

Earthquake Resistant Design Of Open Ground Storey Framed Building

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Abstract: Today all over the world, multistoried buildings with open (soft) ground floor are inherently vulnerable to collapse due to earthquake load, their construction is still largely practiced in the developing nations. Social and functional need to provide car parking space at ground level gives the warning against such buildings from engineering community. The building is being modeled as an 3D space frame with six degrees of freedom at each node using the software STAAD-Pro V8i. Analysis is performed for Bare Frame,Bare frame having open ground storey, Frame with infill wall, open ground story frame, frame with stiffer column size having open ground storey. Results are obtained for axial force, shear and moments for columns and are compared.

Key Words: Soft Storey,Earthquake,infill,multistorey.

earthquake is fully dependent on its natural period, the seismic force distribution is dependent on the distribution of stiffness and mass along the height

1.INTRODUCTION

It has always been a mans desire to create taller and bigger structures. Development of metro cities in India there is increasing demand in High Rise Building.The building with soft story behaves differently as compared to a bare framed building(without considering any infill) or a fully infilled framed building under lateral load. A bare frame is drastically less resistant than a fully infilled frame; it resists the applied lateral load through frame action and shows well-distributed plastic hinges at failure. An appropriate way to analyze the Soft story buildings is to model the strength and stiffness of infill walls. Unfortunately, there are no guidelines are given in IS 1893: 2002 (Part-1) for modeling the infill walls.the upper storey during the earthquake move almost together as a single block and most of the horizontal displacement occurs in the soft ground storey of the building. In other words, these types of buildings sway back and forth like an inverted pendulum. Analytical models based on the concept of the equivalent diagonal strut, considering the whole structure as an Monolithic and equivalent braced frame system with a diagonal compression strut replacing the infill,provide an accurate prediction of the behavior of steel frames. The total seismic base shear as experienced by a building during an



Fig-1:Soft storey

2.ANALYSIS AND MODELLING

The building considered in the present report is G+6 Bare Frame structure, Frame structure with infill wall, Open ground storey structure and Frame structure with stiffer column size. Complete analysis is carried out for dead load, live load & seismic load using STAAD-Pro V8i. All combinations are Considered as per IS 1893:2002.

Typical plan of building is shown in Fig-2

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Space Mouse

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Abstract: Space Mouse opens a new age for man-machine communication. This device is based on the technology used to control the first robot in space and has been adapted for a wide range of tasks including mechanical design, real time video animation and visual simulation. It has become a standard input device for interactive motion control of three-dimensional graphic objects in up to six degrees of freedom. Space Mouse works with standard serial mouse interface without an additional power supply. The ergonomic design allows the human hand to rest on it without fatigue. Thus, flying an object in six degrees of freedom is done without any strain.

Keywords: DLR; 3D, etc...

1.0 INTRODUCTION

Every day of your computing life, you reach out for the mouse whenever you want to move the cursor or activate something. The mouse senses your motion and your clicks and sends them to the computer so it can respond appropriately. An ordinary mouse detects motion in the X and Y plane and acts as a two dimensional controller. It is not well suited for people to use in a 3D graphics environment. Space Mouse is a professional 3D controller specifically designed for manipulating objects in a 3D environment. It permits the simultaneous control of all six degrees of freedom – translation rotation or a combination. The device serves as an intuitive man machine interface.

The predecessor of the space mouse was the DLR controller ball. Space Mouse has its origins in the late seventies when the LDR (German Aerospace Research Establishment) started research in its robotics and system dynamics division on devices with six degrees of freedom (6 dof) for controlling robot grippers in Cartesian space. The basic principle behind its construction is mechatronics engineering and the multisensory concept. The Space Mouse has different modes of operation in which it can also be used as a two-dimensional mouse.

2.0 COMPUTER MOUSE

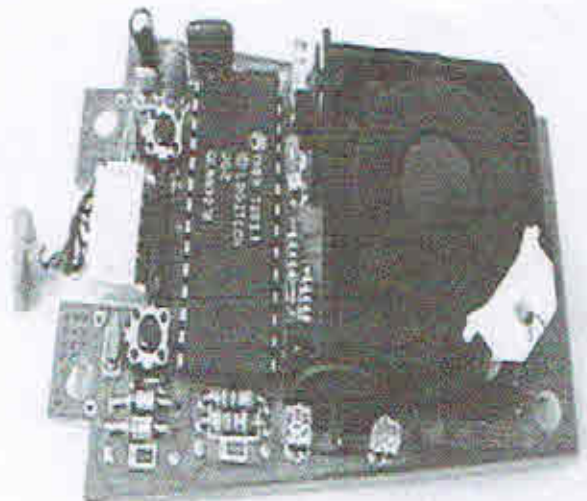
2.1 How does Computer Mouse work?

Mice first broke onto the public stage with the introduction of the Apple Macintosh in 1984, and since then they have helped to completely

redefine the way we use computers. Every day of your computing life, you reach out for your mouse whenever you want to move your cursor or activate something. Your mouse senses your motion and your clicks and sends them to the computer so it can respond appropriately.

2.2 Inside a Mouse

The main goal of any mouse is to translate the motion of your hand into signals that the computer can use. Almost all mice today do the translation using five components.



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Fig.1: The guts of a Mouse

A ball inside the mouse touches the desktop and rolls when the mouse moves.

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Modulating Technique Based Cascaded Multilevel Inverter using Voltage Multiplier

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ABSTRACT: The inclusion of multilevel inverter (MLI) in power electronics is steadily increasing in various industrial sectors. The work in this paper presents symmetrical cascaded H-bridge MLI that can be implemented to reduce the number of dc input power supply and harmonic contents present in it. The involvement of proposed topology with voltage multiplier significantly decreases the number of dc sources, providing equalization of voltage across switches with higher efficiency. The numerous sinusoidal pulse width modulation (SPWM) strategies are analysed to get reduced Total harmonic distortion (T.H.D) in output voltage waveform without using filter. The topologies mainly designed for 9-level(line to line) and further can be extended for N level using $(3N-3)/2$ switches and $(N-1)/4$ dc sources with voltage multiplier. The proposed topology with voltage multiplier for 9-level is simulated for various modulation index using different multicarrier SPWM and additional techniques like trapezoidal, multi-reference, staircase PWM techniques. The results obtained are evaluated using MATLAB/SIMULINK.

KEYWORDS: Multilevel inverter, Voltage multiplier, Multicarrier SPWM, T.H.D.

I. INTRODUCTION

In the last few decades, multilevel inverter has become interest of study in the several industrial sectors. Due to the capability of adapting advantageous features it is more feasible for high voltage high power applications [1]. The main consideration taken in to account while formulating multilevel inverter is the undesirable harmonics and number of switches to be reduced. Plenty topologies [2][3] so far suggested must cope with following fulfilments,

- It should be capable of enduring minimum number of dc input voltage sources and
- It should have less switching devices.

In general the performance of an inverter with any switching strategies depends upon the harmonic contents at its output voltage. In multilevel technology there are several PWM modulation strategies, among them multicarrier SPWM technique [4] dominated other techniques due to its feasible characteristics in suppressing harmonic distortion.

In this paper, several cascaded H-bridge topologies [5] with symmetrical dc input source is studied. The comparative study of various topologies is carried out using various different level shifting SPWM techniques. The conventional H-bridge with 9 level using 16 switches [6], 9 level using 11 switches [7], 9 level using 10 switches [8] requires more number of switching devices is depicted in Fig.1(a)-(c). Acquiring high number of switches decreases the efficiency and performance due to switching and conduction losses. Although as depicted in Fig.1 (d), 9 level using 8 switches [9] requires less number of switching devices provided there is unbalance in voltage across each switch. With the sharp contrast to these topologies the disadvantages can be overcome by proposed topology with voltage multiplier [10]. In many drive related applications separate dc sources precludes the use of an inverter, to minimize the number of dc sources voltage multiplier is included [11]. The comparison of various topologies based on number of devices and maximum number of switches ON is shown in table.I.





Identifying Structured Attributes by Jointly Using Content and Querying Values

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ABSTRACT

Document annotation is the task of adding metadata information in the document which is useful for information extraction. In many applications domain textual data contains significant amount of structured information which is in unstructured text. So that is always difficult to find relevant information. This paper proposes, an adaptive technique that facilitates the generation of structured metadata by identifying documents containing information of interest. Such information is further useful for querying the database. This paper proposes survey on Collaborative Adaptive Data sharing platform (CADS) for document annotation and use of query workload to direct the annotation process. A key novelty of CADS is that it learns with time the most important data attributes of the application, and uses this knowledge to guide the data insertion and querying.

Keywords – Adaptive forms, Collaborative Adaptive Data Sharing platform, Document annotation, Query value, unstructured data.

1. INTRODUCTION

Nowadays the presented output on searching some type of a particular document is a primary requirement. To get such collected search output, we have to maintain documents, information and data in smart way i.e. stored data in structured and unstructured format. Annotation technique is one of the best featured techniques to manage such documents and get effective search result. Attribute – value pairs are generally more meaningful and significant as they can contain more information than un-typed approaches.

Efforts to keep such decent maintenance of such annotate documents user has to take extra efforts. A scenario cumbersome, complicated and tedious where there are number of fields to be filled at time of uploading a particular document. Hence end user frequently ignores such annotation capabilities. User is still unresponsive and ignoring task though system offers the facility to randomly annotate the data with attribute-value pairs. Along with this there it also has unclear usefulness for subsequent searches in the future. Such difficulties finally tend to very basic annotations, if any at all, that are often limited to simple keywords. Such simple annotations make the analysis and querying of the data cumbersome.

It's the fact that this effective but ignored attribute – value paired annotation scheme can bring smooth searching and maintenance and this motivated us to work on Collaborative Adaptive Data Sharing platform (CADS), which is an "annotate-as-you create" infrastructure that facilitates fielded data annotation. The contribution of our system is the direct use of the query workload to direct the annotation process, in addition to checking the content of the document. Along with this contribution we are also working on phrase

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extraction process to build knowledge out of text. CAD provides cost effective and good solution to help efficient search result. The goal of CADS is to support a process that creates nicely annotated documents that can be immediately useful for commonly issued semi-structured queries of end user.

This paper is divided in five sections; in section II some earlier related work is explained. In section III, proposed system is explained. In section IV, the architecture is given. In section V, Experimental work & algorithm are performed which may be satisfied. In section VI mathematical modeling is shown. Finally in section VII, the conclusion.

2. RELATED WORK

Currently available information sharing tools, like content management software annotate document in an ad hoc way. For Google Base, there is predefined template available, which facilitates subsequent information discovery.

Some systems do not have attribute-value annotation would make querying feasible. An annotations strategy that uses attribute-value pairs contains more information than untyped approaches which are more expensive. For such annotations user must be aware of using and applying annotations. In such cases users are not ready to perform the task though system allows user to perform required task. Such annotations are limited to simple keywords making the analysis and querying data of the data cumbersome. So, there is need of appropriate annotation of the document.

Author	Method	Limitations
I.Eduardo J.	Collaborative	Initial annotations are

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Implementation of Message Authentication Scheme for Elliptic Curve Cryptography in Wireless Sensor Networks

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Abstract : Message authentication is one of the most effective ways to thwart unauthorized and corrupted messages from being forwarded in wireless sensor networks (WSNs). For this reason, many message authentication schemes have been developed, based on either symmetric-key cryptosystems or public-key cryptosystems. Most of them, however, have the limitations of high computational and communication overhead in addition to lack of scalability and resilience to node compromise attacks. To address these issues, a polynomial-based scheme was recently introduced. However, this scheme and its extensions all have the weakness of a built-in threshold determined by the degree of the polynomial: when the number of messages transmitted is larger than this threshold, the adversary can fully recover the polynomial. In this paper, we propose a scalable authentication scheme based on elliptic curve cryptography (ECC). While enabling intermediate nodes authentication, our proposed scheme allows any node to transmit an unlimited number of messages without suffering the threshold problem. In addition, our scheme can also provide message source privacy.

1. Introduction

Message authentication plays a key role in thwarting unauthorized and corrupted packets from being circulated in networks to save precious sensor energy. For this reason, many schemes have been proposed in literature to provide message authenticity and integrity in network communications [1], [2]. These schemes can largely be divided into public-key-based and symmetric-key-based approaches.

A secret polynomial-based message authentication scheme was introduced in [1]. To thwart the intruder from recovering the polynomial by computing the coefficients of the polynomial, the idea of adding

random noise, called a perturbation factor, to the polynomial was proposed [2]. However, a recent study shows that the random noise can be completely removed from the polynomial using error-correcting code techniques [3]. In this paper, we propose an unconditionally secure and efficient source anonymous message authentication (SAMA) scheme, based on the optimal modified ElGamal signature (MES) scheme on elliptic curves. This MES scheme is secure against no-message attacks and adaptive chosen-message attacks in the random oracle model [4]. Our scheme enables the intermediate nodes to authenticate the message so that all corrupted packets can be dropped to conserve sensor power. While achieving compromise-resiliency, flexible-time authentication and source identity protection, our scheme does not have the threshold problem. Both theoretical analysis and simulation results demonstrate that our proposed scheme is more efficient than the polynomial-based algorithms under comparable security levels.

2. Literature Review:

A secret polynomial-based message authentication scheme was introduced in [1]. This scheme offers information theoretic security with ideas similar to a threshold secret sharing scheme, where the threshold is determined by the degree of the polynomial. When the number of messages transmitted is below the threshold, the scheme enables the intermediate node to verify the authenticity of the message through polynomial evaluation. However, when the number of messages transmitted is larger than the threshold, the polynomial can be fully recovered and the system becomes completely broken. To increase the threshold and the complexity for the intruder to break the secret polynomial, random noise, also called a perturbation factor, was added to the polynomial in [2]. The main idea is to thwart the adversary from computing the coefficient of the polynomial. However, the added perturbation factor can be completely removed using error-correcting code techniques [3]. The recent progress on elliptic curve

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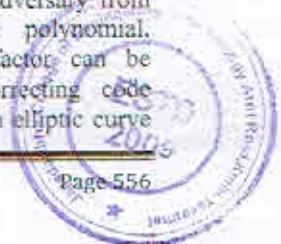
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**EXPERIMENTAL INVESTIGATION AND PERFORMANCE ANALYSIS
OF DIETHYL ETHER (DEE) AND TERT-AMYL ETHYL ETHER (TAEE)
BLEND WITH DIESEL IN C.I.D.I ENGINE: A REVIEW****Pratik H. Rathod¹, Prof.D.S.Darunde²**

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ABSTRACT

Diesel has a mark as traditional hydrogen structure as conventional fuel. In the new trends of investigation of alternative fuel there immerges number of alternative fuels; one of the alternatives is ether. In this experimental analysis there is a study of Diethyl ether (DEE) and Ter-amyl ethyl ether (TAEE) when blended with diesel fuel and its comparison with conventional diesel fuel. There is Comprehensive analysis on combustion characteristics such as cylinder pressure, heat release and performance characteristics, specific fuel consumption and break thermal efficiency are carried out in the analysis 5%, 10%, 15% ethers was blended with the diesel which is compared with the conventional diesel and the result of performance and combustion are found to be satisfactory. The experimental results of this study can be summarized as follows. The blending of diesel fuel with ether gives same results as the conventional diesel fuel. The performance characteristics and combustion characteristics are more or less same as that of the conventional diesel fuel. So from this study we can predict that if diesel is blended with 5% or 10% of ether then it will not affects the C.I.D.I Engine adversely.

Keywords: *Diethyl ether (DEE) and Ter-amyl ethyl ether (TAEE), Diesel fuel, Compression Ignition Direct Injection (C.I.D.I Engine)*

I. INTRODUCTION

Petroleum resources are finite and therefore search for alternative is continuing all over the world. Development of bio-fuels as an alternative and renewable source of energy for transportation has become critical in the national effort towards maximum self-reliance the corner stone of our energy security strategy. Bio- fuels like ethanol and bio-diesel being environment friendly, will help us to conform to the stricter emission norms. International experience has demonstrated the advantages of using ethanol and methanol as automotive fuel. Since blends below 10% of ethanol do not present any problem and reduce harmful emission, a decision has already been taken to blend 5% ethanol with motor spirit w.e.f. 1.1.2003 in a number of States. To achieve higher blending, a concerted programme for use of bio mass for conversion to alcohol is essential including expansion of area under sugarcane cultivation.

High Speed Diesel (HSD) is the main transport fuel hence introduction of biodiesel both as a diesel substitute and for blending with Petroleum diesel both as a diesel substitute and for blending with Petroleum diesel is an imperative need. Bio-diesel commands crucial advantages such as technical feasibility of blending in any ratio with petroleum diesel fuel, use of existing storage facility and infrastructure, superiority from the environment and emission reduction angle, its capacity to provide energy security to remote and rural areas and employment generation. Moreover, crops like sunflower, rapeseed and tree borne oil seeds like *Jatropha curcas* provide rich bio mass and nutrients to the soil and check degradation of land -a major problem affecting nearly 65 million hectares of land.

Diesel engines are broadly used in medium and heavy duty application because of their lower fuel combustion, higher break thermal efficiency and lower emission (such as CO and HC) compared with gasoline engines. Depletion of petroleum derivatives increases the research interest in the area of alternative fuels. The addition of oxygen containing compounds to diesel fuel has been proposed as a method of carbonaceous particulate

Performance Optimization of Mixed Flow Impeller by Ansys CFX

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Abstract—In this paper, the results from numerical studies of the flow of mixed flow pump is presented here and compared. The results agree well with measurements at best efficiency flow conditions. The overall range of H-Q characteristics is predicted and has matched well with the measurements. The predictions for efficiency at the design of flow conditions are seen to be deviating from the one actually measured. Some more investigation are needs to be done in this direction. Similar exercise is being carried out for pumps with different specific speeds. The CFD analysis is an effective tool to calculate the effect of design and operating parameter of pump.

Keywords—Computational Fluid Dynamics, Mixed Flow Impeller, Mixed Flow Pump Impeller, Solid Works 2009.

I. INTRODUCTION

A pump is used to move fluids (liquids or gases) or sometimes slurries by mechanical movement. Pump is a mechanical device generally used for raising liquids from a lower level to a higher one. This is achieved by creating a low pressure at the inlet of impeller and high pressure at the outlet of the impeller of pump. This work has to be done by a prime mover to impart mechanical energy to the liquid which ultimately converts into pressure energy. It is widely in used in industries and residential applications. Centrifugal pumps are the machines, which employ centrifugal force to lift from a lower level to a higher level by developing pressure [2]. The centrifugal pump moves liquid by rotating one or more impellers inside a volute casing. The liquid is entered through the casing inlet to the eye of the impeller where it is picked up by the impeller vanes.

In the mixed flow pump, addition of the pressure to the liquid occurs when the flow of liquid is in axial as well as radial direction. This type of pump in which the liquid passed through impeller is as combination of axial and radial direction. The head is developed partly by the action of centrifugal force and partly by the propelling force. These pumps mostly suitable for irrigation purpose where large quantity of water at a lower head. In this pump, addition of energy to the liquid occurs.

A centrifugal pump is a rotodynamic machine that uses a rotating impeller to increase the pressure of a fluid. They are widely used for liquid transportation [1].

different sectors. Their operating range spans from full-load down to close to the shut-off head. In order to develop a reliable machine for this highly demanding operation, the behaviour of the flow in the entire pump has to be predicted before they are put in actual use. This requires critical analysis of highly complex flow in the pump which is turbulent and three dimensional in nature. The flow analysis through experiments or model testing is considered to be time consuming, tedious and expensive [3]. CFD is the present day state-of-art technique in fluid flow analysis. In recent years, most of the industries are widely using CFD as a numerical simulation tool for flow analysis of centrifugal pumps. Due to the development of CFD, one can predict the efficiency of the system as well as observe actual behavior.

II. COMPUTATIONAL FLUID DYNAMICS

CFD may be used to determine the performance of a component at the design stage, or it can be used to analyses difficulties with an existing component and lead to its improved design. The first step is to identify the region of interest and The geometry of the region of interest is then defined. If the geometry already exists in CAD, it can be imported directly. The mesh is then created. After importing the mesh into the pre-processor, other elements of the simulation including the boundary conditions (inlets, outlets, etc.) and fluid properties are defined. The flow solver is run to produce a file of results which contain the variation of velocity, pressure and any other variables throughout the region of interest. The results can be visualized and can provide the engineer an understanding of the behavior of the fluid throughout the region of interest [4]. This can lead to design modifications which can be tested by changing the geometry of the CFD model and seeing the effect.

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RESIDUAL STRESS ESTIMATION OF CLADDING PROCESS BY FINITE ELEMENT ANALYSIS: A REVIEW

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ABSTRACT

In this paper, review on residual stress estimation of cladding process by finite element analysis is carried out. Material properties i.e. hardness, yield strength, corrosion resistance, conduction properties plays important role in design structure and product life cycle. It is finding difficult to get a material with all required properties. Hence cladding is done for improving the required properties on the surfaces of base metal. Cladding is done by using method of arc welding and Laser welding. Here, arc welding method is used for cladding and the residual stresses produced during welding are estimated. However, a Finite element analysis finds better approximations and also used to analyze the thermo structural behavior of cladding process. So, an attempt is made to use the Finite Element Analysis for the same. SA508 (Steel) material is considered as the base material and cladding materials are varying to predict the nature of residual stresses ex. Aluminum, Brass and Zirconium. First the geometry is made using ANSYS 14.5 then block by block cladding process is carried out. Then coupled field analysis (i.e. Thermal and structural) is done to find residual stresses. The effects of thickness on residual stress are also analyzed and studied.

Keywords: ANSYS 14.5, Steel (SA508), Cladding, Aluminum, Brass and Zirconium.

1. INTRODUCTION

Nowadays materials require multiple important properties such as high hardness and ductility. Different properties however are often required at different locations on products. Corrosion and wear resistance are only required at the surfaces of products for instance. Surfaces of materials are always in contact with their surrounding, resulting in degradations due to wear, erosion and corrosion. Surface modification aims at reducing such surface degradations. So, the surface modification may involve the application of a coating, it is simply done by using the process of cladding. Surface modification can be applied to all kinds of products to increase performance, reduce costs, and modify the surface properties of material. This enables the realization of products with improved functionality, at reduced use of expensive materials.

Cladding is a process where one material covers another. Cladding supplies a combination of desired properties that not found in any one metal. A base metal can be selected for cost or structural properties, and another metal are added for surface protection or some special property such as high hardness.

2. LITERATURE SURVEY

A. Based on residual stress

KAMAL FARAHANINIA, B.S. [1] Mentioned, destructive methods of residual stress analysis are based on the principle that says removing of part of the stressed material and measuring the response of the remaining material as it adjusts its shape to remain in equilibrium. The principle behind electro polishing is controlled by corrosion of metal. This is done possible by applying external potential to the working metal such that it is made anodic with respect to a physically separate counter. The corrosion taking place on the work piece can be increased or decreased by increasing or decreasing the applied current. This makes the current an important variable in electro polishing. The tubular aluminium specimens investigated in this study provided knowledge of the magnitude of residual stresses associated with the tube drawing process. After a comprehensive review of the subject of residual stresses in metals and their measurements, the electro polishing technique was selected as a means of material removal for

FAILURE ANALYSIS OF HELICAL COIL SPRING IN AUTOMOBILE SYSTEM USING FINITE ELEMENT METHOD

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Abstract - It is observed that, in an automobile system the Helical suspension coil springs shows, stress distribution, materials characteristic and manufacturing defects are responsible for the common failures. As the failure affect the performance of spring which is not preferable for suspension system in automobiles. The proposed work of the study is to find out the failure by considering parameter like dynamic and stability response, deflection of spring etc. As well as it is proposed to optimize design this will be safe in every aspect of working of helical spring achieving some goals such as,

- Compensation in weight of spring and cost.
- Higher strength.
- Maximum load failure and deflection.

Key words - Decarburization¹, Helical Coil spring², and Stress distribution³.

1. INTRODUCTION

The vehicle chassis is mounted on axles, not direct but through some form of spring this is to be done to isolate the automobile body from the road shocks which may be in the form of bounce, pitch, roll or sway. These tendencies give rise to an uncomfortable travel and also cause additional stress in automobile frame and body. All the parts which perform the task of isolating the automobile from the road shocks are collectively called the suspension system. Springs are widely used in mechanical instruments with moving parts, to absorb loads, which may be continuously, or abrupt varying. The absorption of the loads takes place in the form of elastic energy. Coil springs are manufactured from rods which are coiled in the form of a helix. The design parameters of a coil spring are the rod diameter, spring diameter and the number of coil turns per unit length. Coil springs are commonly used for automobile suspension and industrial applications. Metal springs have several advantages, they are very cheap to produce and can be produced in almost all kinds of measures and in a very broad range of stiffness. Since the composite materials are anisotropic in nature, the design and manufacture of composite springs are difficult. Therefore the application of composite materials in springs is not yet popular. However they are used in the suspension system of the automobiles. The literature survey has revealed that, only prototype composite springs were prepared and tested for the performance. Since the time consumed for the manufacturing of the composite springs is more, the standard and simple method of mass production of composite coil springs is required from the economical point of view. In this study a spring from the two wheeler is taken for replacement. Glass fibres and carbon fibres are used for the manufacture of composite coil springs. The principle advantage of fibres reinforced polymer matrix composites for automobile parts is weight savings, part consolidation, and Investigation on the Feasibility of Composite Coil Spring for Automotive Applications D. Abdul Budan, T.S. Manjunatha improvement in NVH (noise, vibration and harshness). The absence of corrosion problems, which lowers maintenance cost for automobile parts, enables the use of fibres reinforced polymeric composite.

THERMAL ANALYSIS OF CYLINDRICAL PERFORATED FINS IN STAGGERED ARRANGEMENT BY CFD

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ABSTRACT

This project consist of Numerical and Computational Fluid dynamics analysis of heat transfer enhancement and the corresponding pressure drop on a flat surface equipped with cylindrical cross-sectional perforated and solid pin fins in a rectangular tunnel. The tunnel had a cross-sectional area of 250-100 mm². The experiments covered the following range: Reynolds number 13,500–43,500, the constant clearance ratio (C/H) = 0, the inter-fin spacing ratio (Sy/D) 1.944 and 3.417 for Staggered arrangement and Inline arrangement of fins. Nusselt number and Reynolds number are considered as performance parameters. Correlation equations are developed for the heat transfer and friction factor. Computational Fluid Dynamics analysis is performed by using ANSYS FLUENT 14.5 software. The Numerical and computational analysis shows that the use of the cylindrical perforated pin fins leads to heat transfer enhancement than the solid cylindrical fins. Heat transfer Enhancement varies depending on the inter-fin spacing ratio. Validation of Numerical and Computational Analysis is done.

Keywords: Heat Transfer¹, Cylindrical perforated Fins², Staggered Arrangement³, Inline Arrangement⁴.

1. INTRODUCTION

Extended surfaces, which are generally known as fins, are broadly used in air-cooled automobile engines and in air-cooled aircraft engines. Fins are also used in computer processors for cooling, and other electronic devices. Fins are used in the cooling of oil transport pipe line which runs several hundreds of miles. In different applications heat from the fins is dissipated by free as well as forced convection and radiation. Types of fins such as cylindrical, rectangular, square, annular and tapered or pin fins, to a combination of different geometries, have been used. These fins may manufactured from either a rectangular or cylindrical base. One of the commonly used heat exchanger fins is the pin fin. A pin fin is a cylinder or other shaped element attached perpendicular to a wall with the transfer fluid passing in cross flow over the element. Fins are basically used in the trailing edges of gas-turbine blades, in electronic cooling and in the aerospace industry. The height-to-diameter ratio (H/d) is of particular interest in heat-exchanger applications in which the attainment of a very high heat-transfer coefficient is of major concern. The fin height (H/d) affects the heat transfer of fins, and other affecting factors include the velocity of fluid flowing through channel, the thermal properties of the fluid, shape of the pin-fins like perforation, the relative inter-fin pitch, the arrangement of the pin-fins like inline, staggered arrangement and others. In existing studies, all the parameters affecting the heat transfer and pressure drop processes have not been investigated in detail, because it requires a vast number of experiments, which enormously increases the experimental cost and period. Therefore, the purpose of this study is to quantitative estimations of the various parameters affecting the performance of the cylindrical fins i.e. an optimization of design parameters for the perforated cylindrical pin fin.

2. LITERATURE SURVEY

There have been many investigation related to heat transfer and pressure drop of channel with pin fin was done by the following researchers considering the different factors for heat transfer



Green Structural Design of Building using Advance Energy Efficient Material

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Energy consumption in buildings is one of the most significant sources of greenhouse gas emissions.

Green Structural Design of Building using Advance Energy Efficient Material (Sagar Akhavan-Hafshejani)

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