in the liner and high grade Low Heat Rejection combustion chamber which is combined arrangement of low grade and high grade.

Experiments were already carried out with engine with low grade Low Heat Rejection combustion chamber diesel engine[Paralak et al, 2005; Ekrem et al, 2006; Ciniviz et al, 2008; Janardhan et al, 2014; Janardhan et al, 2015]. They revealed that brake specific fuel consumption decreased by 3-4% in comparison with conventional engine. Tests were carried out by keeping the air gap in piston [Parker et al, 1987]. However, they fixed up the crown with bolted joint, which had become a failure concept as it was not sealed air completely in the gap. It was become a successful by screwing the crown to the piston, by keeping a gasket, made of superni in between these two parts [Rammohan et al, 1999; Janardhan et al, 2015].

Experiments were conducted on high grade Low Heat Rejection engine with injection pressure at recommended injection timing to study the pollution levels of smoke and NOx levels. They came to know that drastically increased in the NOx levels. It was known clearly from literature survey that hot combustion chamber is suitable for high viscous vegetable oils.

STUDIES ON INFLUENCE OF INJECTION PRESSURE ON EXHAUST EMISSIONS OF DIESEL ENGINE WITH MEDIUM GRADE INSULATED COMBUSTION CHAMBER WITH CRUDE JATROPHA OIL OPERATION

Dr.N. Janardhan
[1,]Mechanical Engineering Department, Chaitanya Bharathi Institute of Technology,
Gandipet, Hyderabad 500075, Telangana State, India,
[1]E-mail: narambhatlu.datta@gmail.com

Abstract–In the context of depletion of fossil fuels, evar increase of pollution levels with fossil fuels, search for alternative fuels has become pertinent. Vegetable oils are important substitutes for diesel fuel as their properties are comparable to diesel fuel. Investigations were carried out to study exhaust emissions of diesel engine with air gap insulated low heat rejection (LHR–2) combustion chamber consisting of air gap insulated piston with 3 mm air gap, with superni (an alloy of nickel) crown and air gap insulated liner with superni insert with varied injector opening pressure. Exahsut emissions [particulate emissions and nitrogen oxide levels] were determined at various values of brake mean effective pressure (BMEP) of the LHR–2 combustion chamber and compared with neat diesel operation on conventional engine (CE) and vegetable oil operation at similar operating conditions. Engine with LHR–2combustion chamber with vegetable oil operation showed reduction of particulate emissions at manufacturer's recommended injection timing of 27° bTDC, and these emissions decreased marginally with increased injector opening pressure n comparison with CE with diesel and vegetable oil at 27°bTDC. However, LHR-2 engine drastically increased nitrogen oxide levels in comparion with conventional engine with vegetable oil.

Index Terms– Alternative fuels, Vegetable oil, Exhasut emissions, Particulate Emissions, Nitrogen oxide levels, Conventional engine, LHR engine, Injection pressure.

1.INTRODUCITON

Non-edible vegetable oils can be seriously considered as alternative fuels for engines as their properties are comparable to diesel fuels and also edible oils are in great demand and are far too expensive as fuels. When Rudolph Diesel, first invented the diesel engine, about a century ago, he demonstrated the principle by employing peanut oil and hinted that vegetable oil would be the future fuel in the diesel engine [1]. Several researchers experimented the use of vegetable oils as fuel on conventional engines (CE) and reported that the performance was poor, citing the problems of high viscosity, low volatility and their polyunsaturated character causing the problems of piston ring sticking, injector and combustion chamber deposits, fuel system deposits, reduced power, reduced fuel economy and increased exhaust emissions [1]–[8]. The presence of the fatty acid components greatly affects the viscosity of the oil, which in turn affect the wear of engine components, oil consumption, fuel economy, hot starting, cold starting, low temperature pumpability, noise and shear stability. The limitation of unsaturated fatty acids is necessary due to the fact heating higher unsaturated fatty acids results in polymerization of glycerides. This can leads to formation of deposits or to deterioration of lubricating oil. The different fatty acids present in the vegetable oil are palmic, steric, lingoceric, oleic, linoleic and fatty acids [1]. These fatty acids increase particulate emissions and also lead to incomplete combustion due to improper air–fuel mixing. Studies were made with single cylinder, four-stroke water cooled direct injection diesel engine, with 3.68 kW brake power at a speed of 1500 rpm with a compression ratio of 16:1 with vegetable oils with varied injector opening pressure and injection timing.[5]-[6]. The injection timing was varied by inserting copper shims in between pump body and engine frame, while change of injector opening pressure was achieved by using nozzle–testing device. At manufacturer's recommended injection timing of 27° bTDC, particulate emissions increased by 56%, while nitrogen oxide (NO_x) levels decreased by 18% with crude vegetable oil when compared with neat diesel operation on conventional engine. Particulate emissions decreased by 15–20%, while NO_x levels increased by 15–20% with conventional engine with crude vegetable oil operation with an increase of injector opening pressure of 80 bar, when compared with neat diesel operation.

Experiments were conducted on preheated vegetable oil in order to equalize their viscosity to that of pure diesel may ease the problems of injection process [5]–[6]. Investigations were carried out on conventional four stroke diesel engine, 3.68 kW at a speed of 1500 rpm with preheated vegetable oil with varied injection timing and injection pressure. They reported that preheated vegetable oil at 27° bTDC, decreased particulate matter emissions by 8–9%, NO_x emissions by 5–6%, when compared with normal vegetable oil.

Increased injector opening pressure may also result in efficient combustion in compression ignition engine It has a significance effect on the performance and formation of pollutants inside the direct injection diesel engine combustion. Experiments were conducted on conventional four stroke diesel engine, with neat diesel operation with increased injector opening pressure. [9]–13]. They reported that particulate emissions decreasd while NO_x levels increased with an increase of injection pressure.

Experiments were conducted on conventional four stroke diesel engine, 3.68 kW at a speed of 1500 rpm with vegetable oil operation with increased injector opening pressure. They reported that performance of the engine improved with increased injector opening pressure with vegetable oil operation.[5]–[6]. It decreased particulate emissions by 20–22% and increased NO_x levels by 10–14% with an increase of injector opening pressure by 80 bar.

EFFECT OF INJECTION TIMING ON EXHAUST EMISSIONS AND COMBUSTION CHARACTERISTICS OF DIRECT INJECTION DIESEL ENGINE WITH AIR GAP INSULATION

N. Janardhan[1]

[1]Mechanical Engineering Department, Chaitanya Bharathi Institute of Technology,

Gandipet, Hyderabad 500 075, Telangana State, India,

[1]E-mail: narambhatlu.datta@gmail.com,

Abstract: Experiments were carried out to study exhaust emissions of diesel engine with air gap insulated low heat rejection (LHR–2) combustion chamber consisting of air gap insulated piston with 3 mm air gap, with superni (an alloy of nickel) crown, air gap insulated liner with superni insert with neat diesel with varied injection timing. Exhaust emissions of particulate emissions and nitrogen oxide (NO_x) levels were determined at various values of brake mean effective pressure (BMEP) of the LHR-2 combustion chamber and compared with neat diesel operation on conventional engine (CE) at similar operating conditions. Combustion diagnosis was carried out using miniature Piezo electric pressure transducer, TDC (top dead centre) and special pressure-crank angle software package at full load operation. The optimum injection timing was found to be 31°bTDC (before top dead centre) with conventional engine, while it was 29° bTDC for engine with LHR–2 combustion chamber with diesel operation. Engine with LHR–2 combustion chamber with neat diesel operation showed increased particulate emissions and NOx levels at manufacturer's recommended injection timing of 27° bTDC, and the they improved marginally with advanced injection timing of 31°bTDC in comparison with CE at 27°bTDC.

Keywords: Conservation of diesel, conventional engine, LHR combustion chamber, Performance.

I.INTRODUCTION

In the scenario of i) increase of vehicle population at an alarming rate due to advancement of civilization, ii) use of diesel fuel in not only transport sector but also in agriculture sector leading to fast depletion of diesel fuels and iii) increase of fuel prices in International market leading to burden on economic sector of Govt. of India, the conservation of diesel fuel has become pertinent for the engine manufacturers, users and researchers involved in the combustion research. [1].

The nation should pay gratitude towards Dr. Diesel for his remarkable invention of diesel engine. Compression ignition (CI) engines, due to their excellent fuel efficiency and durability, have become popular power plants for automotive applications. This is globally the most accepted type of internal combustion engine used for powering agricultural implements, industrial applications, and construction equipment along with marine propulsion. [2–3].

The concept of LHR combustion chamber is to reduce coolant losses by providing thermal resistance in the path of heat flow to the coolant, there by gaining thermal efficiency. Several methods adopted for achieving LHR to the coolant are ceramic coated engines and air gap insulated engines with creating air gap in the piston and other components with low-thermal conductivity materials like superni, cast iron and mild steel etc.

LHR combustion chambers were classified as ceramic coated (LHR–1), air gap insulated (LHR–2) and combination of ceramic coated and air gap insulated engines(LHR-3) combustion chambers depending on degree of insulations.

Wallace et al. also studied the performance of the insulated piston engine in which air gap thickness was maintained at 2-mm. [4]. The major finding was increase of particulate emissions due to reduction of air–fuel ratios from 18.27 to astonishingly small 12.76, which was inadmissible in practice.

Karthikeyan et al. studied the performance of a diesel engine by insulating engine parts employing 2-mm air gap in the piston and the liner, thus attaining a semi-adiabatic condition. [5]. The nimonic piston with 2-mm air gap was studded with the body of the piston. Mild steel sleeve, provided with 2-mm air gap was fitted with the total length of the liner. They reported increase of particulate emissions at all loads, when compared to neat diesel operation on conventional engine. This was due to higher exhaust gas temperatures.

Jabez Dhinagar et al. conducted experiments on LHR engine, with an air gap insulated piston, air gap insulated liner and ceramic coated cylinder head. [6]. The piston with nimonic crown with 2 mm air gap was fitted with the body of the piston by stud design.

ICAAMM-2016

Vibration Isolation of the Wind Tunnel Drive System

Gopal[a], Dr L Suresh Kumar[b], V Jaipal Reddy[c], M Uma Maheshwara Rao[d], K PavanKumar[e1]

[a]Chinthalapudi Engg College, Ponnur, Guntur 522124, India
[&cb]C.B.I.T, Hyderabad, Telangana, India.[d&e] SMICH, Hyderabad, Telangana, India.

Abstract

The paper deals with the analysis of the wind tunnel drive to isolate the vibrations generated during testing. A wind tunnel is a tool used in aerodynamic research to study the effects of air moving past solid objects. Wind tunnels involve intricate study of various parameters by the addition of various accessories to the model. At the test section, the lift forces are predominant due to the vibrations. The aerofoil structure which is placed in the test section for study gets disturbed by the vibrations which effect the coefficient of lift parameter. Keeping in view all these effects, the study of vibrations is essential to minimize vibrational effects over mechanical components.

The torsional natural frequency of the wind tunnel system is found out by both Analytical method and Finite Element (or) Eigen value methods. The mode shapes are drawn. Mathematical modelling of the physical system is done. Critical speeds are calculated. The amplitudes of vibration prior to the introduction of damping were measured. Suitable Dampers are selected and placed under the wind tunnel system for vibration isolation. Damping pads are selected as they are a perfect match for this wind tunnel. Isolation of the vibrations are confirmed by both analytical calculations and practical values measured by the vibration analyzers.

Keywords:Wind tunnel; Torsional vibrations; Critical speeds; Transmissibility; Damping; Isolators;

[1]   * G Gopal. Tel.: +91 94416 32074.
        E-mail address:cadcamgopal@gmail.com

Investigation on the Performance of Photovoltaic Panel with Various Filters

(At rural areas of bale robe region in Africa continent)

D.Ravi[1]
[1]Assistant professor
CBIT,Hyderabad
India-500075
ravid.346@gmail.com

Samson yohennes[a]
[a]Head of the Department
MW University
Bale Robe, Ethiopia-247
enkusam@gmail.com

HabtamuMitikuFeyissa[b]
[b]college of Engineering
Research and Technology.
Transfer coordinator
hmitiku21@gmail.com

[*]B.Koteswararao
[*]Lecturer
MW university
Bale robe, Ethiopia-247
basam.koteswararao@gmail.com

Abstract: The world looking towards the alternative energy sources because the utilization of conventional fuel is more and its impact on the environment is also more.The solar power is clean, cheap and availability is plenty. The sun intensity is various from place to place and available at remote areas. Even though we are having plenty amount of solar energy availability but we are unable to utilize solar energy effectively due to wave length variation and intensity variation. Our endeavor is effective utilization of solar energy at robe region where there is no electricity. In robe region, the availability of sun light is 13 hours per day that is morning 6 am to evening 7 pm. This experiment conducts with different filters and without filter on photovoltaic panel to find the effective utilization and for best efficiency level. Around 90 days we conducted this experiment. Every day we taken reading from morning 8 am to evening 5 pm. The best power generation values considered from each filter.
Keywords: Efficiency, Electricity, Energy, Filter, solar, Utilization.

1.INTRODUCTION

A photo voltaic cell [1] is device which converts heat energy into electrical energy. A typical solar module has an efficiency in the range of 33%.the left over energy is transformed into heat and this heat [2] emitted in the form radiation into atmosphere. The output efficiency drop owed to augment in temperature of the panel and not incident enough sun intensity on the panel due to atmosphere conditions. Many experiments conducted on solar panel to enhance the efficiency and output of the panel. The wave [3] length of sun light has a substantial impact on the competence of PV panels. The present existing PV panels retort well up to certain levels but not all wave lengths. Various PV modules designed to work effectively at various wave length liable on the ingredients use to produce them. The noticeable light spectrum [4] runs from approximate 460×10^{12} Hz 9red color to 760×10^{12} (Blue color). The following table.1 shows the various wavelengths of light spectrum.

TABLE:1. DIFFERENT WAVELENGTHS OF SPECTRUMS OF WHITE LIGHT[1]

Light color	Approximate Wave lengths(nm)
Red	630-790
Yellow	580-610
Green	490-580
Blue	460-490
White	380-790

2.EXPERIMENTAL

SETUP The system consisting of
1.Solar panels 100W (5 pieces) 2.Multi meters
3.connecting cables
4. Filter papers (4 types)
The PV module specifications shown in the Table.2.

TABLE:2. SPECIFICATIONS OF THE POLY CRYSTALLINE MODULE

Poly crystalline Blue cells	100 W
No of cells	72
Minimum power output	89 %
Maximum power	90 W
Voltage pmax	24 V
Current at Pmax	5.0 A
Short circuit current	5.7 A
Open circuit voltage	27.4 V
Cell operating temperature	-45^0 C to $85\,^0$ C
Weight	9.3 Kg
Dimensions	Dimensions 1090 L X 665 W X 35 mm
Power tolerance	+ / - 5%

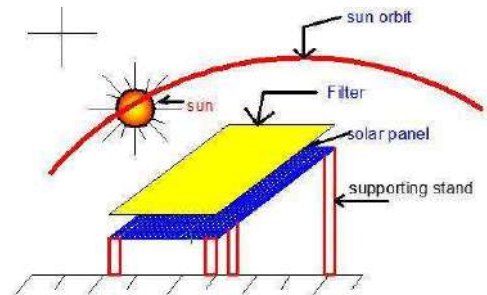The total experiment arranged as following shown in Figure:1.

Figure:1. Experimental setup

The experiment conducted from March 1 2017 up to May 30 2017. The obtained readings shown in the following table.3. The voltage values and current values taken based on hour

REVIEW ON DIFFERENT LOAD RESONANT CONVERTERS SUITABLE FOR DISTRIBUTED POWER SYSTEM (DPS)

Kowstubha. P

Department of Electrical and Electronics Engineering,
Chaitanya Bharathi Institute of Technology, Hyderabad, India

ABSTRACT:

In this paper, an emphasis and analysis of various types of load resonant converters are reviewed to select a favorable Front-end DC/DC converter topology for the application in Distributed Power system (DPS). DPS is a widely used configuration in server and telecom power systems because of its high flexibility, reliability and efficiency. DPS concept is used in the critical components like computer peripherals like CPU such as video adapter, modem-card or network-card etc., In this paper, the three load resonant converter topologies, Series Resonant Converter (SRC), Parallel Resonant Converter (PRC), Series Parallel Resonant Converter (SPRC, also called LCC resonant converter) are investigated with their analysis. The major objective is to evaluate with wide input range for the performance of the converter.

Keywords: Distributed power system, Computer peripherals, Load resonant Converters, LCC and LLC resonant converters.

1. INTRODUCTION

In Pulse-Width-Modulated (PWM) converters, the controllable switching devices are operated in switch mode. But, in this mode of operation, the switching devices are required to turn on and turn off at entire load current with a high value of di/dt. Therefore, the switching devices experience high switching stress and increased switching losses. These switching losses increase linearly with the increase of switching frequency of PWM. This operation causes high values of di/dt and dv/dt leading to the increase of electromagnetic interference. These disadvantages of PWM converters could be overcome with Resonant Converters operating at high frequencies [1]-[5] In these resonant converters, the PWM switch is replaced with a resonant switch, where the current through and voltage across the switch are forced to pass

Parallel ICI Cancellation of MC-CDMA Systems under Typical Urban Channel

[1]Mr. K.V. Murali Mohan and [2]D. Krishna Reddy

[1]Research Scholar in Rayalaseema University,
Holymary Institute of Technology & Science, Bogaram (V), Keesara (M), Hyderabad, India
[2]Professor in ECE Dept. Chithanya Bharathi Institute of Technology, Gandipet, Hyderabad, India

Abstract: Multi carrier systems are robust to channel noise, however due to Doppler shift and carrier frequency offset there arises inter carrier interference which degrades the performance of the system. In this paper a parallel cancellation algorithm in spatial frequency domain is proposed to mitigate the effect of ICI, the performance of the approach is evaluated under typical urban channel environment. A clear analysis is performed to adapt the modulating frequency with a finite set of sub carriers

Key words: ICI cancellation · Multi carrier system · Parallel cancellation MC-CDMA

INTRODUCTION

Modern electronic gadgets require high data rate wireless transmission which can be attained only when the ICI can be mitigated to mere level. Multi carrier code division multiple access (Mc-CDMA) reaps the benefits of both OFDM and CDMA where the data is spreaded by spreading codes such as gold codes, Pseudo Noise sequences, Walsh Hadamard sequences and mapped into sub carriers which are spread in frequency domain [1]. This approach finds its own trademark for high speed data transmission over different multipath propagation channels. However, due to the miss-match of carrier frequency offset and Doppler shifts the orthogonality between the subcarriers is lost resulting in ICI. This interference degraded the BER performance of the multi carrier system and hence it is to be treated with appropriate equalization methods [2].

ICI is caused due to the difference between the transmitter and receiver local oscillator frequencies which may be due to the presence of Doppler shift occurred in the channel. This undesired ICI deteriorates the performance of the multi carrier system so there is huge demand of ICI mitigation methods. This paper presents parallel cancellation for space frequency coded system which is incorporated for MC-CDMA systems. This approach is robust to the variation in the size of blocks and lowers the error for multi carrier systems.

This paper is organized as, section 1 presents the need and necessity of ICI cancellation algorithms, section 2 presents the related work done by earlier researchers, section 3 presents the proposed approach for MC CDMA system and its mathematical analysis, section 4 presents the experimental results achieved under varying different constraints and the achievements that could be attained with the proposed approach.

Related Work: Many ICI cancellation approaches are proposed so far for multi carrier systems, some of them which are related to the work are presented in this section.

In [3] seyedi *et al.*, presented a general ICI self-cancellation scheme that can be implemented through windowing at the transmitter and receiver and this approach requires 2N additional multiplications, where 'N' is the number of sub carriers.

In [4] Yeh *et al.* propose a parallel cancellation approach for space time coded system, apart from low complexity it also inherits the backward property of traditional parallel cancellation approach

In [5] Li *et al.* presented ICI self cancellation for coded OFDM systems, which integrates the ICI self-cancellation technique into the Index modulation-OFDM framework and able to achieve an attractive tradeoff between the spectral efficiency and ICI cancellation performance of the system.

Corresponding Author: Dr. D. Krishna Reddy, Professor in ECE Dept. Chithanya Bharathi Institute of Technology, Gandipet, Hyderabad, India.

The Design of Cascode, Shunt feedback Low Noise Amplifiers in 180nm Technology for WiMAX Applications

M.Ramana Reddy

Assistant professor, Department of Electronics and communication engineering,
Chaitanya Bharathi Institute of Technology, CBIT Campus, O.U, Hyderabad, Telangana, India.
Orcid Id: 0000-0001-1854-4896

N.S.Murthy Sarma

Professor, Department of Electronics and Communication Engineering,
JNTU University, Sreenidhi institute of Science and Technology, Hyderabad, Telangana, India.

P.Chandrasekhar

Professor and Head, Department of Electronics and Communication Engineering,
Osmania University, Hyderabad, Telangana, India.

Abstract

The proposed designed cascode common source, Shunt feedback LNA topology structures are a fully integrated at 5.9 GHz. The low noise, low power, high gain CMOS LNAS are designed for an WiMAX applications with TSMC 0.18μm RF CMOS process and are operated with a 1-V supply, the cascode LNA achieved the best performance with a simulated gain of 16dB and noise figure of 1.85dB. Similarly Shunt feedback LNA achieved forward gain of 20dB and noise figure of 2.34dB.The proposed structures has been simulated using cadence spectre RF.

Keywords: RF CMOS, VLSI Design, Low noise amplifier, Cascode , WiMAX, TSMC.

INTRODUCTION

The WiMAX is a new wireless wideband technology specified by IEEE 802.16e standards. Since last decade several CMOS LNA'S have been reported at 802,11/6,802.11/a and GSM. The network structures developed for existing internet is insufficient, such that so many developers are tried to improve this problem. The CMOS technology [1] is the best solution for low cost, for high integration processing and analog circuits to be mixed with [1] From fig (1), the low noise amplifier is one of the most crucial blocks in a receiver section of communication systems. Because of the sensitivity is mainly determined by the LNA performance with respect to mainly noise figure and gain.LNA is first stage of receiver such that it provides better input impedance matching. [1, 2]
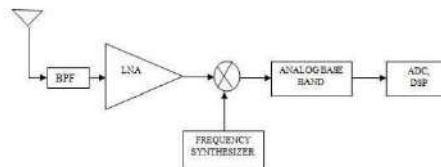

Figure.1: The basic receiver block diagram with LNA [1]

WiMAX is a communications technology which stands for Worldwide Interoperability for Microwave Access. It belongs to the IEEE 802.16 family of standards, which aim to provide wireless broadband access. There are two types of WiMAX systems: Fixed WiMAX and Mobile WiMAX. The fixed WiMAX system does not allow handoff between base stations. Mobile WiMAX on the other hand provides both mobile and fixed services. The WiMAX provide 75mbps data rate with coverage area 50km range by a metropolitan area network access scheme and also cope with NLOS(none line of sight) and LOS(line of sight) transmission conditions. It can also expand 3G, Cable modem, wired broad band access. [1, 2].

BASIC LNA REQUIREMENTS

1. Gain (10-20 dB) to amplify the received signal and to reduce the input referred noise of the subsequent stages.

2. Good linearity: Handling large undesired signals without much distortion.

3. Low noise for high sensitivity

4. Maximum power gain 50 Ω termination for proper operation and can route the LNA to the antenna which is located an unknown distance away without worrying about the length of the transmission line [1,7].

MC-CDMA Performance Analysis with RNS Precoding Under Different Radio Channels

Mr K. V . Murali Mohan & Dr D Krishna Reddy

Research Scholar in Rayalaseema University Holymary Institute of Technology & Science, Bogaram(V), Keesara(M),Hyderabad.

Professor in ECE Dept. Chithanya Bharathi Institute of Technology, Gandipet, Hyderabad.

Abstract: Multi carrier systems are more robust to noise and fading caused with multi path propagation channels and this is heavy when the data transmitted is of high data rate. This paper presents a speed and effective RNS precoding approach for MC-CDMA systems. This approach mainly concentrates to minimize the PAPR and to improve the BER performance which is analyzed under different radio channels. The main advantage of this method is that it doesn't require side lobe information and also mitigates the non linear distortions.

Key words: MC-CDMA, Spreading codes, Residual number system, PAPR

I Introduction

Multi carrier code division multiple access (MC-CDMA) which is integration of OFDM with CDMA is introduced in 1993 [1]. The main idea of this technology relies in transmitting the high data rate stream into 'N' low data rate parallel streams in different sub carriers. Latest 4G and 5G technologies mainly concentrate on minimize the inter carrier interference and inter symbol interference in high data rate streams. MC-CDMA is one of the solutions for this problem which combines the benefits of both CDMA and OFDM technologies. In MC-CDMA, the data symbols are spreaded by different spreading codes like Pseudo Noise codes, Gold Codes, and Walsh Hadamard codes which are mapped for every symbol in the sub carrier [2].

MC-CDMA finds its own advantages in transmitting high speed data over fading channels but as in the case of OFDM this approach also suffers from PAPR which leads to the degradation of efficiency in transmitting the signal. Furthermore it introduces the complexity in designing the ADC which results in poor BER and high power consumption. So in this paper a fast and effective way of precoding approach is presented which mainly intends to

decrease the PAPR and improves the performance of the MC CDMA system under different channeling environments.

This paper is organized as follows, section I , presents the brief introduction regarding the implication in MC CDMA systems, section II provides a brief literature on the work done so far in the related research area and their outcomes. Section III provides the information reading the concepts involved in analysis of the approach. Section IV presents the proposed approach to mitigate the PAPR and to enhance BER proceeding with the experimental values that are achieved.

II Related work

MC-CDMA is a very attractive technique for high speed data transmissions over multi path fading channels. It incorporates high security while minimizing the multipath fading effects [3]. There are certain technical issues in this technology such as Time-dispersion, Doppler-spreading, frequency and phase offset synchronization, sub carrier selection and PAPR. After all PAPR causes severe performance degradation in transmitting the signal. Many researchers have proposed several algorithms to mitigate this problem few of them which are correlated with the paper is presented.

A compression and expanding technique is proposed by Jiang et.al in [4], clipping and filtering is the simpler approach but increases in band distortions which in turn increases the BER. The use of companding finds good use rather than clipping, a similar approach with airy function is proposed by Yuan .J et.al in [5].Various coding mechanisms like use of Huffman coding [6], Zade-off-chu matrix [7]. In [8] Vijayarangan et.al , proposed pulse shaping raised cosine pulse waveform for minimizing PAPR without use of side information which seems to be more effective and simpler.

Finger Vein Authentication Using Biometric Graph Method

Mrs. D.DEEPIKA ; Mr. A.KRISHNA KUMAR ; Ms. K.SWETHA REDDY ; Mr. K.SHIVA ADITHYA

Assistant Professor Dept. of Computer Science, Mahatmagandhi Institute Of Technology

Assistant Professor Dept. of Ece Chaithanya Bharathi Institute Of Technology

3-4 B.Tech, H. T. No: 14261A0588 Dept. of Computer Science, Mahatma Gandhi Institute Of Technology

E-mail:deepika.deshmukh@mgit.ac.in ; E-mail:a.krishnakumar@cbit.ac.in

ABSTRACT:

The main objective of this mini project is to find out how well the biometric graph matching method for authentication of finger vein biometrics works. Finger vein recognition is a method of biometric authentication that uses pattern-recognition techniques based on images of human finger vein patterns beneath the skin's surface. Finger vein recognition is one of many forms of biometrics used to identify individuals and verify their identity. Finger Vein ID is a biometric authentication system that matches the vascular pattern in an individual's finger to previously obtained data. Blood vessel patterns are unique to each individual, as are other biometric data such as fingerprints or the patterns of the iris. Unlike some biometric systems, blood vessel patterns are almost impossible to counterfeit because they are located beneath the skin's surface.

The basic principle of biometric graph matching authentication technique is when the finger vein image captured from an infrared camera undergoes several image processing steps to be represented as a graph. The graph captured and the graph present in the database is aligned for matching the edges of the graphs. The amount of matched edge pairs are a measure for the similarity of the graphs. At the end of the project we would be able to answer the following.

1. Is the biometric graph matching method a suitable method for comparing finger vascular patterns, given that we use the best performing existing vein vessel network extraction method?

2. How can we improve the performance of our implementation of the biometric graph matching method?

3. How can we make the biometric graph matching method more specific to finger vein authentication in order to improve the recognition performance?

INTRODUCTION TO FINGER VEIN BIOMETRICS

Finger vein ID is a biometric authentication system that matches the vascular pattern in an individual's finger to previously obtained data. Hitachi developed and patented a finger vein ID system in 2005. The technology is currently in use or development for a wide variety of applications, including credit card authentication, automobile security, employee time and attendance tracking, computer and network authentication, end point security and ATM machines.

Compared to the other biometrics, Finger vein biometrics is easy to use and more comfortable. For the safety reason, the opposite biometrics, fingerprint, face reputation, voice popularity, Iris reputation are used. Earlier, the authentication was based on keys, password and magnetic card which are not safe as they will be stolen effortlessly or easily forgotten. To provide better protection, biometrics technology is implemented in a huge variety of system. Finger vein era has the exclusive vein patterns for the different

Detection and Elimination of Wormhole Attacks in a MANET

A.Vani

Dept. of ECE, Chaitanya Bharathi Institute of Technology (Autonomous), Hyderabad, India

Corresponding Author: vanialamur@cbit.ac.in

Available online at: www.isroset.org

Abstract—Wormhole attacks in Mobile ad hoc networks is impermeable to traditional security measures. The attack can be launched regardless of the MAC, routing, or security protocol used in the network. Two or more malicious nodes in conspiracy usually perform the wormhole attack. Two malicious nodes at different locations send received routing messages to each other via a secrete channel. In this way, although the two malicious nodes are located far from each other, they appear to be within one-hop communications range. Wormhole nodes can successfully execute such attacks without compromising any computer, and are inevitable even though some ad hoc wireless networks provide authenticity and confidentiality protection. Practically all widespread security extensions are proposed for popular routing protocols but they do not alleviate wormhole attacks. However, since wormhole attack such a severe thread to MANET security. In this situation wormhole attack methodology presented is motivated by WARP and the same procedure and terminology is used but slight modification In this work wormhole attack is detected and eliminated by simply modifying AODV routing protocol and its performance is measured.

Keywords— MANET, Routing, AODV, Wormhole attack, WARP

I.INTRODUCTION

Mobile ad hoc network formed temporarily for emergency needs and emerged with great popularity because the networks has no fixed infrastructure, dynamic and scalable. These networks mainly used for battlefield and emergency conditions and hence security is the main problem. In a MANET, a node can join a network automatically if the network is in the radio range of the node, thus it can communicate with other nodes in the network. MANET is more susceptible to attacks when no secure boundaries used. These networks exposed to attacks due to their security vulnerabilities. Wormhole attack is the one of the most serious attack that affects the availability and confidentiality security services.

Rest of the paper is organized as follows, Section I contains the introduction of Mobile ad hoc networks , Section II contain the related work of Wormhole attacks, Section III contain the methodology and procedure for proposed algorithm, Section IV describe the results and discussions and Section V presents conclusion and future scope.

II.RELATED WORK

Several solutions have been proposed in the literature for wormhole attacks in MANET.

In [1, 2], who introduced wormhole attacks in ad hoc networks, suggested the use of geographical or temporal packet leashes to detect wormholes. A geographical leash (location-and time-based approach) requires each node to know its own location and all nodes to have loosely time synchronized clocks. The nodes need to securely exchange the information and have to authenticate the location and time information.

S.Capkun, L.Buttyain, and J.-P. Hubaux, SECTOR: secure tracking of node encounters in multi-hop wireless networks [3].Presented a protocol (distance bounding approach) that is based on distance bounding and does not require synchronization or location information to prevent wormhole attacks. However, they depend on a secure challenge request-response and require accurate time measurements. They assumed that the network operates with central authority that controls the network membership and assigns unique identity to each node.

In [4], using Directional antennas to prevent worm hole attack (special hardware approach). They assumed that the antennas on all nodes are aligned (which may be difficult in practice) and share a secret key with each other

Khalil et al have developed two protocols to defend against wormholes: LITEWORP [5] and MOBIWORP [49].

A New Technique Based on Grey Model for Forecasting of Ionospheric GPS Signal Delay Using GAGAN Data

Ginkala Venkateswarlu[1, *] and Achanta D. Sarma[2]

Abstract—The ionospheric GPS signal delay which is a function of TEC plays a major role in the estimation positional accuracy of satellite based navigation systems and detrimental to position estimation, especially in strategic applications. Ionospheric TEC is a function of geographical location (Latitude, Longitude), time, season, etc. In this paper, we propose a system theory based Grey Model (GM(1,1)) which uses past and present data for forecasting TEC (GPS signal delay). In this model, data of nine sequential days from five stations of a GPS Aided Geo Augmented Navigation (GAGAN) system network located at different places representing different latitudes, longitudes and equatorial anomaly regions are used to forecast the 10th day TEC values. The performance of the model is assessed by comparing the statistical parameters such as Standard Deviation (SD) and Mean Square Deviation (MSD). The forecasted results are very encouraging. For all the considered five stations, forecasting is better for post sunset time than day time. Also, the results indicate that SD and MSD values are comparatively higher for Trivandrum (near geomagnetic equator) and Ahmedabad (near the crest of the equatorial anomaly region) stations. These results indicate that the proposed model is useful for forecasting of GPS signal delay both for civil aviation and strategic applications.

1. INTRODUCTION

The Global Positioning System (GPS) is a satellite based navigation system that provides user position, velocity and time information in all weather conditions. Like GPS, other satellite based navigation systems such as GLONASS of Russia, Galileo of Europe, Compass of China and IRNSS of India have come up. In order to receive and utilize signals from these systems, the receiver antenna should have a wide bandwidth and high performance [1]. Characterization of GPS signals is very important in evaluating the overall performance of the navigation system. The propagating GPS signals experience different effects in different environments and need statistical techniques to assess the effects. The satellite signals propagate through various atmospheric layers including ionospheric layers and reach the user receiver. Therefore, the accuracy of the user position is limited by a number of errors including ionospheric time delay of the signals and multipath. The signal may reach the receiver by taking multiple reflections from the surrounding environment resulting in multipath. The effect of multipath can be mitigated by using various adaptive filtering techniques [2]. Forecasting the delay would be very helpful in strategic applications. As the ionosphere is dispersive medium, using a dual-frequency GPS receiver, the delay can be estimated by using the code phase and/or carrier phase measurements. Ionospheric delay depends on Total Electron Content (TEC) along the signal propagation path from satellite to receiver. The TEC is a function of solar radiation, season, day, time of the measurements and receiver location. In the last two decades, several grid models have been proposed to predict the

Time Frequency Analysis of LPI radar signals using Modified S transform

Metuku Shyamsunder

*University College of Engineering,
Osmania university, Hyderabad-500007, India*

Kakarla Subba Rao

*Chitanya Bharathi Institute of Technology,
Hyderabad-500029, India.*

Abstract

Features of LPI radar have been the challenge for ESM receivers for the identification of modulation parameters. Many signal processing algorithms were developed for improving the efficiency of ESM receiver performance. We apply the S transform method to construct the spectrogram of received signal. We also propose a novel technique by including the signal dependent parameters in S transform. Polyphase signals of LPI radar P1, P2, P3 and P4 are analyzed to estimate the parameters Carrier frequency (fc), bandwidth (BW), code rate (Rc), cycles per phase(CPP) and no of phases(N).The analysis is done for LPI signal under different Signal to noise ratio conditions.

Keywords: Intra Pulse Modulation, LPI-Low Probability of Intercept, Time Frequency Algorithms, S transform

I. INTRODUCTION

Low Probability of Intercept radar uses the intra-pulse modulation schemes to improve the range resolution by transmitting the longpulses.LPI radar works on principle of spreading the transmitted waveform in wideband noise. Advanced signal processing algorithms were applied to extract the LPI radar signal from wideband noise. LPI radars attempt to detect targets at longer ranges than intercept receivers at the target can detect the radar. Thus, the objective of an LPI radar is "To See and Not Be Seen" or "To Detect and Not Be Detected" [1].In LPI radar the role of frequency agility described by[2] makes ESM receivers to find carrier frequency with coherent techniques. If the total

Automatic Speech Recognition system for class room database management in Fixed – C Language

*MounikaJammula

Assistant Professor, Chaitanya Bharathi Institute of Technology, Hyderabad.
*Corresponding Author: *MounikaJammula*

Abstract: *Speech is a natural mode of communication for people. People are more comfortable with speech to interact with computers than using of interfaces such as keyboards and pointing devices. This type of speech interfaces finds applications in many areas like telephone directory assistance, hand busy applications in medicine or field work or even automatic voice translation into foreign languages. The speech recognition involves many real time challenges. These challenges arise as the system may need to deal with different people with different accents and dialects. Moreover a person does not speak the same word alike twice and the biggest challenge of all is that the speech recognition system should be capable of working with continuous speech. There shall also be the concern of invasion of channel noise. In the current paper, the automatic speech recognition system is implemented for Isolated words, which in turn can be made part of any standalone application like class room data base management. The training and the implementation is carried out for speaker independent isolated word speech recognition. Furthermore this implementation is intended to be extended towards the usage in real time in the Digital signal processors. Once the ASR is realized on DSP's they can be brought into open market.*

***Index terms:** ASR, Mel scale, MFCC, DTW, Baum-Welch re-estimation.*

I. Introduction

Automatic Speech Recognition (ASR) is the process of converting an acoustic signal, captured by a microphone or a telephone, to a set of words. The recognised words can be used for applications such as commands & control, data entry, and document preparation. They can also serve as the input to further linguistic processing in order to achieve speech understanding. Speech recognition is different from speaker verification and speaker identification. Speech recognition is detecting what a person says, where as speaker verification authenticates a person as who she/he claims to be and speaker identification assigns an identity to the voice of an unknown person.

The steps involved in ASR systems are speech data acquisition, feature extraction, training the features of the data for obtaining the acoustic models for words or phonemes, language modeling and finally recognition of the speech with developed models.

ASR finds huge number of applications in diversified fields, such as Healthcare, Training Air Traffic Controllers, Hands-Free Computing, but not just limited to these areas and the possibilities are enormous.

Speech recognition is generally considered advantageous for users with limited mobility, such as those that are partially paralyzed. It allows them to type documents and use commands at nearly the same speed as those without this particular type of disadvantage. It is also useful for the general public, particularly for those that are less computer literate or those that are not able to type quickly (such as those that cannot "touch type").

A. Challenges in Speech Recognition

Humans use more than their ears while listening and they utilize the knowledge they have about the speaker and the subject. Words are not arbitrarily sequenced together, there is a grammatical structure and redundancy that humans use to predictwords not yet spoken. Furthermore, regular phrases that are used usually that is, the sentences more often expressed make prediction even easier. In ASR there is only speech signal. In recent times, model for the grammatical structure and also some kind of statistical model to improve prediction are being constructed, but there is still the problem prevailing in terms of modeling i.e. world knowledge, the knowledge of the speaker. This is encyclopedic in nature and still beyond the understanding. The main challenge in here may not be to model world knowledge exhaustively, but as how much ASR needs can to scale nearer to human comprehension.

Outstanding work in speech recognition and computing has produced the commercial ASR systems for voice-driven computing and word-processing systems in English and European languages. Though significant
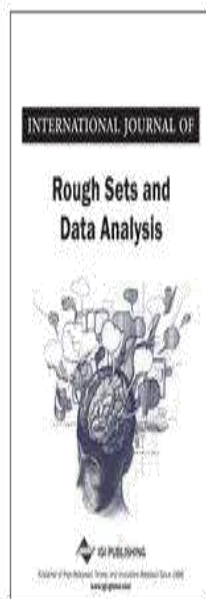
Detecting Communities in Dynamic Social Networks using Modularity Ensembles SOM

Raju Enugala (SR Engineering College, Department of Computer Science and Engineering, Warangal, India), Lakshmi Rajamani (Osmania University, Hyderabad, India), Sravanthi Kurapati (Kakatiya University, Warangal, India), Mohammad Ali Kadampur (Saudi Electronic University, Department of Computer Science & Information Technology, Riyadh, Saudi Arabia) and Y. Rama Devi (Chaitanya Bharathi Institute of Technology, Hyderabad, India)

Abstract

Social network analysis has gained much importance these days. Social network analysis is the process of recording various patterns of interactions between a set of social entities. An important phenomenon that draws the attention of analysis is the emergence of communities in these networks. The understanding and detection of communities in these networks is a challenging research problem. However, approaches to detect communities have largely focused on identifying communities in static social networks. But real-world social networks are not always static. In fact, many social networks in reality (such as Facebook, Bebo and Twitter) are dynamic networks that frequently change over time. In this paper, a framework is proposed for community detection in dynamic social networks, which explores self-organizing maps (SOM) for cluster selection and modularity measure for community strength identification. Experimental results on synthetic network datasets show the effectiveness of the proposed approach.

Article Preview

Top

Introduction

Social network analysis has gained much attention. Social network analysis is emerging as one of the most important research domains by which useful information from social network data can be extracted. Social networks, such as Twitter, Bebo and Facebook, are growing rapidly in recent years. A social

PGNBC: Pearson Gaussian Naïve Bayes classifier for data stream classification with recurring concept drift

Article type: Research Article

Authors: Babu, D. Kishore[a;*] | Ramadevi, Y.[b] | Ramana, K.V.[c]

Affiliations: [a] Institute of Aeronautical Engineering (AUTONOMOUS),, Dundigal 500043, India | [b] CBIT, Gandipet, Telangana | [c] JNTU, Kakinada, Andhra Pradesh

Correspondence: [*] Corresponding author: D. Kishore Babu, Institute of Aeronautical Engineering (AUTONOMOUS), Dundigal 500043, India. E-mail: kishorebabujntu@gmail.com.

Abstract: In data stream classification, selecting the classifier for the dynamic feature space and considering the concept drift is a challenging task. This paper addresses the major challenges in the data stream classification with recurring concept drift. We developed a novel classification method known as Pearson Guassian Naïve Bayes classification (PGNBC). The proposed PGNBC method is the advancement over the existing Guassian Naïve Bayes classifier (GNBC) by additionally adding the correlation among the attributes. For the data stream classification, the proposed PGNBC is frequently updated based on the concept drift. This newly developed method is experimented by comparing the results with the existing methods such as RGNBC and MReC-DFS. The metrics such as sensitivity, specificity and accuracy are used for measuring the performance. It is found that the improvement in terms of sensitivity, specificity and accuracy values are better for the proposed method, with the values of 4%, 1% and 1% respectively, which is higher for the PGNBC method than the RGNBC method for the skin data. But with the localization data, the improvement in terms of specificity and accuracy values are 6% and 2% respectively which is higher than the RGNBC.

A Review on the Evolution of Resource Description Framework

D. R. Reddy, Ch Aparnadevi, Dr. Y. Ramadevi · Published 2017 · Computer Science

The enormous growth in computational speed and storage leads us to distributed and cloud computing. Today, the world runs on digital data, with the invention of the web, most of our data and resources are stored in the web. It has a vast amount of data which continues to grow at greater speed. In the past few years, technology has progressed with the increase in data size, creating boundless demand for a place to store and retrieve it. With this rapid increase, the issue of data scalability has become very important and various solutions using several new technologies have been developed to emphasize on scalability and query efficiency. One such standard that has been graded by the World Wide Web Consortium is the Resource Description Framework (RDF). This data model technology can be utilized to build an efficient and scalable system to retrieve the web resources. Cloud Computing, an emerging technology, also seems to offer some incredible benefits related to data scalability and efficiency. A new technique that takes the advantage of both RDF data management system and Cloud is being adopted to resolve the scalability issues, making it easy to apply all the data operations. Collapse

Adaption Model for Building Agile Pronunciation Dictionaries Using Phonemic Distance Measurements

Akella Amarendra Babu, Rama Devi Yellasiri, Natukula Sainath

Abstract—Where human beings can easily learn and adopt pronunciation variations, machines need training before put into use. Also humans keep minimum vocabulary and their pronunciation variations are stored in front-end of their memory for ready reference, while machines keep the entire pronunciation dictionary for ready reference. Supervised methods are used for preparation of pronunciation dictionaries which take large amounts of manual effort, cost, time and are not suitable for real time use. This paper presents an unsupervised adaptation model for building agile and dynamic pronunciation dictionaries online. These methods mimic human approach in learning the new pronunciations in real time. A new algorithm for measuring sound distances called Dynamic Phone Warping is presented and tested. Performance of the system is measured using an adaptation model and the precision metrics is found to be better than 86 percent.

Keywords—Pronunciation variations, dynamic programming, machine learning, natural language processing.

I. INTRODUCTION

PATTERN recognition in human is inherent ability to process the sounds and convert them into words. The input stream of speech is segmented into small segments of speech frames and converted into phonemes. The sequence of phonemes thus obtained, are converted into words. Due to pronunciation variability, a particular word will have many sequences of phonemes. These sequences are called pronunciation variations or accents.

The pronunciation varies from person to person, and a person pronounces the same word in a different way under different conditions of emotion, and thus, it results different speech patterns and pronunciations. For example, the speaking style changes when asking for cup of tea in the board room and asking for the same at home. Thus, pronunciation variability depends on the speaker's speaking style, mood, emotions [1], [2] and speaking habits like disfluencies [3]. The length of the vocal cords in the humans differs from person to person. Therefore, the frequencies generated would differ resulting in different pronunciation. The reasons for pronunciation variations are summarized in Fig. 1.

The articulators in humans position themselves in different ways to produce a sound wave. The articulators move

Akella Amarendra Babu is with St. Martin's Engineering College, Dhulapally, Secunderabad, Telangana State, India – 500100 (corresponding author, phone: +919849934000; e-mail: sababu.akella@gmail.com).

Rama Devi Yellasiri is with CBIT, Gandipet, Hyderabad, Telangana State, India (e-mail: yrd@cbit.ac.in).

Natukula Sainath (Associate Professor) is with St. Martin's Engineering College, Dhulapally, Secunderabad, Telangana State, India – 500100 (e-mail: nsainath@gmail.com).

continuously to produce different combination of sounds. As the articulators move in anticipation of the next sound, co-articulation effect takes place causing pronunciation variability.

The native language will influence the pronunciation of a person. For example, there are many languages spoken in India. The native language of the language has influence on the pronunciation of English language. Therefore, the pronunciation of English language spoken by different Indians will be different due to influence of the native language.

Fig. 1 Causes for pronunciation variability

In real-time scenario, humans use only a limited numbers of words for communication and therefore, those words and their pronunciation variations are remembered by them. The number of words will vary from person to person and it will vary between 600 to 200 words [4]. The pronunciations will be around 2 to 3 on average per word, and therefore, humans remember around 1200 to 6000 pronunciation variations. It is reasonable to expect the same number of words and their pronunciation in the front-end memory of machines as well [5], [6]. It keeps the size of the pronunciation dictionaries lean and agile.

Related literature is discussed in the next section. The human articulatory system is explained in Section III. Theory related to measuring acoustic distance between two phonemes is explained in Section IV. Process to measure the distance between various phonemes of a language is detailed in this section. Dynamic Phone Warping (DPW) algorithm is explained in Section V. Experiments for measuring acoustic distance between two words or two pronunciations are detailed in this section. Section VI covers the adaptation model which covers the building up of the pronunciation dictionaries using an adaption model. The adaptation model is described in detail. A parameter called critical distance is covered. The results are analyzed in this section.

A New Approach for Secure Traffic Data Analytics using Hadoop

[1] A.Pramod Kumar, [2]B.Sateesh

1 Assistant Professor, Matrusri Engineering College, Hyderabad, T.S, India
2Assistant Professor, Chaitanya Bharathi Institute of Technology,Hyderabad, T.S, India

Abstract: Nowadays traffic congestion is an extreme difficulty. Traffic congestion is most predominant in metro towns. There are distinct reasons for traffic congestion such as growing population, rising earning main to greater automobiles on the road, the inadequate capability of roads to address traffic and so on. A cluster of garage devices is wanted to save such big amounts of data and also a parallel computing version for studying the ones huge inputs of data. Hadoop is one such framework that gives the reliable cluster of storage facility, which stores huge statistics in an allotted way using a unique report machine, known as Hadoop Distributed File System and presents efficient parallel processing feature through MapReduce framework. Using Map Reduce the filtered traffic data may be fetched without problems, to offer quit user with traffic analysis and giving beneficial predictions.

Keywords- HDFS: Hadoop Distributed File System, Map Reduce

I. INTRODUCTION

The data of transportation industry have rich sources, diverse types, and new data is produced continually. customer information of rail way, road traffic, aviation industry, public transit, are recorded ,and tens of billionstravel records are generatedevery year. Operating data generated by transport companies, such as the data generated by the courier companies. Dynamic data generated by various sensors, such as induction coil at bayonet point, infrared detector, microwave detector, ultrasonic detector, laser detector, video detector, and so on, and the data are generated by GPS vehicle location tracking system and other mobile deviceseach year the amount of data generated by the transportation industry in a cityhas exceeded TB level, are developing from PB level to EB.A massive data storage space and equipment are required and it must have fault tolerance and stability.

One of the maximum useful applications of the structures hired in visitors control is the stepped forward ability to control the road community site visitors. Trucking strategies are used to seize the location and/or location of the large variety of cellular items. With the help of that tracked data, evaluation and prediction of traffic density in a given network is superior.

This renders precious data for controlling traffic waft, prediction of congestion and reducing the quantity of accidents in that network. The subject of huge data for resolving the above queries affords a brand new technical approach. Big data carried out to road visitors evaluation has the following benefits:

1. Traffic control mechanism that uses huge information generation can handle sizable amounts of complex and diverse facts. Big data have resolved 3 principal troubles: statistics storage data evaluation and data control. Hadoop is instinctive with the capability to handle large amounts of information wherein facts is segmented and is stored on different nodes. A big task is split into small duties and is processed in a MapReduce version. At the equal time, the device balance and fault tolerance are crucial.

2. Big data can improve the efficiency of transportation enterprise in large part. Transportation enterprise, related to many factors of work, need to address big amounts of data every day, desires more controlled mode of utility and has a superb deal of system. In the issue of improving delivery efficiency, enhancing the threshold capability of the road network, adjusting site visitors demands, large records technology has obvious blessings.

II. RELATED WORKS

A smart metropolis framework for intelligent traffic device using VANET turned into proposed in [2].

CrossMark

RESEARCH ARTICLE - COMPUTER ENGINEERING AND COMPUTER SCIENCE

RGNBC: Rough Gaussian Naïve Bayes Classifier for Data Stream Classification with Recurring Concept Drift

D. Kishore Babu[1] · Y. Ramadevi[2] · K. V. Ramana[3]

Abstract Due to the necessity of performing classification in streaming environments, researchers have developed various stream classification methods by handling concept drift. But, recurring concept drift is a challenging problem in data streams as the dimension of the data is not static over the period of time. By considering the recurring concept drift, this paper proposes a new classifier model, called Rough Gaussian Naïve Bayes Classifier (RGNBC) for the data stream classification. Here, two new contributions are made to handle the challenges of recurring concept drift. The first contribution is to utilize the rough set theory for detecting the concept drift. Then, gaussian naïve classifier is modified mathematically to handle the dynamic data without using the historic data. Also, the classification is performed using the posterior probability and the objective function which considers the multiple criteria. The proposed RGNBC model is experimented with two large datasets, and the results are validated against the existing MReC-DFS algorithm using sensitivity, specificity and accuracy. From the results, we proved that the proposed RGNBC model obtained the maximum accuracy of 74.5 % while compared with the existing algorithm.

Keywords Data stream · Recurring concept drift · Naïve bayes · Rough set theory · Classification

1 Introduction

Information extraction as models and patterns from continuous data streams is referred as data stream mining [1–3]. For data stream mining, literature presents several research works [3–5] which are mainly dedicated only to static environments by reading the complete dataset for the mining process. These datasets are stored electronically and can be accessed whenever it is required by the mining algorithm. Furthermore, the target concepts should be learned by the classifier which is a kind of mining algorithm. In past years, several solutions for static classification were developed and several accurate classifiers are also available in the literature [6, 7]. But, in latest applications, the learning algorithms are applied to dynamic environments, in which the data are generated continuously. Examples of such applications include telecommunication, sensor networks, traffic management, monitoring, and web log analysis [4]. For such applications, data classification becomes a big challenge for the researchers belonging to data stream mining community.

Commonly, the data streams are of infinite size and it cannot be stored in main memory. Thus, several challenges such as storage, querying and mining required much more attention. Here, mining is mostly linked with the computational resources to examine such a huge volume of data and therefore, it is broadly studied in the literature. It is suggested that the data streams must be processed in online manner to guarantee that the results are up-to-date and that the queries can be replied in real time with less delay [1]. Usually, data elements enter the system continuously at a high rate. Also, the concept of data can change at any time, called as concept drift [2, 3, 8]. Several approaches are proposed in the literature to deal with the concept drift [9–13] in data stream classification.

✉ D. Kishore Babu
  kishorebabujntu@gmail.com

[1] Jawaharlal Nehru Technological University, Kakinada, India

[2] CBIT, Gandipet, Telangana, India

[3] JNTU, Kakinada, Andhra Pradesh, India

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Journal of Chemical, Biological and Physical Sciences

Determination of blend level of biodiesel in petroleum diesel by ^{1}H NMR spectroscopy

K.Rajagopal[1*] and Adeel Ahmad[2]

[1]Department of Biotechnology, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad – 500075, Telangana, India.

[2]Biophysics unit, Department of Physics, Nizam College, Osmania University, Hyderabad – 500001, Telangana, India.

Abstract: Often biodiesel is used as blend component with Petroleum Diesel (PD). As the blend percent of biodiesel affects the performance of engine due to its poor cold flow properties and since, ^{1}HNMR is nondestructive and rapid spectroscopic technique, in the present work, the blend levels of Cotton Seed Oil Methyl Esters (CSOME) biodiesel and Palm Stearin Methyl Esters (PSME) biodiesel in PD were estimated using ^{1}H NMR spectroscopy. The values obtained were in good agreement with the known values with only maximum of 10 % deviation.

Keywords: CSOME, PSME, PD, biodiesel blends, ^{1}H NMR spectroscopy

1. INTRODUCTION

In the present scenario of global fuel crisis, one of the better alternatives to petroleum diesel (PD) is biodiesel. In general, it is obtained from transesterification of any vegetable oil and animal fat with methanol. Chemically biodiesel is a mixture of fatty acid methyl esters (FAME). The advantages of biodiesel are such as local availability, environmental friendly and renewability[1,2].

Instant Synthesis of ZnO Nanoparticles by Microwave hydrothermal Method

Madunuri Chandra Sekhar
*Department of Physics, Rayalaseema University,
Kurnool, A.P, India.*

M.Venkata Ramana
*Department of Physics, Govt. Arts & Science College,
Kothagudem, Telengana, India.*

Abstract

ZnO nano particles has been prepared for fulfilling the necessity of large scale application in modern research world. The present article reports a new, simple and highly efficient microwave assisted hydrothermal chemicalized precipitation method from a mixture of solutions like zinc acetate and sodium hydroxide. The current synthesis method has more advantageous parameters like low cost, rapid reaction rate, large yield production of ZnO nano particles. The obtained ZnO nano particles are within averaged diameter of 30-35 nm and were characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD), UV Spectroscopy, FTIR analysis from which the morphology and particle size of ZnO nano particles was revealed.

Keywords: ZnO nanoparticles, microwave radiation, hydrothermal

1. INTRODUCTION

The unique properties of ZnO nanostructures have attracted considerable attention for there potential technological applications [1]. The wide band gap of 3.3 eV and large excitonic binding energy of 60 meV as made ZnO nanostructures important both for scientific as well as industrial applications [2]. ZnO nanoparticles have pinnacle range of applications in ultraviolet (UV) lasers [3], power generators [4], solar cells [5], gas sensors[6], field emission devices [7], capacitors[8], photo printing [9],electro mechanical nano devices[10], sunscreen lotions[11]. In addition to ZnO nanoparticles [12-14] several forms like nanorods [15] nanofilms [16] can be synthesized. The ZnO Nanoparticles are having high surface area to volume ratio as well as good electrical, electro chemical and structural properties[17] in general there are many synthesis

SWIFT SYNTHESIS OF ZnO NANORODS BY MICROWAVE HYDROTHERMAL METHOD

MADUNURI CHANDRA SEKHAR[1] & M. VENKATA RAMANA[2]

[1]Department of Physics, Rayalaseema University, Kurnool, Andhra Pradesh, India

[2]Department of Physics, Govt. Arts & Science College, Kothagudem, Telengana, India

ABSTRACT

A new, simple, large yield, low cost, microwave assisted hydrothermal method to synthesize high quality ZnO nanorods has been adopted. The microwave assisted hydrothermal synthesis method brought significant benefits like greater speed and yield compared to the traditional methods. The present article utilized zinc acetate, sodium hydroxide solutions as precursors which exerted a tremendous effect on morphology and size of ZnO nanorods. The scanning electron microscoping (SEM), X-ray diffraction (XRD), UV Spectroscopy, FTIR analysis revealed the morphology and particle size of ZnO nanorods having around 40nanometer in diameter and 0.8micrometer in length formulate 150^0C with 120minutes growth time. This current method suitable for large scale production of ZnO nanorods and could be extended to metal oxide nanostructures.

KEYWORDS: ZnO Nanorods, High Yield Chemical Synthesis, Microwave Radiation & Hydrothermal Method

Original Article

1. INTRODUCTION

ZnO nanostructures has attracted intensive research effort for its unique properties for versatile application [1]. ZnO nanorods are attracting much interest several applications such as nanophotonics [2], dye-sensitized solar cells [3, 4], electron field emitters [5, 6], field effect transistors [7] and piezotronics [8]. Among various synthesis methods the microwave assisted hydrothermal synthesis has emerged as a powerful method for the synthesis of ZnO nanorods with some significant advantages such as cost effective large yield and less complicated technique [9]. Among several oxides semiconductors ZnO nanorods is considered to the best application material than other metal oxide nanorods [10]. Therefore the development of new, simple, cost effective and large scale synthesis roots for high quality ZnO nanorods is under investigation [11]. Now a days different nanostructures like nanowires, nanocombs, nanorings, nanobridges, nanoflowers, nanoblets, nanocages [12, 13] etc., are reported to their high potential application in nano electronic devices [14].

2. EXPERIMENT

In this method ZnO Nanorods are synthesized by a 0.5Mol solution of zinc acetate dehydrate $[Zn(COOCH_3)_2(H_2O_2)]$ was prepared by dissolving in 100ml of ethanol and stirred so much for 30minutes at 60^0C. Also 0.9M aqueous solution of sodium hydroxide (NaOH) was prepared in a similar way with stirring for 30 minutes. The 60^0C heated 0.9M NaOH aqueous solution was added to drop by drop(slowly for 1 hour) touching the walls of the conical flask containing zinc acetate dehydrate $[Zn(COOCH_3)_2(H_2O_2)]$ solution under high constant speed stirring by magnetic stirrer. The solution turns into a jelly form and a milky white turbid

Photoluminescence quenching and enhanced spin relaxation in Fe doped ZnO nanoparticles

Manoj M. Ovhal[a], Santhosh Kumar A.[a], Prerna Khullar[b], Manjeet Kumar[a] and A. C. Abhyankar[a*]

[a]Department of Materials Engineering, Defence Institute of Advanced Technology, Girinagar, Pune-411025, India.

[b]School of Materials Science and Technology, Indian Institute of Technology (Banaras Hindu University), Varanasi-221005, India.

*Corresponding author: ashutoshabhyankar@gmail.com

Anomalous Magnetotransport Properties of Bi Doped La$_{0.67}$Sr$_{0.33}$MnO$_3$

Nagaiah Kambhala, S. Shanmukharao Samatham, R. Venkatesh, V. Ganesan, and S. Angappane*

We have studied the magnetotransport properties of La$_{0.67-x}$Bi$_x$Sr$_{0.33}$MnO$_3$ ($x = 0$, 0.3, 0.4, 0.5). The $x \leq 0.3$ samples show metal–insulator transitions, whereas $x \geq 0.4$ samples exhibit an insulating behaviour at zero field. Notably, two low-temperature upturns were observed for La$_{0.37}$Bi$_{0.3}$Sr$_{0.33}$MnO$_3$, which indicates the existence of two different mechanisms. La$_{0.27}$Bi$_{0.4}$Sr$_{0.33}$MnO$_3$ shows field-induced metallic behavior due to the melting of charge ordering with applied magnetic field. A large magnetoresistance of ~100% is observed for La$_{0.27}$Bi$_{0.4}$Sr$_{0.33}$MnO$_3$ at ~90 K. On the other hand, La$_{0.37}$Bi$_{0.3}$Sr$_{0.33}$MnO$_3$ exhibits a nearly constant large magnetoresistance of ~80% between ~30 and 250 K, which decreases outside this temperature range. The observed anomalous low-temperature magnetotransport properties of La$_{0.67-x}$Bi$_x$Sr$_{0.33}$MnO$_3$ are shown to arise from the coexisting phases of ferromagnetic metallic and antiferromagnetic charge-ordered insulating states.

When Bi is doped in La$_{0.67}$Sr$_{0.33}$MnO$_3$, there is a competition of ferromagnetic metallic and charge ordering insulating phases occur. We have reported step wise magnetization behaviour for nominal Bi doping in La$_{0.67}$Sr$_{0.33}$MnO$_3$ and the phase separation of the ferromagnetic metallic and antiferromagnetic charge ordering states for higher doping.[9] The La$_{0.37}$Bi$_{0.3}$Sr$_{0.33}$MnO$_3$ has shown the phase competition of the ferromagnetic metallic and antiferromagnetic charge ordered states. Upon observing the phase transitions, coexisting phases and magnetic phase competitions, we intended to study the magnetotransport properties of La$_{0.67-x}$Bi$_x$Sr$_{0.33}$MnO$_3$ ($x = 0$, 0.3, 0.4, 0.5) at different applied fields.

1. Introduction

The colossal magnetoresistance (CMR) manganites, RE$_{1-x}$A$_x$MnO$_3$ (RE = rare earth, A = Ca, Sr, Ba . . .) exhibit remarkable properties, such as antiferromagnetic insulators, charge ordering states, ferromagnetic insulators, ferromagnetic metallic states depending on doping concentrations of the divalent ions.[1,2] These materials are fascinating due to the rich physics for understanding the interplay of charge, spin, and lattice degrees of freedom.[3] CMR manganites exhibit the metal-to-insulator (MI) transitions or insulating behaviour due to the doping concentration of the holes or electrons.[4] Several reports state that the phase separation is one of the key factors to achieve the large magnetoresistance in CMR manganites.[5,6] The phase separation dominates when the ions of different nature doped into the manganites.[7,8] For example, La$_{0.67}$Sr$_{0.33}$MnO$_3$ is one of the ferromagnetic metallic manganites, while Bi$_{0.67}$Sr$_{0.33}$MnO$_3$ is a charge ordered insulating manganite.

Dr. N. Kambhala, Dr. S. Angappane
Centre for Nano and Soft Matter Sciences,
Jalahalli, Bangalore 560013, India
E-mail: angappane@cens.res.in;
angappane@gmail.com

Dr. S. S. Samatham, Dr. R. Venkatesh,
Dr. V. Ganesan
Low-temperature Laboratory, UGC-DAE
Consortium for Scientific Research, University
Campus, Khandwa Road, Indore 452001, India

2. Experimental

Details on the preparation of the polycrystalline La$_{0.67-x}$Bi$_x$Sr$_{0.33}$MnO$_3$ ($x = 0$, 0.3, 0.4, 0.5) samples (indicated as Bi0, Bi3, Bi4, Bi5 in our discussion), the structural characterization and the determination of magnetic properties are reported elsewhere.[9] The magnetotransport measurements were performed using a physical properties measurement system (PPMS®, Quantum Design, USA). The resistance was measured from 350 K down to 2 K under the applied fields of 0–10 T. The details of the measurement conditions are given under the respective results.

3. Results

Figure 1 shows the temperature dependent dc electrical resistance of La$_{0.67-x}$Bi$_x$Sr$_{0.33}$MnO$_3$ ($x = 0$, 0.3, 0.4, 0.5) viz. Bi0, Bi3, Bi4, and Bi5 under different applied magnetic fields of 0, 5, and 10 T measured in the temperature range from 2 to 350 K. The metal to insulator transition is observed for Bi0 and Bi3, whereas the fully insulating behaviour is observed for Bi4 and Bi5 under zero field. The resistances of Bi4 and Bi5 samples are higher below 70 K, which is beyond our measurement limits. For Bi0, the cooling and warming curves of resistance data are matching, which shows the absence of thermoresistive hysteresis behavior. However, for Bi3, the thermoresistive hysteresis is observed with zero applied field and clear change of metal to insulator transition temperature, T_{MI} is observed. The hysteretic

Spin-flop quasi-first order phase transition and putative tricritical point in Gd$_3$Co

S. Shanmukharao Samatham*, Soumendu Barua[1], K. G. Suresh

Magnetic Materials Laboratory, Department of Physics, Indian Institute of Technology Bombay, Mumbai 400076, India.

Abstract

Magnetic nature of Gd$_3$Co is investigated using detailed measurements of temperature and field dependent magnetization. The antiferromagnetic phase is field-instable due to prevailing ferromagnetic exchange correlations above Néel temperature $T_N \sim 130$ K. Below T_N, with gradually increasing magnetic fields, the compound undergoes a quasi-first order phase transition from AFM to spin-flop over region and eventually acquires ferromagnetic phase in higher fields. Further the point at which the quasi-first order transition ends and second order transition sets in is the tricritical point, $T_{TCP} \sim 125.6$ K, $H_{TCP} \sim 4.4$ kOe.

Keywords: First order phase transition, tricritical point, metamagnetism, Gd$_3$Co

*Corresponding author
Email address: sssrao@phy.iitb.ac.in (S. Shanmukharao Samatham*)
[1]Sagar Institute of Science and Technology, Jaipur Road, Gandhi Nagar, Bhopal, Madhya Pradesh 462036, (M.P.), India.

Quantum size effect on the heat capacity of nickel nanolattice

J. Singh,[1] Tarachand,[2] S. S. Samatham,[2,a)] D. Venkateshwarlu,[2,b)] Netram Kaurav,[3,c)] V. Ganesan,[2] and G. S. Okram[2,c)]

[1]*Department of Physics, ISLE, IPS Academy, Rajendra Nagar, Indore 452012, Madhya Pradesh, India*
[2]*UGC-DAE Consortium for Scientific Research, University Campus, Khandwa Road, Indore 452001, Madhya Pradesh, India*
[3]*Department of Physics, Government Holkar Science College, A. B. Road, Indore 452001, Madhya Pradesh, India*

Nearly exponentially decaying heat capacity was observed exceptionally in a well-characterized naturally assembled hexagonal closed packed lattice of 4.0 nm nickel nanoparticles (NPs). It was also associated with quantum jumps. These were however not observed in other NP sizes and have negligible effects of high magnetic fields. Magnetic susceptibilities in contrast revealed the evolution of quantum size effects with a decrease in particle size. They exhibited sharp rise below about 30 K and vestiges of saturations below 5 K. The sharp rise was explained by Curie-like characteristics of odd electrons, while the saturations tend towards the orthogonal even-like case. *Published by AIP Publishing.* https://doi.org/10.1063/1.4985583

In a free electron model, the Fermi energy (E_F) of a metal depends only on the density of electrons ($n \sim 10^{22} \, cm^{-3}$) with the electronic states almost in continuum and hence independent of the particle size. However, in a typical metal nanoparticle (MNP), the very few conduction electrons available N, say $\sim 10^3$, fill their electronic states up to the fixed E_F at $T = 0$ and the electronic states are not continuous but discrete due to the confinement of electron wave functions. Consequently, the average energy spacing, δ, known as the Kubo gap, between the states increases with decreasing particle volume V as $\delta \approx E_F/N \propto V^{-1}$ or precisely[1–3]

$$\delta = 4E_F/3N. \tag{1}$$

This phenomenon is known as quantum size effects (QSE). If we consider 4.0 nm spherical Ni nanoparticles (NPs) as an example, δ turns out to be about 30 K. When we were supposed to be able to measure specific heat on a single MNP at a temperature T sufficiently low such that $k_B T \ll \delta$, the linear dependent heat capacity $C_P(T)$ at $k_B T \gg \delta$ switches to an exponential dependence[2,3]

$$C_P = k_B \exp(-\delta/k_B T). \tag{2}$$

This however has not yet been observed experimentally except their reduction[4–7] or enhancement[8–14] compared to their bulk counterparts. This is in expected lines since one cannot perform $C_P(T)$ measurements on a single MNP but on a large number of nanoparticles. This is in contrast to QSEs observed in facsimile ways in other various physical properties.[15–19] The reason is attributed to (i) high sensitivities to uncontrollable influences of their matrices or the

environment[1–3,8] and (ii) natural difficulties in obtaining ideally monodispersed MNPs.[8,20,23] It has therefore been believed to be due to the simplified theoretical assumptions[1–3] that cannot meet the real experimentally challenging environments.[3,7,8] They include (i) failure of a single metal particle, not able to meet the thermodynamic nature of heat capacity;[3,8] (ii) limitation in the size effect for $d \geq 10$ nm with $T < 0.1$ K, to avoid surface effects;[8] (iii) disturbances of the matrix on MNPs' properties;[18,20,22] and (iv) smoothening of level spacing in an ensemble of practically monodispersed MNPs.[3,7,8] Typical samples investigated were compacted samples of gas-/thermally evaporated Pd,[9,10] V,[11,12] and MNPs and polyol-method prepared[13] and thermal decomposition-prepared[14] Ni MNPs. In these, at least some surface oxidation naturally occurs,[13,20] in addition to the interactions with surfactants/matrices.[20–22]

Stewart,[4] for example, reported a reduced heat capacity of Pt MNPs embedded in SiO_2 at low temperatures and argued it to be a manifestation of QSE. However, the majority of enhancement was attributed to the matrix, say SiO_2, since Pt and SiO_2 were cosputtered. The problem was that he subtracted the bulk values of the heat capacity of Pt and vitreous silica from nanoparticle data with the disadvantage of large error involved especially from the sputtered SiO_2 by taking the values of vitreous silica directly. Schmidt *et al.*[5] reported a negative microcanonical heat capacity near solid to liquid transition on the cluster of 147 sodium atoms produced in a gas aggregation source. Volokitin *et al.*,[7] on the other hand, reported the consideration of odd-even electron spin state QSE based on the presence of spurious magnetic impurities especially in shellular Pd clusters but not in colloidal Pd. The significant influence of the magnetic field on magnetic susceptibility and specific heat below 0.2 K was also found but ruled out exponentially decaying C_P.

In contrast, our study shows nearly exponentially decaying heat capacity associated with quantum jumps exceptionally in 4.0 nm Ni NPs that are assembled naturally into a hcp lattice. Magnetic susceptibilities in contrast reveal the

a)Present address: Magnetic Materials Laboratory, Department of Physics, Indian Institute of Technology Bombay, Powai, Mumbai 400076, Maharashtra, India.
b)Present address: Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu, India.
c)Authors to whom correspondence should be addressed: netramkaurav@yahoo.co.uk and okram@csr.res.in.

111, 201904-1

Electrical transport and magnetoresistance of double layered CMR manganites $R_{1.2}Sr_{1.8}Mn_2O_7(R = La, Pr, Sm)$

Y.S. Reddy*

Department of Physics, Chaitanya Bharathi Institute of Technology, Hyderabad 500 075, India

Polycrystalline bulk samples of double layered (DL) colossal magnetoresistive (CMR) manganites $R_{1.2}Sr_{1.8}Mn_2O_7$ (R = La, Pr, Sm) were prepared by sol-gel method to study the effect of size of lanthanide ion on their magnetotransport properties. The electrical resistivity of the samples was investigated in the temperature range of 70 K to 300 K at different magnetic fields. The samples LSMO and PSMO show insulator-to-metal transition (IMT) behavior, while SSMO sample exhibits insulating behavior in the entire temperature range with a very large value of resistivity. The insulator-to-metal transition temperature (T_{IM}) decreases from 123 K (LSMO) to 90 K (PSMO) and disappears in SSMO sample. To explain the electrical transport above T_{IM}, the temperature dependent resistivity data ($T > T_{IM}$) of all the samples were fitted to the equations of different conduction models. The results indicate that the conduction at $T > T_{IM}$ is due to Mott variable range hopping (VRH) mechanism in the LSMO and PSMO samples, while Efros-Shkloskii (ES) type of VRH model dominates the conduction process in the SSMO sample. All the three samples show increasing magnetoresistance (MR) even below T_{IM} and the maximum MR is shown by LSMO (39 % at 75 K, 3 T).

Keywords: double layered manganites; electrical transport; magnetoresistance; variable range hopping; sol-gel process

1. Introduction

The doped rare earth manganese perovskites with a general compositional formula $R_{1-x}A_xMnO_3$ (R is a rare earth element and A is a divalent alkaline earth metal) have been extensively investigated due to their CMR properties [1–5]. The CMR phenomena in this system are generally understood in terms of double-exchange mechanism and Jahn-Teller distortions of Mn^{3+} ions [6–8]. Although these materials show large magnetoresistance (MR) values, the requirement of high magnetic fields and MR at narrow temperature range put constraints on the practical usage of these materials. Hence, there has been a world-wide research activity to discover the materials which show high MR values at moderate magnetic fields and in a wide temperature range.

The La-based DL manganites $La_{2-2x}Sr_{1+2x}Mn_2O_7$ have gained much importance since Moritomo et al. discovered CMR

in these materials [9]. These DL manganites belong to n = 2 members of the Ruddlesden-Popper series $(R,A)_{n+1}Mn_nO_{3n+1}$ [10]. These materials show large values of MR at moderate magnetic fields and proved to be promising materials for many technological applications. The reduced dimensionality and structural anisotropy of these materials are expected to result in anisotropic characteristics in charge-transport and magnetic properties. The crystal structure of $La_{1.2}Sr_{1.8}Mn_2O_7$ consists of double layers of corner shared ferromagnetic-metallic MnO_6 octahedra (perovskite structure-type) in the ab-plane of the crystal, separated by a single rock-salt-type nonmagnetic-insulating (La,Sr)O layer along the c-axis giving it 2D character. Hence, a natural array of ferromagnetic-insulator-ferromagnetic junctions is present in the structure of these materials which actually may lead to large CMR at low magnetic field, i.e. low field magnetoresistance (LFMR) [11–14]. The two important interactions between Mn ions, namely double exchange (DE) driven ferromagnetic (FM) interactions and superexchange (SE) driven antiferromagnetic (AFM)

*E-mail: ysreddy.ou@gmail.com

Syntheiss and Magnetotransport Behavior of Double Layered Colossal Mganteoresistive Manganite $La_{1.2}Sr_{1.4}Ba_{0.4}Mn_2O_7$

Y.S. REDDY

Department of Physics, Chaitanya Bharathi Institute of Technology, Hyderabad 500 075, INDIA
ysreddy.ou@gmail.com

Abstract The electrical transport behavior and magnetoresistance (MR) of a polycrystalline double layered manganite $La_{1.2}Sr_{1.4}Ba_{0.4}Mn_2O_7$, synthesized by the sol-gel method, are investigated in the temperature range 4.2 K - 300 K. The sample exhibits an insulator-to-metal transition at 87 K (T_{IM}) and the spin-glass (SG)-like behavior is observed below 50 K (T_{SG}). The transport behavior is analyzed in paramagnetic insulating region ($T>T_{IM}$) and ferromagnetic metallic region ($T_{SG}<T<T_{IM}$) by fitting the temperature dependent resistivity data to the equations governing the conduction process in the respective temperature regions. The results show that the conduction at $T>T_{IM}$ follows Mott variable range hopping (VRH) process, while the two-magnon scattering process is evidenced at $T_{SG}<T<T_{IM}$. The sample exhibits a large MR (≈45%) over a temperature range 5 K – 50 K and it shows ≈32% MR at 5 K with a magnetic field of 0.5 T.

Keywords-Layered manganite; Magnetoresistance; Transport behavior; Variable range hopping; Magnon scattering

1. Introduction

The discovery of colossal magnetoresistance (CMR) in La-based double layered (DL) manganites $La_{2-2x}Sr_{1-2x}Mn_2O_7$ has provided an opportunity to explore the interaction among spin, charge and lattice in reduced dimensions [1,2]. These materials show large values of MR at moderate magnetic fields and proved to be promising materials for many technological applications. The $(La,A)_3Mn_2O_7$ (A = Sr, Ca, Ba) perovskite compound with layered structure consists of the MnO_2 bilayers which are respectively separated by the rock-salt-type $(La,A)_2O_2$ layers along c-axis [3]. Because of its structural anisotropy, it is expected to present the anisotropy of physical, electrical and magnetic properties. Further, the natural array of conducting ferromagnetic/non-magnetic insulating/conducting ferromagnetic junctions present in the structure of these materials may lead to large CMR at low magnetic field, i.e., low field magnetoresistance [4]. Because of the reduced dimensionality, the balance between ferromagnetic double exchange ((FM-DE) and antiferromagnetic superexchange (AFM-SE) interactions between Mn ions is more subtle [5,6]. Therefore, one can expect that the slight changes in the size and/or concentration of (La,A) site ions can show significant effect on bulk transport and magnetic properties. Further, the Mn-O-Mn bond angle is about 180° in the $(La,A)_3Mn_2O_7$ system and is about 155–170° in $(La,A)MnO_3$ system. The bond-length can be altered by the internal pressure, i.e., by changing the size and/or concentration of (La,A) site ions, however, the variation of the Mn-O-Mn bond-length in Mn_2O_7 system is different from that in MnO_3 system [7]. Therefore, the study of lattice effects on the magnetotransport properties in the $(La,A)_3Mn_2O_7$ system might be useful in understanding the fundamentals of the CMR and its related properties.

We have prepared some DL manganite samples with different doping elements (Ca^{2+}, Ba^{2+}) at Sr^{2+} site with different doping levels with an aim to increase MR and T_{IM} (insulator-to-metal transition temperature) and also to investigate the transport phenomena in these materials [8-10]. In this paper, we present the results obtained for $La_{1.2}Sr_{1.4}Ba_{0.4}Mn_2O_7$ which exists in three different regions: paramagnetic insulating region, ferromagnetic metallic region and antiferromagnetic insulating region in the temperature range 4.2 K – 300 K with a main focus on its transport behavior.

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ORIGINAL RESEARCH PAPER	Management
PRE AND POST MERGER PERFORMANCE OF BANKS IN INDIA	

J.MOUNIKA REDDY	ASST.PROFESSORCHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
DR.K.SOWMYA	ASST.PROFESSORCHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

ABSTRACT

Banks play a major role in the development of the economy a country. Mergers and Acquisitions (M&A) are considered to be on the fast track for increasing the size, expanding branch network, and enlarging business operations. Mergers and Acquisitions encourage banks to gain global reach and better synergy and allow banks to acquire the stressed assets of weaker banks. A complete combination of two separate corporations involving in a business is referred as business merger. Through Mergers and Acquisitions banks not only get established brand names, new geographies, complementary product offerings but also opportunities to cross sell to new accounts acquired. Merger is a useful strategy, through this Banks can expand their operations, serve larger customer base, increases profitability, liquidity and efficiency but the overall growth and financial illness of the bank can't be solved from mergers. For this purpose 6 Indian commercial banks merged during the period 2006 to 2014 were selected out of which, three are merger of public sector banks and three are merger of private banks.

INTRODUCTION

Banks in general terminology is referred to as a financial institute or a corporation which is authorized by the state or central government to deal with money by accepting deposits, giving out loan and investing in securities. The main role of banks is to improve the economy by providing funds for investment. In recent times banking sector has been undergoing a lot of changes in terms of regulations and effects of globalization. These Changes have affected this sector both structurally and strategically. With the changing Environment, many different strategies have been adopted by this sector in order to remain efficient and to surge ahead in the global arena. One such profitable strategy is the process of consolidation of the banks and the most preferred one is merger. Merger can be performed in any of the way it may be the merging of two weaker banks or one strong bank is going to merge with the weaker or small bank to expand their usage and availability in the market. Merging is done to improve their business and profitability of the banks and also to satisfy the customer with their faster and secured services. The main motive behind the merger and acquisition in the banking industry is to achieve economies of scale and scope. Mergers also help in the diversification of the products, which help to reduce risk. To a large extent, this M&A strategy is based on a belief that gains can accrue through expense reduction, increased market power, reduced earnings volatility, and scale and scope economies. If consolidation does, in fact, lead to value gains, then shareholder wealth can be increased. On the other hand, if consolidating entities does not lead to the promised positive effects, then mergers may lead to a less profitable and valuable banking industry. Many researchers worldwide have empirically found that shareholders' wealth of the acquiring banks has decreased while it has been vice versa in the case of acquired firms.

REVIEW OF LITERATURE

Khan Azeem Ahmad (2011) evaluated the performance of banks after merger and he came to know that the efficiency and performance of banks has improved after merger.

Ramon, A.A., Onaolapo and Ajala, O. Ayorinde (2012) examined the effects of merger and acquisition on the performance of selected commercial banks in Nigeria.. The study recommended that the banks should be more aggressive in marketing financial products and also manpower training and re-training, investment in Information Technology should be emphasized.

Gupta Himani (2013) examined the impact of mergers and acquisition on financial efficiency of banks in India by comparing the gross earnings, profits after tax and net assets of the selected banks were taken as indices for comparison. Three mergers of Indian Banks were taken as sample for the study.
Calipha, Tarba & Brock (2011) has analysed mergers motives and

success factors in their article such as entering a new market, gaining new scarce resources, achieving synergies and other managerial and organizational factors.

OBJECTIVES OF THE STUDY:
1) To study the pre and post Merger Performance of Public and Private Merged Banks.
2) To analyze the impact of Mergers on Financial Performance of Public and Private Merged Banks.

RESEARCH METHODOLOGY:
a. Sample Descriptions:
The data for this study have been selected based on the convenience sampling method, among the banks list with RBI Report. In the list of commercial banks only six scheduled commercial banks merged during the period 2006 to 2014 were selected. During the course of study two major categories of mergers were identified and accordingly six banks are divided into three Private and Public and the same is presented in Table.

Table-1: The list of Selected Merged Banks

S. No	Acquiring Bank	Target Bank	Category	Date of Merger
1	IDBI	United Western Bank	P-Pr	13/09/2006
2	Indian Overseas Bank	Bharat Overseas Bank	P-Pr	31/03/2007
3	SBI	State Bank Of Indore	P-P	26/08/2010
4	HDFC Bank	Centurion Bank of Punjab	Pr-Pr	23/05/2008
5	ICICI Bank	Bank Of Rajasthan	Pr-Pr	13/082010
6	Kotak Mahindra Bank	ING Vysya Bank	Pr-Pr	1/04/2014

6Kotak Mahindra BankING Vysya BankPr-Pr1/04/2014

Note: P=Public sector, Pr=Private Sectors

In order to evaluate financial performance of the merging banks, six years financial data is considered i.e., three years pre merger period and three years   post merger period. Only domestic mergers taking place were selected. Cross-border mergers, i.e., in which either bidder or the target was based outside India were dropped. This was done to ensure homogeneity of the economic and industrial environment so that generalizability of the results could be achieved for Indian Mergers.

b. Data Collection:
• Financial statements of banks: For the purpose of analyzing the impact of mergers on physical performance and financial performance of selected commercial banks in India, the

VOLATILITY IN STOCK MARKETS

Dr. Sowmya Kethi Reddi,
Assitant Professor,
School of Management Studies,
Chaitanya Bharati Institute of Technology, Hyderabad, Telangana.
E-mail: chsowmyaramesh@gmail.com Ph: 9642802757

Abstract

In India, the history of capital markets dates back to the 18th century when East India Company securities traded the country. The present study is largely based on the available secondary data. The statistical data regarding growth of the capital markets was available from various websites. Capital markets help to channelize surplus funds into productive use. Generally, this market trades mostly in long-term securities. A country's depression or recession turned into severe volatile stock market which cannot be cured in the short run. The stock market volatility has the negative nexus with the growth rate of a nation i.e. high volatility reduces growth rate.

Key words: stock market, OTCEI, NSE, volatility, Nifty and Sensex.

Introduction

The Indian stock market turned out to be among the world's best performers in 2014-15 with the Bombay Stock Exchange (BSE) Sensex rising 29% from 21,140 on January 1st 2014 to 27,312 on December 19th 2014. Most market players believe this stellar run will continue in 2015-16 on the back of reforms, strong foreign fund inflows, revival of manufacturing, improvement in the macro-economic situation and rise in corporate earnings growth.

Trading in Indian stock exchanges are limited to listed securities of public limited companies. They are broadly divided into two categories, namely, specified securities (forward list) and non-specified securities (cash list). Equity shares of dividend paying, growth-oriented companies with a paid-up capital of atleast Rs.50 million and a market capitalization of atleast Rs.100 million and having more than 20,000 shareholders are, normally, put in the specified group and the balance in non-specified group.

Two types of transactions can be carried out on the Indian stock exchanges: (a) spot delivery transactions "for delivery and payment within the time or on the date stipulated when entering into the contract which shall not be more than 14 days following the date of the contract" and (b) forward transactions "delivery and payment can be extended by further period of 14 days each so that the overall period does not exceed 90 days from the date of the contract".

A member broker in an Indian stock exchange can act as an agent, buy and sell securities for his clients on a commission basis and also can act as a trader or dealer as a principal, buy and sell securities on his own account and risk, in contrast with the practice prevailing on New York and London Stock Exchanges, where a member can act as a jobber or a broker only.

Over The Counter Exchange of India (OTCEI)

The traditional trading mechanism prevailed in the Indian stock markets gave way to many functional inefficiencies, such as, absence of liquidity, lack of transparency, unduly long settlement periods and benami transactions, which affected the small investors to a great extent. To provide improved services to investors, the country's first ringless, scripless, electronic stock exchange - OTCEI - was created in 1992 by country's premier financial institutions - Unit Trust of India,

Original Research Paper

Management

DIVERGENCE OR CONVERGENCE: PARADOXES IN CORPORATE GOVERNANCE

Dr Sowmya K | Assistant Professor, Dept. of SMS, CBIT, Gandipet, Hyderabad.

ABSTRACT The study is a review paper to explore the various dimensions of the traditional governance models namely the Anglo-Saxon model and the German-Japan model. The study identifies the different strands of the researches on the various dimensions of these models and also on the possibility, challenges to the convergence of these governance mechanisms. The literature review on corporate governance models suggests that the two mechanisms differ broadly in their internal and external control mechanisms. The review considers agency theory as the fundamental theory explaining the need for governance structures. The traditional models of governance are moving towards a system of 'dual convergence', which is expected to result in a hybrid model inculcating the best of both the worlds. However, the convergence in the true sense does not seem to be possible due to fundamental differences pertaining to cultural, economic, and legal and socio economic aspects confirming the presence of the paradox in the near future. The study explores the arguments in the existing literature about the diverging dimensions of the traditional models. It helps to understand the adaptation of the traditional governance models to the dynamically changing external and internal mechanisms of the firms.

1. INTRODUCTION

Globalization of the world economy and the integration of the financial markets have brought the traditional models (Anglo-Saxon Model and the German-Japan Model) of corporate governance at the crossroads. With increasing debate about the convergence of the governance models amongst practitioners and academicians resulting from the economic systems convergence across world and other unseen forces; the objective of the present review paper is to explore the arguments in the existing literature about the diverging dimensions of the traditional models. Convergence refers to the gradual movement of policies and practices towards a common point. The different dimensions of convergence can be source, learning process, principles, content and structures and the perfect alignment among these dimensions promises seamless convergence. Comparative governance literature provides the evidences for the existence of transition systems in the eastern European countries, which are characterized as the midpoint between the completely distinct insider systems and outsider systems .In this context, the review also identifies the forces and challenges to the process of convergence as discussed in the existing literature with an aim to identify the future direction of governance mechanisms, which can have important implications for the corporations across world.

The review paper has been structured as follows: Section II discusses the agency problems as the seed for having governance systems. Section III explains the existing traditional models of governance and their functioning. Section IV articulates the dimensions of the governance models (internal control mechanism and external control mechanism), which make them distinct as documented in the literature. Section V reviews the forces, possibilities and challenges to convergence, with conclusion and implications in the last section.

2. AGENCY THEORY: EXISTENCE OF GOVERNANCE ISSUE

Agency theory is the dominant theory in the corporate governance literature. However, in the absence of an overarching theory, the literature on the corporate governance provides evidences of existence of many competing theories of corporate governance other than agency theory. The major competing theories are stewardship theory, managerial hegemony, resource dependency theory, stakeholder theory and multi governance theory''' .

3. CORPORATE GOVERNANCE MODELS & MECHANISM

Corporate governance mechanism at the macroeconomic level defines the ethics of the game for the business houses in the corporate world. Withdrawal of capital by the investors after the Asian crises compelled the international community to focus on investor confidence and on the basic principles of governance

namely transparency, accountability and the fair treatment of shareholders. Corporate Governance refers to the ways in which the suppliers of finance to corporations assure themselves of getting a return on the investments. It can also be defined as the system of laws, rules, and factors that control operations at a company .Corporate Governance mechanism is considered to be the nexus of contracts. Hence the governance mechanism includes the systems pertaining to regulations and laws, which ensure the absence of misbehavior by the agents, efficient and effective utilization of the finances provided by the investors. For instance, the emerging economies (BRICnations) differ from the developed economies on many dimensions such as relation versus rule based governance, ownership structures, institutional development, enforcement of laws and regulations . According to OECD "corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders".

In this type of governance systems the shareholders play a central role in the governance systems. Shareholders, who are the owners of the corporations as they invest funds in the organizations, have the right to control the firms. However, to avoid the conflicts in management of the firms 'Board of directors' is appointed to carry out the managing activities in the business, which is continuously monitored by the shareholders externally. Boards of directors in turn delegate the managing activities to the management of the company and closely monitor and evaluate their performance. In such type of model, the effectiveness of internal control systems of the organization is heavily dependent on the board of directors as the "board, at the apex of the internal control system, has the final responsibility for the functioning of the firm and the job of the board is to hire, fire, and compensate the CEO, and to provide high-level counsel".

Essentially, the businesses are not managed with only the shareholder value maximization in mind but also the welfare of other stakeholders such as the employees, creditors, suppliers and community at large. Hence, the stakeholders are at the center of the governance systems and do not focus aggressively on the market value maximization objective. The corporations in the model are characterized by the large block of shareholding controlled by the large institutions such as financial institutions, banks and public shareholding. The corporations not only focused on value maximization for the fund providers but also the society at large. In this type of mechanism the corporations are also not prone to hostile takeovers unlike the corporations in the market based governance systems. The model is characterized by the system of governance wherein the board exists in two parts namely, the management board and supervisory board without the overlap of the members of these boards.

Original Research Paper

Commerce

A STUDY ON WEB-BASED REPORTING SYSTEM IN BANKING SECTOR

Dr Sowmya Kethi Reddi | Assistant Professor, Dept of SMS, Chaitanya Bharati Institute of Technology, Hyderabad, Telangana

ABSTRACT The present study examines the status of web-based reporting in the banking industry. It also explores the pattern and factors affecting web-based reporting. For this study content analysis has been carried out for finding the level and extent of web-based reporting. A web-based reporting index has been developed into three major headings namely, general information index, financial information index and presentation information index. Ordinary least square regression is used for checking the factors affecting web-based information. The study had drawn two major findings. First, finding reveals that there is negative and significant association between certain key factors such as productivity, shareholders profitability and liquidity of the banks. Second finding reveals that other factors such as profitability, leverage and growth are not significantly associated with web-based reporting of the banks. This paper is constructed based on the concept of transparency and reporting on the web that may facilitate the investors and stakeholders.

KEYWORDS : Web-based reporting, banking industry, profitability.

I. INTRODUCTION
In globalization, most of the listed companies are connected with their stakeholders through internet. Company's information is available in a single click away. Corporate web-based reporting system has emerged as one of the most popular source of communication for disclosing and providing corporate financial information.

With the tremendous growth in the number of internet users there is an increasing demand from the stakeholders worldwide to provide information on the company websites. The most important advantage is, while in the hard copy information can be provided only in the static form, i.e. words and pictures only, web-based reporting system can provide audio and video. It has also led to challenges for the companies, accountants, regulators and web-administration, who ultimately provide the information. Particularly web-based reporting has affected the capital market and equity securities market. The number of investors has increased through the use of internet for trade and investment activities. The change in accounting Information through internet is expected to bring changes in accounting models, way of communication and finally the profession itself.

A number of studies have investigated different sectors but till now not even single study found on web-based reporting system in banking sector. However, in bankingsector, websites disclosure and using internet as medium of gathering information by the users became very common. Hence banking sector selected for the study.

II. LITERATURE REVIEW
In the present era, acquiring and accessibility of information required by anyone is become very easy. Internet as a source of information distribution is relatively new; still there are ample numbers of papers on the internet as a means of information distribution. Disclosure of financial information, i.e. web-based financial reporting, has also been researched widely to understand requirements and usefulness. Unerman& Bennett (2004)20 also carried out a study to examine the wide reach of the financial information to the stakeholders through the use of internet reporting.

Davey &Homkajohn (2004)5 also found large variations in Thai companies disseminating information over the internet. Study by Feketeet al. (2009)8 implied that there was association between corporate characteristics and internet reporting disclosures of the firms.

As financial reporting on the internet has evolved, that it is important to maintain a single standardized accounting body. The study revealed the need for standardization of financial reporting on the internet. This led to the development of ExtensibleBusiness Reporting Language (XBRL) for the same purpose. The accounting standards and practices adopted also affect the reliability and integrity of financial information. Use of generally accepted accounting practice (GAAP) or International Financial Reporting Standards (IFRS) for internet financial reporting and the location selected for the disclosure of the

information may make it difficult to assess available information. It is also a debatable issue whether internet financial reporting can be a direct substitute for the traditional hard copy form for all the financial statements of the companies.

Ismail (2012)10 discussed the benefits of website reporting as inexpensive, easier and timely investment decisions. Debreceny et al (2001)6 carried out a study in France, Germany and the UK for financial reporting of information through World Wide Web and discussed various challenges related to auditing and electronic presentation. Procter & Symonds (2001)18suggested that graphics influence the usability of web sites.

In India, only a limited number of studies have been carried out to find the level and extent of web-based corporate financial reporting. Studies relating to any specific sector were also limited. Present study uses a more comprehensive web-based reporting system on a particular sector, i.e. banking sector.

III. OBJECTIVES OF THE STUDY
1. To understand the concept and extent of web-based reporting system of banking sector on the corporate websites.
2. To investigate the relation between the web-based reporting and financial factors like shareholders and firm profitability, leverage, liquidity, and productivity of the company
3. To study the impact of web-based reporting on different stakeholders.

IV. RESEARCH METHODOLOGY
In order to select the sample of top banks in India according to market capitalization on National Stock Exchange are taken for the study. Data has been collected from the respective websites of the banks that were searched with the help of Yahoo and Google. Financial data is collected from Centre for Monitoring Indian Economy (CMIE) database named Prowess. Data has been collected from October 2015 to December 2015. The present study is to examine the web based reporting through the general, financial and presentation indicators which were generally available all the time.

The present study uses content analysis for measuring the level of web-based reporting about banking industry in India. Neuendorf (2002)16 identified content analysis as "the systematic, objective quantitative analysis of message characteristic". The author found that there was a constant growth of usage and variety of content analysis methodology. Duriau, et al. (2007)7 revealed that the content analysis is useful in management research.

Web-based reporting index is an association of three indexes: they are general reporting index, financial reporting index, and presentation reporting index. These indexes are formed to carry out extensive literature review. For the data analysis, content analysis was carried out followed by correlation and multiple regression analysis. Before using content analysis, reliability of the data has been checked. Reliability

Does Industry Friendly enough to Get More FDI into the States of India?

S Tulasi Ram,
Assistant Professor,
School of Management Studies,
Chaitanya Bharathi Institute of Technology,
Gandipet, Hyderabad-500075.

G. Srinivasa Raju,
Director,
Mantra School of Business Management,
LBnagar,Hyderabad-500074.

Abstract: Capital is an important element of business even for economic development too. The availability of capital very is high in developed countries than developing ones. Potential investors who are delighted with good returns on their investments search for business friendly environment and pour their money as a form of Foreign Direct Investments. India faced a situation of massive balance of payment crises with low foreign exchange reserves, One of the reason behind introduction of liberalization, privatization and globalization policy popularly known as LPG. LPG uplifts FDI flow to India for integrated development. However, this Flow of FDI is not equal to all Indian states. Six states have been receiving greater part of share in FDI inflows with their industry friendly environment. This research identifies regional inequalities presented in FDI inflows to Indian states and identifies that few factors influenced to get FDI. Data were collected from secondary sources such as documents produced by Government of India, Industrial policy and promotion (DIPP), Reserve Bank of India, World Bank reports, UNCTAD and State government Industrial promotional bodies and founded that States like Maharashtra, Delhi, Tamilnadu, Karnataka, Gujarat Telengana and Andhra Pradesh are holding major share in FDI inflow by maintaining industry friendly environment.
Key Words: *Foreign Direct Investment, Inflows, Industry friendly environment.*

I. Introduction:

There is no fixed abode for capital to transfer funds, technology, tap new markets, get cheap production and to utilize global resources, Investors use the tool called Foreign Direct Investment.FDI Is a tool for Economic growth through its Strengthening of domestic capital productivity & Employment. India is one of the fastest growing economies in the world, attracting greater part of FDI. Investment is a process of sacrificing money today for prospective gain of tomorrow. For investments investor is being influenced by a few factors called investment factors like infrastructure, Tax benefits, Stable Government, Market Size, Cheapest Human resources, & Macro Economic factors. Beside these factors recently state governments liberalized their policies and introduced single window system to provide all permissions under one roof.

Types of FDI
Greenfield Investment: A Form of FDI where a parent company starts a new venture in a foreign country by constructing new factors and/or stores
Mergers & Acquisition: It occurs when a transfer of existing assets from local firms takes place.
Forms of FDI
Automatic Route
FDI is allowed under the automatic route without prior approval either of government of the reserve bank Of India in all activities/ sectors up to 100%.
Government Route
FDI in activities not covered under the automatic route requires prior approval of the Government which are considered by the Foreign Investment Promotion Board (FIPB), Department of Economic Affairs, ministry of Finance.

II. Review of Literature

According to International Finance Corporation (2001) "identifies size of the market and it's growth potential; linkage and proximity to the other important markets; availability of trained manpower and wages structure; as well as Industrial and institutional infrastructure as the factors that influence FDI inflows".

A Multidisciplinary Indexed International Research Journal

ADHYAYAN
INTERNATIONAL
RESEARCH
ORGANISATION

Remedies to Challenges Facing by Commercial Banks with Payments banks

Mr. S Tulasi Ram[1]

Assistant Professor, School of Management Studies, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad - 500075. Email: tulasiram.mba2010@gmail.com,

Abstract

Based on Nachiket Mor committee recommendations regulator in Banking sector approved licenses to establish Payments banks in India. As soon as RBI announced guidelines eleven companies from different sectors were applied for license. As of now Airtel, Paytm and India Post got their license to start operations. Being a first mover advantage Airtel getting good response in the market by its existing customers by offers and discounts on various payments. Traditional banking system contains Public and Private Sectorial banks have been effecting by payments banks entry particularly to their Current and Savings Account (CASA). This Proposed research paper list out the Challenges faced by traditional banks with Payments banks and gives few suggestions to them.

Key words: *Banks, Payments bank, CASA deposits, SWOT analysis*

JEL Classification:E21, G21, G23, G28.

[1] Assistant Professor, School of Management Studies, Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad -500075. Email: tulasiram.mba2010@gmail.com, Contact: Contact: +919704888306.

PERCEPTION OF EMPLOYEES ON HIERARCHY OF NEEDS

[1]Dr.S.Saraswathi, [2]Elagandula Amani
[1]Associate Professor, [2]MBA Student
School of Management Studies
Chaitanya Bharathi Institute of Technology
Hyderabad – 500 075, Telangana, India.

Abstract: Organizations would like to have their employee's motivated for better performance, but do not really understand what motivates employees. Organizations will succeed only when employees work presently and prepare themselves for future. There are needs to be met for employees, to succeed in the workplace. Motivated employee is a valuable asset who creates value for the organization. This study is aimed to examine the relative strength the employees attach to the Maslow's hierarchy of needs. Data was collected through a questionnaire consisting of 20 items categorized under five needs of Maslow's hierarchy. The respondents consisted of software employees working in various software organizations. Convenience sampling is used for collection of data from 120 software employees. The results indicates that basic needs were given high importance by the employees followed by Esteem needs, Safety needs, Self-Actualization needs and Social needs. The main concern of the employees was special wages, bonuses, incentives, equipment's and using of their skills, and giving best to the job. Hence it is essential for an organization to motivate their employees towards achieving of organizational goals by fulfilling their needs.

Index Terms - **Motivation, Maslow's Hierarchy of Needs, Software Organization, and Employees.**

I. INTRODUCTION

People in an organisation are considered as valuable asset. In the 21st century, human asset is considered the most important asset of any company (Hafiza, Shah, Jamsheed and Zaman, 2011).Without increased motivation of the employees, the organization may lose valuable employees and will be disadvantage in attracting best talent (Dessler, 2003). Presently there is no scarcity of manpower but scarcity of best talented manpower. Rewards can serve the purpose of attracting best talent, achieving human resource objectives and also obtaining competitive advantage (Bratton and Gold, 2007). Beck (1983) found that happy employee tend to be more motivated and will be faithful to a company which results in higher quality output. Caruth and Handlogten (2002) mentioned that reward systems are considered as forerunners of employee's motivation. Since the employees are the most driving force for organizational success, their continuous efforts could be realized by providing rewards for their best efforts.

II. THEORETICAL FRAMEWORK

Managers play a significant role in motivating the employees. Motivating implies that one person induces another person to engage in desired work behavior by ensuring that a channel to direct the motive of the person becomes available and accessible to the person. Pinder (1998) defined a term motivation a s "a set of internal and external forces that triggers work related behaviours that determine its form, intensity, direction and duration." It is at the heart of how innovative and productive things are done at the workplace. A number of theories have been propounded to analyze why a person behaves the way he does. Maslow' Need Hierarchy is one among the theories which is considered for this study.

2.1 Maslow's Hierarchy of Needs Theory

The theoretical framework for this study is Maslow's Hierarchy of Needs. This theory is based on the study of the person which includes one's self-awareness and choices (Schunk 2011). The hierarchy of needs is a pyramid in which the basic needs exist at the bottom, with the needs becoming more complicated as one moves from bottom to top.

Abraham H Maslow classified human needs into five categories: 1.Physiological needs 2.Safetyneeds 3. Social needs 4.Esteemneeds 5.Self-actualization needs. Maslow regarded the first three needs (Physiological, Safety, and Social needs) as the lower order needs and the other two (Self actualization and esteem needs) as the higher order needs. Once a person's basic needs are met, they try to satisfy needs in the next level of hierarchy (Maslow, 1943; Schunk, 2011; Weiner, 1992). The fulfilment of one need will induce for next level (Maslow A, 1954).

2.1.1 Physiological Needs: These are lower-order needs and include the need for food, clothing and shelter. These are the basic needs to be satisfied before a person is motivated by higher-order needs.