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### Criterion III: - Research, Innovations and Extension

#### 3.3 Research Publications and Awards 2018



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# EEMGR: Energy and ETX aware Multipath Geographic Routing in WMSN

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In Mobile Ad-hoc Network (MANET), we cannot predict the clear picture of the topology of a node because of its varying nature. Without notice participation and departure of nodes results in lack of trust relationship between nodes. In such circumstances, there is no guarantee that path between two nodes would be secure or free of malicious nodes. The presence of single malicious node could

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Grid technology has emerged as development of distributed frameworks mostly centered around remote sharing and access to computational resources in an effectively transparent, reliable and secure way. To provide practical solutions to overcome the drawbacks and limitations of both the technologies, it is required to

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# Continuous Facial Emotion Recognition System Using PCA for Ambient Living

[Anil R. Surve](#) , [Vijay R. Ghorpade](#)  & [Anil S. Patthe](#) 

Conference paper | [First Online: 08 September 2018](#)

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## Abstract

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Nowadays, Facial Emotion Recognition is widely used and is an attractive area in affective computing especially for computer vision with healthcare applications. Facial expressions change with respect to time and person in different instances. To find out the emotions automatically by computers, facial expressions perform the most important role and also aid for human-machine interfaces. Persons can be distinguished by facial expressions easily on time but for computers, it is still a challenge. Presented work proposes the emergence-based eigenface techniques. By using PCA (Principal Component Analysis), we can extract all relevant information present in frames where human faces are detected. We know that facial expressions are conveying emotions exactly. We use PCA to reduce the dimensionality of computations. In this process we are detecting face, extracting features, reducing dimensionality using PCA, and then classifying emotions using Euclidean distance metric and after that, we apply temporal dynamics (Patthe and Anil in Temporal dynamics of continuous



## A Survey on Speech Emotion Recognition Using

### MFCC and Different classifier

Supriya B.Jagtap<sup>1</sup>, Dr.K.R.Desai<sup>2</sup>, Ms. J. K. Patil<sup>3</sup>

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#### ABSTRACT

*In this paper methodology for emotion recognition from speech signal is presented. Speech emotion recognition means extracting the emotional state of speaker and detecting the actual intension of the speaker through his or her speech. The goal is to recognize the emotions like Happiness, Anger, Boredom, Sadness, Surprise, Fear and Neutral. This Paper presents survey of three methods for Speech emotion recognition, Application of features like energy, formant, Mel frequency cepstral coefficient (MFCC) and different classifiers such as Support Vector Machine (SVM), Binary SVM, K-Nearest Neighbors approach (KNN), Radial Basis Function (RBF), Random Decision Forest (RBF) and Gaussian mixture Model (GMM) are discussed. In addition to the mentioned techniques it gives an outline of the areas where emotion recognition could be utilized such as healthcare, psychology, smart phones, marketing, call centers and cognitive science.*

**Keywords:** Emotion recognition, speech features, classification methods, speech database

#### INTRODUCTION

Emotions play a vital role in human communication. Speech is one of the most natural forms of communication between human and computer. With the visitation of technology in the recent years, more intelligent interaction between humans and machines is desired [1]. The importance of recognizing emotions from human speech has grown with the increasing role of spoken language interfaces in human-computer interaction applications. The goal of speech emotion recognition system is to understand emotions which are present in speech and synthesizing actual intention of the person. And recognize the emotions like Happiness, Anger, Boredom, Sadness, Surprise, Fear and Neutral.

From a recent scenario, for human emotion recognition through speech signal a wide ranging research is made and this researches using different speech information and signal. Many researchers use different classifiers or also develop own classifier [1]. For recognition of emotional state researchers use different classifier such



## Study of Texture features for Content Based Image Retrieval

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### ABSTRACT

To retrieve the required images from databases has become an area of wide interest in many applications. Relevant images can be retrieved using unique image features like texture, color or shape. This paper presents a extensive survey of the Content Based Image Retrieval (CBIR) techniques based on texture features. Paper presents through discussion on three texture features used for development of CBIR systems. These features includes Gray-Level Co-Occurrence Matrix (GLCM), Gabor filter and Local Binary Pattern (LBP). Performance analysis of these features is compared to showcase effectiveness in retrieval problems.

**Keywords-**CBIR, gray-level co-occurrence matrix (GLCM), Gabor filter, Local Binary Pattern (LBP).

### INTRODUCTION

Image databases are used in many fields including biometric security, medicals and satellite image processing. Content Based Image Retrieval (CBIR) is a technique used to search images from such large image databases according to user's demand, which is known as query image. It is based on image visual contents, known as features. Most of the CBIR systems are developed using three basic image features which includes texture, color and shape of an image. Figure 1 shows general block diagram of CBIR system.

It consists of two major phases i.e. feature extraction and similarity matching. The features are extracted from images and formulated as feature vectors and stored in feature database for further use. When query image is given similar feature vector is extracted and compared with the stored feature vectors from feature database. If the distance among the feature vector of the query image and database image is insignificant enough compared with predefined threshold, then the corresponding image in the database is considered as a match to the query image and is retrieved[1].



## Anti-theft Locker Security System (Using IOT ,GSM & GPRS)

Ms.Bhatkar Bhakti Girish<sup>1</sup>, Mr.Sankapal Pranesh S.<sup>2</sup>,  
Mr.Chinchani Aditya Mahesh<sup>3</sup>, Mrs. Mulla Shagupta M.<sup>4</sup>

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<sup>4</sup>Asst. Prof., CSE Dept., BVCOEK,

### ABSTRACT

The idea of this project is to implement a secure, non hack able, authenticated locker system to use in the banks or anywhere it is needed. What happens with traditional Key based access system, keys can get cloned or can get lost or theft & unauthorized access can ruin someone's life. Over last few years some sort of digital security entered in this lockers and lockers became accessible keyless but by digital or biometric authentication. But both password system as well as biometric scanning systems faced many problems like password hacking or CCTV recording, thumbprint mismatch etc. To avoid these problems, we are developing the new solution of keyless digital authentication & access system by using RFID tags. In this idea, we have interfaced the RFID reader to the microcontroller. The user of this system will have his own passive RFID tag. This RFID tags have their own ID numbers and each tag in this world is unique tag & non replicable. Whenever user wants to access his locker he just has to scan his tag on reader just in few seconds. If the tag or user is valid then the locker will be accessed & opened for preset time & it will automatically close after time lapse. If the card is invalid, then locker will not be accessible to the person. A small LCD is used to display the status of system.

**Keywords**—Microcontroller ,GSM, Locker System, RFID reader

### 1.INTRODUCTION

The Bank, which is a place that indicate very high level security. In day to day life every person is involved in banking transaction. Because of high level security, we use bank locker to secure our important document, expensive jewels, or cash etc in it. Hence it has become a very important part for every common human being. The user has to tag the bank official along with him/her locker. The user key along with the bank official's key can provide access to user. The conventional method has many drawbacks such as-

- Both the bank employees must have to present with the keys to open the locker.
- There is possibility of losing the key which makes the system insecure.
- The system is unable to match with today's fast paced digital world.
- The keys can be duplicated.





## Short text Understanding

Snehal Gurav<sup>1</sup>, Urmila Lambe<sup>2</sup>, Sonal Balanna<sup>3</sup>, Puja Savarde<sup>4</sup>, Aishwarya  
Suryavanshi<sup>5</sup>, Prof. Mrs. Mulla Shagupta M<sup>6</sup>

<sup>1,2,3,4,5,6</sup>CSE, Bharathi Vidyapeeth's College Of Engineering,Kolhapur, (India)

### ABSTRACT

*The idea of this project is to implement a short text understanding, short texts is difficult to many applications. Short texts not follow the grammatical syntax of written language. Using the old natural language processing tools, identified by part-of speech of each word in short texts does give us precise results. Short texts do not contain sufficient information to identify its meaning. Short texts are more ambiguous and noisy, are generated in a conflict volume, which is more tedious to handle them. In this project, we develop a system for short text understanding which shows similar knowledge provided by well-known datasets and automatically detect from a huge standford dictionary. Our approach is to less use of traditional methods for using such as text segmentation, part-of-speech tagging, and concept labelling. All these tasks focus on similar short text. We perform this method on real-time data. The results show that semantic knowledge for short text understanding.[1]*

**Keywords:** Concept labeling, semantic knowledge, Short text understanding , text segmentation, type detection

### 1. INTRODUCTION

Information technology is a need for machines to better understand language texts. In this project work, we focus on short texts which refer to texts with limited context. Many applications such as web search and micro blogging services etc. need to handle a large amount of short texts. Obviously, a better understanding of short texts will bring tremendous value.

One of the most important tasks of text understanding is to discover hidden semantics from texts. Many efforts have been devoted to this field. For instance, named entity recognition locates named entities in a text and classifies them into predefined categories such as persons, organizations, locations, etc. Topic models attempt to recognize "latent topics", which are represented as probabilistic distributions on words, from a text. Entity linking focuses on retrieving "explicit topics" expressed as probabilistic distributions on an entire knowledgebase. However, categories, "latent topics", as well as "explicit topics" still have a semantic gap with human's mental world. As stated in Psychologist Gregory Murphy's highly acclaimed book, "concepts are the glue that holds our mental world together". Therefore, we define short text understanding as to detect. A typical strategy for short text understanding which consists of three steps:



## EXPERIMENTAL INVESTIGATION OF EFFECT OF SHRINKAGE REDUCING ADMIXTURE ON SHRINKAGE CRACKING OF CONCRETE

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### ABSTRACT

One of the main factors that contribute to the cracks in concrete is shrinkage. One of the causes that result in the early deterioration of reinforced concrete involves volume changes in concrete due to autogenous shrinkage and moisture loss. As concrete cures and dries, tensile stresses are created due to hydration and loss of moisture. When a concrete's tensile strength is exceeded by an applied stress, a crack forms in the concrete. Concrete has a relatively low tensile strength compared to its compressive strength and experiences a variety of volumetric changes depending on environmental conditions, curing conditions, and applied stresses. Practically speaking it is difficult to make concrete which does not shrink and crack. It is only the question of magnitude. Now the question is how to reduce the shrinkage and shrinkage cracks in concrete structures. As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics.

In this dissertation an attempt is made to study the shrinkage characteristics and of concrete, containing admixture Shrinkage Reducing admixture. The shrinkage characteristics of concrete like length, width, total number and total area of cracks etc. are measured on concrete panels.

**Keywords:** Cracking in concrete, Concrete, Shrinkage, Shrinkage reducing admixture.

### 1. INTRODUCTION

As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics. In general, the "gel" structure of the cementitious paste in concrete undergoes swelling when it is wetted and shrinkage when it is dried. Such cracking adversely affects durability of the concrete, integrity and aesthetics of the structure. It is only when the mechanism of all kinds of shrinkage and the factors affecting the shrinkage are understood, an engineer will be in a better position to control and limit the shrinkage in the body of concrete.

The volume instability results in response to moisture, chemical, and thermal effects. In addition, various deleterious chemical reactions involving the constituents of concrete or embedded materials can play significant roles causing localized internal expansions. The impact of cracking on durability, especially corrosion, is detrimental to many transportation structures. In particular, cyclic or tidal exposures initiate dry-wet cycles and



## APPLICATION AND VALIDATION OF REGRESSION ANALYSIS IN THE PREDICTION OF STABILITY VALUE IN COLD BITUMINOUS EMULSION MIX

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### ABSTRACT

Regression analysis is one of the statistical technique which is used for estimating the relationship between various variables. For establishing the relationship between a dependent variable and independent variable regression analysis is used. The Regression analysis with one dependent variable and two or more independent variable is called as multiple regression analysis. It is required to establish a relationship between variables in many civil engineering practical problems. In this study, Marshall Stability test results of cold bituminous emulsion mix are analyzed and the relation between stability values and values of air void with different variables is established. Emulsion content, Aluminum dross, and Cement content these three variables are considered as an independent variable. In this study, total thirty different combinations are analyzed. Comparison between actual stability values and predicted stability values shows that there is very little error and prepared model can be used effectively.

**Keywords:** Cold Bituminous Emulsion Mix, Marshall Stability Value, Ordinary Portland Cement, Regression Analysis.

### 1. INTRODUCTION

#### 1.1 Regression Analysis

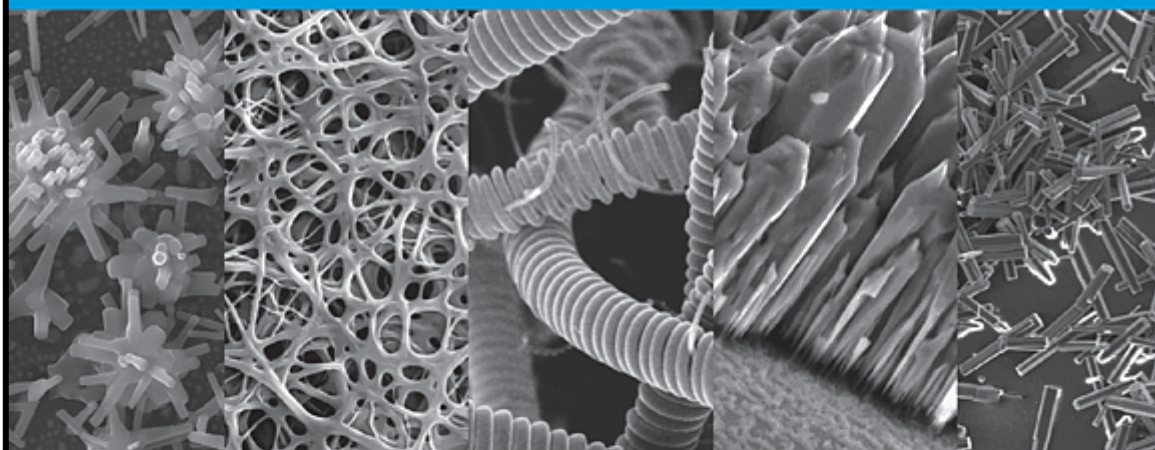
Regression analysis is a technique that allows finding a functional relationship (model or equation) between dependent variables and independent variables. If only one dependent variable is considered then the regression analysis is called univariate regression; while if two or more dependent variables are considered then the regression is called multivariate regression. There are two main types of regression analysis techniques



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# materials letters



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## Organic non-volatile memory device based on cellulose fibers

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### Abstract

The present manuscript reports the development of Ag/cellulose fibers/Al memory device using the electrospinning technique. The morphological characterization suggested that the active layer is composed of micro-fibers. The developed device shows fingerprint pinched hysteresis loop of the memristive device in I–V plane without any additional electroforming step. An excellent endurance for  $6 \times 10^3$





## A Survey on Speech Emotion Recognition Using MFCC and Different classifier

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### ABSTRACT

*In this paper methodology for emotion recognition from speech signal is presented. Speech emotion recognition means extracting the emotional state of speaker and detecting the actual intension of the speaker through his or her speech. The goal is to recognize the emotions like Happiness, Anger, Boredom, Sadness, Surprise, Fear and Neutral. This Paper presents survey of three methods for Speech emotion recognition, Application of features like energy, formant, Mel frequency cepstral coefficient (MFCC) and different classifiers such as Support Vector Machine (SVM), Binary SVM, K-Nearest Neighbors approach (KNN), Radial Basis Function (RBF), Random Decision Forest (RBF) and Gaussian mixture Model (GMM) are discussed. In addition to the mentioned techniques it gives an outline of the areas where emotion recognition could be utilized such as healthcare, psychology, smart phones, marketing, call centers and cognitive science.*

**Keywords:** Emotion recognition, speech features, classification methods, speech database

### INTRODUCTION

Emotions play a vital role in human communication. Speech is one of the most natural forms of communication between human and computer. With the visitation of technology in the recent years, more intelligent interaction between humans and machines is desired [1]. The importance of recognizing emotions from human speech has grown with the increasing role of spoken language interfaces in human-computer interaction applications. The goal of speech emotion recognition system is to understand emotions which are present in speech and synthesizing actual intention of the person. And recognize the emotions like Happiness, Anger, Boredom, Sadness, Surprise, Fear and Neutral.

From a recent scenario, for human emotion recognition through speech signal a wide ranging research is made and this researches using different speech information and signal. Many researchers use different classifiers or also develop own classifier [1]. For recognition of emotional state researchers use different classifier such





## Study of Texture features for Content Based Image Retrieval

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### ABSTRACT

To retrieve the required images from databases has become an area of wide interest in many applications. Relevant images can be retrieved using unique image features like texture, color or shape. This paper presents a extensive survey of the Content Based Image Retrieval (CBIR) techniques based on texture features. Paper presents through discussion on three texture features used for development of CBIR systems. These features includes Gray-Level Co-Occurrence Matrix (GLCM), Gabor filter and Local Binary Pattern (LBP). Performance analysis of these features is compared to showcase effectiveness in retrieval problems.

**Keywords**-CBIR, gray-level co-occurrence matrix (GLCM), Gabor filter, Local Binary Pattern (LBP).

### 1. INTRODUCTION

Image databases are used in many fields including biometric security, medicals and satellite image processing. Content Based Image Retrieval (CBIR) is a technique used to search images from such large image databases according to user's demand, which is known as query image. It is based on image visual contents, known as features. Most of the CBIR systems are developed using three basic image features which includes texture, color and shape of an image. Figure 1 shows general block diagram of CBIR system.

It consists of two major phases i.e. feature extraction and similarity matching. The features are extracted from images and formulated as feature vectors and stored in feature database for further use. When query image is given similar feature vector is extracted and compared with the stored feature vectors from feature database. If the distance among the feature vector of the query image and database image is insignificant enough compared with predefined threshold, then the corresponding image in the database is considered as a match to the query image and is retrieved[1].



## EXPERIMENTAL INVESTIGATION OF EFFECT OF SHRINKAGE REDUCING ADMIXTURE ON SHRINKAGE CRACKING OF CONCRETE

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### ABSTRACT

One of the main factors that contribute to the cracks in concrete is shrinkage. One of the causes that result in the early deterioration of reinforced concrete involves volume changes in concrete due to autogenous shrinkage and moisture loss. As concrete cures and dries, tensile stresses are created due to hydration and loss of moisture. When a concrete's tensile strength is exceeded by an applied stress, a crack forms in the concrete. Concrete has a relatively low tensile strength compared to its compressive strength and experiences a variety of volumetric changes depending on environmental conditions, curing conditions, and applied stresses. Practically speaking it is difficult to make concrete which does not shrink and crack. It is only the question of magnitude. Now the question is how to reduce the shrinkage and shrinkage cracks in concrete structures. As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics.

In this dissertation an attempt is made to study the shrinkage characteristics and of concrete, containing admixture Shrinkage Reducing admixture. The shrinkage characteristics of concrete like length, width, total number and total area of cracks etc. are measured on concrete panels.

**Keywords:** Cracking in concrete, Concrete, Shrinkage, Shrinkage reducing admixture.

### 1. INTRODUCTION

As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics. In general, the "gel" structure of the cementitious paste in concrete undergoes swelling when it is wetted and shrinkage when it is dried. Such cracking adversely affects durability of the concrete, integrity and aesthetics of the structure. It is only when the mechanism of all kinds of shrinkage and the factors affecting the shrinkage are understood, an engineer will be in a better position to control and limit the shrinkage in the body of concrete.

The volume instability results in response to moisture, chemical, and thermal effects. In addition, various deleterious chemical reactions involving the constituents of concrete or embedded materials can play significant roles causing localized internal expansions. The impact of cracking on durability, especially corrosion, is detrimental to many transportation structures. In particular, cyclic or tidal exposures initiate dry-wet cycles and



## APPLICATION AND VALIDATION OF REGRESSION ANALYSIS IN THE PREDICTION OF STABILITY VALUE IN COLD BITUMINOUS EMULSION MIX

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### ABSTRACT

Regression analysis is one of the statistical technique which is used for estimating the relationship between various variables. For establishing the relationship between a dependent variable and independent variable regression analysis is used. The Regression analysis with one dependent variable and two or more independent variable is called as multiple regression analysis. It is required to establish a relationship between variables in many civil engineering practical problems. In this study, Marshall Stability test results of cold bituminous emulsion mix are analyzed and the relation between stability values and values of air void with different variables is established. Emulsion content, Aluminum dross, and Cement content these three variables are considered as an independent variable. In this study, total thirty different combinations are analyzed. Comparison between actual stability values and predicted stability values shows that there is very little error and prepared model can be used effectively.

**Keywords:** Cold Bituminous Emulsion Mix, Marshall Stability Value, Ordinary Portland Cement, Regression Analysis.

### 1. INTRODUCTION

#### 1.1 Regression Analysis

Regression analysis is a technique that allows finding a functional relationship (model or equation) between dependent variables and independent variables. If only one dependent variable is considered then the regression analysis is called univariate regression; while if two or more dependent variables are considered then the regression is called multivariate regression. There are two main types of regression analysis techniques



## ROOT CAUSE ANALYSIS OF DELAYS ON RESIDENTIAL CONSTRUCTION PROJECTS IN KOLHAPUR CITY

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### ABSTRACT

The construction industry has much complex in nature as it involves large number of activities involved within. Managing all these activities is very difficult task even though a proper management some factors affect the project. So the method to track and mitigate these causes affecting the project is needed.

In this research, paper the causes affecting delays on residential projects in Kolhapur city, Maharashtra are taken to study. The questionnaire designed for collection of data and then data analyzed using RII (Relative Importance Index) method. In this paper, the 37 individual causes affecting project duration are categorized into 8 main groups for the study purpose. And the delays are considered as the planned duration with actual duration of the activity. This paper is aimed on knowing the causes of delays occurrence. The causes which vary the planned duration and actual duration of task during construction stage are considered as delays for this research purpose. These causes in construction task can affect the cost of the project so this study is important in cost saving manner as well as for improvement of the organizational method, which are currently used in construction industry. The RII (Relative importance index) method is used to know the effect of such causes on performance. This study helps in knowing the exact causes of delay occurrences with the help of questionnaires prepared and analysed using 'Relative importance index'.

The RII ranking shows that the causes like Delay in progress payment by owner, Unqualified workforce, Low productivity of labour, Personal problem of labour, Difficulties in financing project have very high RII which are most affecting factors causing delays of construction of residential buildings in Kolhapur city. Cause and effect relationship will act as the base of this study and will help develop suitable and sustainable method. Time and money saving factors interdependency will strategically produce outcomes. The results obtained from this study help produce high end graphs which seizes all the details of delays and overall performance of the project.

## WATER SUPPLY SYSTEMS AND HIGH RISE BUILDINGS

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### ABSTRACT

Along with constant rise of land prices in densely populated cities, high rise buildings continuously are gushing out. This high rise housing trend increases energy required for water supply & corresponding green gas emission. Therefore it is necessary to evolve methods which result into energy savings. This paper addresses the issue of appropriate water supply system to be employed for high rise buildings in India. Optimizing energy requirement of water supply systems in high rise buildings is a way towards sustainable development. This paper brings out a case study of a 11 to 24 floor residential building wherein the gravity system and Hydropneumatic system and intermediate tank system methods of water supply schemes are compared on energy consumption profile, all systems being sized as per National Building Code 2005 guidelines. The result shows that the corresponding annual electricity energy can be saved via intermediate tank system than gravity system for scenario considered.

**Keywords:** High rise buildings, Water supply systems, intermediate tank system, energy consumption profile.

### 1. INTRODUCTION

Along with constant rise in land prices in densely populated cities high rise buildings are continuously gushing out. This high rise housing trend across our great nation increases energy required for water supply. Reducing energy consumption of water supply system in buildings is a way of reducing carbon emission now days.

As the water pressure head at the government water mains is insufficient to supply whole building (or to reach topmost floor of building), gravity tank system and Hydro pneumatic systems are designed, for water distribution through pipes [1].

Although energy consumption is a major concern for sustainable high-Rise developments, there is no existing measure that systematically addresses the issue with respect to the optimal design and operation of high rise water supply systems. Design solutions which integrate effective energy use into water planning and supply





## EFFECT OF FLY ASH AND ARTIFICIAL SAND ON THE COMPRESSIVE STRENGTH OF CONCRETE

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### ABSTRACT

Slurry infiltrated fibrous concrete (SIFCON) is a unique fiber concrete with high percentage of fiber. SIFCON has tremendous potential for application in areas where high compressive strength is required. The SIFCON consists of cement slurry in which steel fibers are preplaced in the mould, after placement of fibers, cement slurry is poured into the fibre network.

To study the performance of SIFCON in compression strength, the cube specimens of dimension 150x150x150 mm were cast. In this paper effect of addition of fly ash, artificial sand & steel fiber on the properties of SIFCON is reported. Waste steel fibers were used in SIFCON. In this study aspect ratios of steel fiber like 80, 90, 100 and 110 are used with 6%, 8% and 10% fibers percentage. Specimens are cast by adding fly ash at varying percentages like 10%, 15%, 30% and 40% by weight of cement and 100% artificial sand. The compressive strength is evaluated.

Test results revealed the superior characteristics of SIFCON as compared with normal FRC

**Keywords:** SIFCON, aspect ratio, waste steel fibers, fly ash, artificial sand, compressive strength.

### INTRODUCTION

Continuous use of natural sand in construction activity has needed a full or partial replacement, and one of the alternative is artificial sand. On the other hand fly ash is widely used material all over the world. The use of fly ash in concrete not only improves technical advantages to the properties of concrete but also contributes to the environmental pollution control. If it is possible to use this in making concrete by replacement of cement, then it will solve the problem of its disposal.

Concrete is a commonly used material in construction engineering all over the world. Concrete, by desirable quality of its low cost, easy availability, comparatively simple





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### ABSTRACT

One of the main factors that contribute to the cracks in concrete is shrinkage. One of the causes that result in the early deterioration of reinforced concrete involves volume changes in concrete due to autogenous shrinkage and moisture loss. As concrete cures and dries, tensile stresses are created due to hydration and loss of moisture. When a concrete's tensile strength is exceeded by an applied stress, a crack forms in the concrete. Concrete has a relatively low tensile strength compared to its compressive strength and experiences a variety of volumetric changes depending on environmental conditions, curing conditions, and applied stresses. Practically speaking it is difficult to make concrete which does not shrink and crack. It is only the question of magnitude. Now the question is how to reduce the shrinkage and shrinkage cracks in concrete structures. As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics.

In this dissertation an attempt is made to study the shrinkage characteristics and of concrete, containing admixture Shrinkage Reducing admixture. The shrinkage characteristics of concrete like length, width, total number and total area of cracks etc. are measured on concrete panels.

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The volume instability results in response to moisture, chemical, and thermal effects. In addition, various deleterious chemical reactions involving the constituents of concrete or embedded materials can play significant roles causing localized internal expansions. The impact of cracking on durability, especially corrosion, is detrimental to many transportation structures. In particular, cyclic or tidal exposures initiate dry-wet cycles and

## A Literature Review study on Compressive and Tensile Strength of Steel Fibre Reinforced Concrete

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### ABSTRACT

*This paper presents a review of the various mechanical properties like compressive and tensile strength of steel fibre reinforced concrete. Fibres are used as cracking resistance and strengthening of concrete. According to various research papers it has been found that steel fibre carry considerable strength more than normal concrete. In this paper, some research shows compressive and tensile strength are increase linearly but also some research shows that the compressive and tensile strength increase non-linearly with increasing of steel fibre. In another one research, shows that such mentioned mechanical strength of concrete increases up to a certain volume fraction in fibre and get reduces after increasing the fibre volume fraction in the concrete.*

**Keywords:** steel fibre, SFRC, aspect ratio, fibre volume fraction, strengths.

### INTRODUCTION

As we know the concrete is a quasi brittle material. So it is obviously strong in compression but weak in tension. To overcome such brittleness there is interruption of conventional reinforcement in the concrete. By considered such mechanism we only counter balance the compression load by concrete and tension load by steel reinforcement. However we cannot overcome the inherent weakness of plain concrete in post cracking stage. It has been recognised that the addition of closely spaced and uniformly dispersed fibres to concrete would act as crack arresters and also would improve its various mechanical properties like compressive, split tensile and flexural strength etc.

### REVIEW STUDY

D.B.Mohite and S.B.Shinde<sup>1</sup> presents, the study of compression strength on concrete mix of M70 grade, without steel fibre & with steel fibres. The steel fibres of hooked ended, flat and waved shape having aspect ratio of 50. The fibre volume fraction has been varied from 0.5% to 4% with an interval of 0.5% by weight of cement. Compression test carried on 150mm size cube specimens. Table no. 1 to 3 shows the results of compressive strength of steel fibre reinforced concrete compared with normal concrete for 7 and 28 days curing respectively. But in actual practice 28 days test result are more preferably used rather than 7 days test.



## APPLICATION AND VALIDATION OF REGRESSION ANALYSIS IN THE PREDICTION OF STABILITY VALUE IN COLD BITUMINOUS EMULSION MIX

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### ABSTRACT

Regression analysis is one of the statistical technique which is used for estimating the relationship between various variables. For establishing the relationship between a dependent variable and independent variable regression analysis is used. The Regression analysis with one dependent variable and two or more independent variable is called as multiple regression analysis. It is required to establish a relationship between variables in many civil engineering practical problems. In this study, Marshall Stability test results of cold bituminous emulsion mix are analyzed and the relation between stability values and values of air void with different variables is established. Emulsion content, Aluminum dross, and Cement content these three variables are considered as an independent variable. In this study, total thirty different combinations are analyzed. Comparison between actual stability values and predicted stability values shows that there is very little error and prepared model can be used effectively.

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## WATER SUPPLY SYSTEMS AND HIGH RISE BUILDINGS

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### ABSTRACT

Along with constant rise of land prices in densely populated cities, high rise buildings continuously are gushing out. This high rise housing trend increases energy required for water supply & corresponding green gas emission. Therefore it is necessary to evolve methods which result into energy savings. This paper addresses the issue of appropriate water supply system to be employed for high rise buildings in India. Optimizing energy requirement of water supply systems in high rise buildings is a way towards sustainable development. This paper brings out a case study of a 11 to 24 floor residential building wherein the gravity system and Hydropneumatic system and intermediate tank system methods of water supply schemes are compared on energy consumption profile, all systems being sized as per National Building Code 2005 guidelines. The result shows that the corresponding annual electricity energy can be saved via intermediate tank system than gravity system for scenario considered.

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## OPTIMUM PROJECT COST AND DURATION BY USE OF DIFFERENT TECHNIQUE: A REVIEW WITH CASE STUDY

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### ABSTRACT

As we know that construction industry is on a boom these days. The new innovations of various technologies as well as materials have been considered as the boon for the economic development. The economy of nation depends directly or indirectly upon the infrastructural development being prevailed in the nation as there are many foreign investments being involved in it.

Time and cost are the two prime concerns which are to be considered appropriately while planning of any project to establish it successfully in time. We know that there is time delay in any project due to various factors which effects directly upon the Total Project Cost. Thus to minimize the total project cost by completing the project in minimum duration we have suggested to use the "NETWORK COMPRESSION TECHNIQUE" to be assigned over the collective activities considered in any project and obtain an optimum solution.

In this paper , we have considered **1 Case Study**, one of a bungalow for which we have collected data regarding to its plan, quantities required, material required, labour required and derived a chart which would direct give us the appropriate cost and time involved in that activity. By use of network compression technique we have crashed the network in order to get the optimum solution.

**Keywords:** Crash Cost, Direct- indirect costs, Network Compression Technique, PERT planning, Project cost minimization

### INTRODUCTION

Buildings are structures which provide shelters for man, his properties and activities. They must be properly planned, designed and constructed in order to get benefits from the nature. A building project is a task which is undertaken to achieve a goal of completing a certain construction within time and the given budget. But then to the results of expected cost investment cannot be made as certain in each plan as the project varies as per the plan and extent. Thus it becomes important therefore to arrange the tasks within the project sequentially in correct order and optimise it to get the appropriate results. The proper implementation and construction of a





## ROOT CAUSE ANALYSIS OF DELAYS ON RESIDENTIAL CONSTRUCTION PROJECTS IN KOLHAPUR CITY

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The construction industry has much complex in nature as it involves large number of activities involved within. Managing all these activities is very difficult task even though a proper management some factors affect the project. So the method to track and mitigate these causes affecting the project is needed.

In this research, paper the causes affecting delays on residential projects in Kolhapur city, Maharashtra are taken to study. The questionnaire designed for collection of data and then data analyzed using RII (Relative Importance Index) method. In this paper, the 37 individual causes affecting project duration are categorized into 8 main groups for the study purpose. And the delays are considered as the planned duration with actual duration of the activity. This paper is aimed on knowing the causes of delays occurrence. The causes which vary the planned duration and actual duration of task during construction stage are considered as delays for this research purpose. These causes in construction task can affect the cost of the project so this study is important in cost saving manner as well as for improvement of the organizational method, which are currently used in construction industry. The RII (Relative importance index) method is used to know the effect of such causes on performance. This study helps in knowing the exact causes of delay occurrences with the help of questionnaires prepared and analysed using 'Relative importance index'.

The RII ranking shows that the causes like Delay in progress payment by owner, Unqualified workforce, Low productivity of labour, Personal problem of labour, Difficulties in financing project have very high RII which are most affecting factors causing delays of construction of residential buildings in Kolhapur city. Cause and effect relationship will act as the base of this study and will help develop suitable and sustainable method. Time and money saving factors interdependency will strategically produce outcomes. The results obtained from this study help produce high end graphs which seizes all the details of delays and overall performance of the project.



## Analysis of web system by using model-based testing with selenium tool

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### ABSTRACT

Modern business applications predominantly rely on web technology, enabling software vendors to efficiently provide them as a service, removing some of the complexity of the traditional release and update process. To increasing web application accuracy and speed user process crawler model. Cutting edge business applications transcendentally depend on web innovation, empowering programming sellers to give proficiently them as an administration, uprooting a portion of the multifaceted nature of the customary discharge and overhaul process. While this encourages shorter, more productive and successive discharge cycles, it obliges persistent testing. Having knowledge into application conduct through unequivocal models can to a great extent bolster improvement, testing and support. Model-based testing permits effective test creation taking into account a depiction of the states the application can be in and the moves between these states. As determining conduct models that are sufficiently exact to be executable by a test computerization device is a hard assignment, an option is to concentrate them from running applications.

**Keywords**—Specification mining; dynamic analysis; model-based testing; web system testing

### 1. INTRODUCTION

Then again, mining such models is a test, specifically in light of the fact that one needs to know when two states are proportional, and also how to achieve that state. Here introduce ProCrawl (Process Crawler), a device to mine conduct models from web applications that backing multi-client work processes. ProCrawl incrementally takes in a model by creating system runs and watching the application conduct through the client interface. In our assessment on a few true web applications, ProCrawl removed models that briefly depict the actualized work processes and can be specifically utilized for model-based testing [14].

The omnipresence of web programs and progressions in web advances has brought about web applications turning into a prevailing customer for big business programming. Also, the accessibility of system data transfer capacity empowers applications to be worked by the merchant and gave as administrations to clients. Working applications on the seller side evacuates a portion of the intricacy and expenses of the customary programming discharge and





## A STEP TOWARDS SMART MUSEUM USING SMART CAMPUS GUIDE

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### ABSTRACT

*This paper introduces an Android application (Smart Campus Guide) that recognizes the structure (a building and a statue, e.g. Museum) in which a user is interested and displays useful information about the museum. The new technologies introducing the Internet of Things allow to provide advanced services to the users. This application records user's personal information when the user downloads this application, keeps track of the user while it is run, recognizes the structure when the user takes a picture of it, displays the picture along with a text, audio and image showing some useful information about the structure, and plays a video which is closely related to the structure. This paper also introduces our design and implementation of the application in detail. The techniques introduced in this paper can be used in mobile are location based services, IoT based services and QR code scanning. The system has been designed to be easily extensible to other IoT technologies and its effectiveness has been evaluated in the museum. In this system we are also implementing online ticket booking and online transactions.*

**Keywords:** *IoT based, Location-Based, Mobile application, QR code scanning, database.*

### INTRODUCTION

Art and Culture are always played an important role in human beings live. Over the centuries, hundred of museums and art galleries have preserved historical cultural heritage and served as important sources of education and learning. Museums are nowadays point of interest for human beings such as theatres or cinemas. Visits at museums are often considered boring, because it is hard for museums curators to catch the attention of tourists. Interests may vary from person to person. Interests are different from children to adults, students group from single visitor, casual visitor to fond-visitor. Therefore, interactive and personalized museum tours need to be developed. In this perspective, a significant contribution can be given by the next Internet of Things (IoT), which involves the extension of the Internet to small and lowcost "things" that are thought to realize smart environments in order to provide new services to the users.[12]

As the electronic techniques are advance computing machines have been miniaturized and smart phones are developed with powerful processors and large memories. Nowadays, various services become available on

# GROCEROUS: A WEB BASED SOLUTION FOR DAILY GROCERY NEEDS

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## ABSTRACT

*This paper helps in presenting a great method to provide ease in online shopping and the sense of security in sense of money as well as for customer satisfaction while shopping offline. This paper is all about providing a human-centred approach for designing a ubiquitous computing system which aims at providing a better experience for shoppers at a supermarket and a comfortable way for a stress-free shopping experience, which reduces the problems involved in the usual way of shopping for both the customer and the retailer. The implementation is also provided with a user scenario in each phase which successfully contributed to the system design by giving a clear picture of user experiences. Along with this the customer would be informed about the best on-going offers in the shop. Different modes of payments are also available.*

**Keywords-** *Android, Ecommerce, Grocery, Market Place, Multi-vendor.*

## 1. INTRODUCTION

At the current situation shopping is stressful and no comfort and ease involved in it. There are various factors to keep in mind when it comes to traditional way of shopping such as products search, billing and payment and most importantly searching for a good shop. This android application is developed in such a way that it can provide an interactive user environment and enhance the shopping experience. The recent development in Technological has provided and still developing to provide solutions to various departments and has resulted into a safe and comfortable environment to live in. When it comes to big supermarket, Concept stores like the Wal-Mart or Dmart which uses radio frequency identification tags (RFID), stores also have integrated self-checkout points to speed up the paying process while others integrate barcode scanners either at a common section or in separate shopping trolleys. Android is an operating system developed for smartphones and tablets. It is based on Linux kernel and uses Dalvik Virtual Machine (DVM) for executing Java byte code [1].

The technology keeps improving in the smart phones. From the last few years, the mobile phones capabilities have been improved rapidly. Mobile phones are multiprocessing so they can work fast as a computer [2]. With



## EFFECT OF FLY ASH AND ARTIFICIAL SAND ON THE COMPRESSIVE STRENGTH OF CONCRETE

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### ABSTRACT

Slurry infiltrated fibrous concrete (SIFCON) is a unique fiber concrete with high percentage of fiber. SIFCON has tremendous potential for application in areas where high compressive strength is required. The SIFCON consists of cement slurry in which steel fibers are preplaced in the mould, after placement of fibers, cement slurry is poured into the fibre network.

To study the performance of SIFCON in compression strength, the cube specimens of dimension 150x150x150 mm were cast. In this paper effect of addition of fly ash, artificial sand & steel fiber on the properties of SIFCON is reported. Waste steel fibers were used in SIFCON. In this study aspect ratios of steel fiber like 80, 90, 100 and 110 are used with 6%, 8% and 10% fibers percentage. Specimens are cast by adding fly ash at varying percentages like 10%, 15%, 30% and 40% by weight of cement and 100% artificial sand. The compressive strength is evaluated.

Test results revealed the superior characteristics of SIFCON as compared with normal FRC

**Keywords:** SIFCON, aspect ratio, waste steel fibers, fly ash, artificial sand, compressive strength.

### INTRODUCTION

Continuous use of natural sand in construction activity has needed a full or partial replacement, and one of the alternative is artificial sand. On the other hand fly ash is widely used material all over the world. The use of fly ash in concrete not only improves technical advantages to the properties of concrete but also contributes to the environmental pollution control. If it is possible to use this in making concrete by replacement of cement, then it will solve the problem of its disposal.

Concrete is a commonly used material in construction engineering all over the world. Concrete, by desirable quality of its low cost, easy availability, comparatively simple



## Design of cutting and conveying units of mini-sugarcane harvester

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### ABSTRACT

India has largest area under sugarcane and second largest country in the world in sugarcane production, India produced 341.2 million tones in 2013 where world-wide production of sugarcane was 1877.1 million tones. Land preparation, Plantation, Water and Fertilizer, management, Weed management and harvesting are important cultivation practice for sugarcane production, among which manual sugarcane harvesting is a very labour-intensive and laborious activity. This paper is dealing with the Calculations followed to design cutting and conveying units of mini-sugarcane harvester and development of laboratory setup for testing of cutting unit

**Keywords:** Force required in cutting, Sugarcane harvesting, Total Power requirement

### INTRODUCTION

Sugarcane is major crop in India. Majority of Indian farmer have small lands i.e. 3 to 4 hectares in average. Sugarcane planting and harvesting are major activities. In India till date these activities are mostly done manually which is time consuming and laborious job. Harvest labourers can easily fatigue due to excessive stress on the joints and muscles and are exposed to harmful pests from plantations, creating safety concerns. The advent of mechanical harvesting systems frees harvest labourers from the drudgery of field Operations. Available sugarcane harvesters are very large in size and of huge cutting capacity. Due to their size it is next to impossible to use these huge harvesters in dense and narrow row spacing crop as well as small land holding farmers can't afford costly such machines so there is a need to design and development of mini-sugarcane harvester which is helpful for both whom having small or big farms. In this article we are focus on calculations of cutting and conveying units as well as Power requirement for self-propelling of mini-sugarcane harvester.

# Sugarcane Lifting Machine (Harvester)

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## ABSTRACT:-

*In India the number of population working under agriculture is nearly about 70% in which rural population is 80%. The agriculture is contributing in India's national income very fast. The agriculture share 20.5% in GDP of India[7], hence we can say that agriculture is the backbone of Indian economy. In today's world of competition, there is need for faster rate of production of agricultural product. In India farmers are facing problems of labor shortage and the Indian agriculture sector is still depends on labors[1]. The need for faster production of agricultural products and labor shortage encourages the need of mechanization in agriculture. Sugarcane is majorly taking crop in India, after cutting of sugarcane starts reducing its weight, hence it is necessary to send sugarcane as early as possible to sugar factory. The speed of loading sugarcane in trucks or tractors is a time consuming process with labors[1]. Thus we are making a mechanism which reduces time of loading and provide prevention to accidents which happens during loading bunches of sugarcane. The project aims at design and fabrication of small sugarcane harvesting mechanism which is operated by engine.*

**Keywords:** Botte neck, sugaryield, harvester.

## LITARETURE REVIEW

A sugarcane harvester is a complex electromechanical product. The development process commonly uses means of computer-aided, resulting in a large number of files and data. To solve the problem of data integration and sharing, and to provide a rapid designing environment for designers, an integrated design platform was developed. The overall framework and each function modules were analyzed, and the working flow was explained; Based on the data formats which support by each function modules, the data transmission model was expatiated; and the application of the software controls in the integrated design platform was discussed. Using Visual Studio.net as a tool, the integrated design platform was developed, and the functions of this software was validated by a designing example of wheel-type sugarcane harvester. The practical application of the platform shows that it can significantly speed up the design process and shorten the development cycle.





## REVIEW OF CORE TECHNOLOGIES INSUGARCANE HARVESTER

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### ABSTRACT

Sugarcane is major crop in India and Harvesting is a crucial component of sugarcane production. In this article, we critically reviewed sugarcane harvesting technologies currently being used. Review of two harvesting practices was represented and two harvesting modes were introduced including a comparative discussion on their technical challenges, advantages and limitations. It is followed by a comprehensive review of core technologies of current sugarcane harvesters like cane base cutting mechanisms. The influence of base cutter kinematic and geometric parameters, such as blade cutting velocity, disc tilt angle, blade number, blade oblique angle, and blade shape on harvesting efficiency and cutting quality, were reviewed.

**Keywords:** Base cutting mechanisms, green cane Harvesting, Burn cane harvesting, Cutting quality

### INTRODUCTION

According to World Crop and Livestock Statistics published by the Food and Agriculture Organization (FAO), world sugarcane growing area increased from 6.3 million hectares in 1950 to 25.4 million hectares in 2011 (FAOSTAT, 2013). India has largest area under sugarcane and is the second largest country in the world in sugarcane production, India produced 341.2 million tonnes in 2013 where world-wide production of sugarcane was 1877.1 million tonnes. India has 4.999 million hectare of land under sugarcane cultivation with average sugarcane yield 68.25 tonnes per hectare in 2013 (DEPD, India 2015). Before mechanical harvesting systems were introduced, sugarcane had been harvested manually using various types of hand knives. Manual sugarcane harvesting is a very labour-intensive and laborious activity. Harvest laborers can easily fatigue due to excessive stress on the joints and muscles (Clementson and Hansen, 2008) and are exposed to harmful pests from plantations, creating safety concerns (Carvalho, 2012). The advent of mechanical harvesting systems frees harvest labourers from the drudgery of field operations. To harvest one hectare of sugarcane, it requires 3.3-4.2 machine-hour by mechanical harvesting whereas 850- 1000 man-hour by manual harvesting (Yadav et al., 2002). The goal of this study is to comprehensively review the existing literature on harvesting technologies





## DESIGN AND FABRICATION OF SUGARCANE PEELING MACHINE

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### ABSTRACT

India is a land of agriculture. With wide variety of agricultural crops cultivated, the sugarcane is one of the most important production crops in India. This project deals with the concept of sugarcane peeling attachment. The number of sugarcane small scale juice setups need to clean the sugarcane manually. This not only requires time but also is a tiresome task since the sugar cane needs to be cleaned and then fed into the machine for juice extraction. This project deals with development of sugarcane peeling attachment which can help to peel the sugarcane automatically when fed into this attachment. This project aims to reduce the total time required due to manual peeling and reduction in operator fatigue due to the tiresome peeling operation. The proposed machine is expected to peel sugarcane at a faster rate without much fatigue.

**Keywords**—Cutting Peeling, Agriculture, Sugarcane, fatigue, time etc.

### INTRODUCTION

India is the land of villages. This being said the major occupation of majority of villages in India is agriculture. Near about 70% people are dependent upon agriculture. Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17 per cent of world population from 2.3 per cent of world geographical area and 4.2 per cent of world's water resources. The economic reforms, initiated in the country during the early 1990s, have put the economy on a higher growth trajectory. Annual growth rate in GDP has accelerated from below 6 percent during the initial years of reforms to more than 8 percent in recent years. This happened mainly due to rapid growth in non-agriculture sector. The workforce engaged in agriculture between 1980-81 and 2006-07 witnessed a very small decline; from 60.5 percent to 52 percent.

Indian agriculture is characterized by agro-ecological diversities in soil, rainfall, temperature, and cropping system. Besides favorable solar energy, the country receives about 3 trillion m<sup>3</sup> of rainwater, 14 major, 44 medium and 55 minor rivers share about 83 per cent of the drainage basin. About 210 billion m<sup>3</sup> water is estimated to be available as ground water. Irrigation water is becoming a scarce commodity. Thus proper harvesting and efficient utilization of water is of great importance.



## A REVIEW ON :APPLICATION OF SOLAR ENERGY

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### ABSTRACT

*Thousands of small & medium scale solar applications are present in India. All are facing certain problems resulting in lack of electricity, money, space, drying time, etc. In order to solve the faced problem, we are going to design the solar dryer which will focus on reducing the drying time of food products by means of which the drying rate will be improved & this design focuses on space, time, money, energy, and other resources their it most effectively. This design reduces problems and annoyances in the work flow.*

### INTRODUCTION

Since the beginning of time, people have been fascinated by the sun. Ancient civilizations personified the sun, worshipping it as a God or Goddess. Throughout history, farming and agriculture efforts have relied upon the sun's rays to grow crops and sustain populations. Only recently, however, have we developed the ability to harness the sun's awesome power. The resulting technologies have promising implications for the future of renewable energy and sustainability. Below, we've given a brief on solar power, how it works, and what may be in store for the future of solar.

#### What is Solar Power?

Solar power is a form of energy harnessed from the power and heat of the sun's rays. It is renewable, and therefore a "green" source of energy.

#### How does it Work?

The most common way of harnessing energy from the sun is through photovoltaic (PV) panels – those large, mirror-like panels you've likely seen on rooftops, handheld solar devices, and even spacecrafts. These panels operate as conductors; taking in the sun's rays, heating up, and creating energy (and electricity). On a larger scale, solar thermal power plants also harness the power of the sun to create energy. These plants utilize the sun's heat to boil water and, in turn, power steam turbines. These plants can supply power to thousands of people. There are other ways we harness solar power. Read more about these various methods utilized today here via National Geographic. or areas that frequently experience cloudy weather, may have difficulty utilizing solar power effectively. Additionally, solar power is an expensive endeavor. The technologies often require a large amount of land, and they can be extremely costly. Scientists are hard at work to find an affordable,



## Automation, Robotics and Mechatronics –An Introduction to Monopropellant Powered Robotics

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### ABSTRACT

*This paper describes the design and energetic characterization of an actuator designed to provide enhanced system energy and power density for self-powered robots. The proposed actuator is similar to a typical compressible gas fluid-powered actuator, but pressurizes the respective cylinder chambers via a pair of proportional injector valves, which control the flow of a liquid monopropellant through a pair of catalyst packs and into the respective sides of the double-acting cylinder. This paper describes the design of the proportional injection valves and describes the structure of a force controller for the actuator. Finally, an energetic characterization of the actuator shows improvement relative to prior configurations and marked improvement relative to state-of-the-art batteries and motors.*

**Keywords:** - Actuation, robotics, monopropellant power supply, self-powered robot.

### 1. INTRODUCTION

One of the most significant challenges in the development of an autonomous human-scale robot is the issue of power supply. Perhaps the most likely power supply/actuator candidate system for a position or force actuated human-scale robot is an electrochemical battery and dc motor combination. This type of system, however, would have to carry an inordinate amount of battery weight in order to perform a significant amount of work for a significant period of time [1].

With regard to this figure of merit, batteries and dc motors capable of providing the requisite power for human scale robot offer reasonable conversion efficiency, but provide relatively low power-source energy density and a similarly low actuator/gear head power density. A gasoline-engine-powered hydraulically-actuated human-scale robot would provide a high power-source energy density, but a relatively low conversion efficiency and actuation system power density.

#### 1.1 A MONOPROPELLANT POWERED APPROACH

Monopropellants, originally developed in Germany during World War II, have since been utilized in several applications involving power and propulsion, most notably to power gas turbine and rocket engines for underwater and aerospace vehicles. Modern day applications include torpedo propulsion, reaction control thrusters on a multitude of space vehicles, and auxiliary power turbo pumps for aerospace vehicles. This seminar describes the design of a monopropellant-powered actuation system appropriate for human-scale self-



## Design ,drafting and manufacturing of fixtures for surface finish and boring operation on Gauge Frame

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### ABSTRACT

The target of the mass production is to increase the productivity and increase the accuracy. This is done by reducing the set up cost and manual fatigue. Thus mass production can be achieved by the use of fixtures. For large scale production of different materials a lot of time is wasted in set up of the device and clamping the device. Trial and error method is usually practiced until the axis of the hole is properly aligned with the axis of the drill. In such a situation a lot of time is being wasted to maintain the accuracy. Eventually it increases the operator's fatigue. Thus fixture increases productivity by eliminating individual positioning, marking and frequent checking. We are used fixture for gauge frame so increasing the productivity. Now using conventional lathe machine for operation on gauge frame. These project have to methodology of performing operation in number of order to increase the rate of production by using Fixture. There are manufacture Fixture for three operations such as surface finish , boring and drilling. In that surface finish is the first operation which is performed on first fixture, and boring operation is done on second fixture.

**Keywords:-** Design, Fixture, Material, Plate, Shape.

### 1. INTRODUCTION

#### 1.1 Introduction

A key concern for a manufacturing company is the ability to design and produce a variety of high quality products in as short a time as possible. Quick release of a new product into the market place, ahead of any competitors, is a crucial factor in being able to secure a higher percentage of the market place and a higher profit margin. As a result of the consumer desire for variety, batch production of products is now more the norm than mass production, which has resulted in the need for manufacturers to develop flexible, agile manufacturing practices to achieve a rapid turnaround in product development.

Fixture are the device which help in increasing the rate of production of identical parts and simultaneously reducing the human efforts required for producing these parts. It has already been emphasised earlier that a centre lathe is a suitable producing machine tool for producing individual parts of different shape and sizes, but for producing similar articles in great number its use will not be economical. Against this, a capstan or turret lathe can be easily adopted for repetition work on account of the multi tooling arrangement and the use of traverse stops. This increase the rate of production. However the involve use of drilling, milling, planning and grinding machines, etc. If such article are to be produced identical shape and size on mass scale, suitable device



## OPTIMUM PROJECT COST AND DURATION BY USE OF DIFFERENT TECHNIQUE: A REVIEW WITH CASE STUDY

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### ABSTRACT

As we know that construction industry is on a boom these days. The new innovations of various technologies as well as materials have been considered as the boon for the economic development. The economy of nation depends directly or indirectly upon the infrastructural development being prevailed in the nation as there are many foreign investments being involved in it.

Time and cost are the two prime concerns which are to be considered appropriately while planning of any project to establish it successfully in time. We know that there is time delay in any project due to various factors which effects directly upon the Total Project Cost. Thus to minimize the total project cost by completing the project in minimum duration we have suggested to use the "**NETWORK COMPRESSION TECHNIQUE**" to be assigned over the collective activities considered in any project and obtain an optimum solution.

In this paper, we have considered **1 Case Study**, one of a bungalow for which we have collected data regarding to its plan, quantities required, material required, labour required and derived a chart which would direct give us the appropriate cost and time involved in that activity. By use of network compression technique we have crashed the network in order to get the optimum solution.

**Keywords:** Crash Cost, Direct- indirect costs, Network Compression Technique, PERT planning, Project cost minimization

### INTRODUCTION

Buildings are structures which provide shelters for man, his properties and activities. They must be properly planned, designed and constructed in order to get benefits from the nature. A building project is a task which is undertaken to achieve a goal of completing a certain construction within time and the given budget. But then to the results of expected cost investment cannot be made as certain in each plan as the project varies as per the plan and extent. Thus it becomes important therefore to arrange the tasks within the project sequentially in correct order and optimise it to get the appropriate results. The proper implementation and construction of a



## A Literature Review study on Compressive and Tensile Strength of Steel Fibre Reinforced Concrete

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### ABSTRACT

*This paper presents a review of the various mechanical properties like compressive and tensile strength of steel fibre reinforced concrete. Fibres are used as cracking resistance and strengthening of concrete. According to various research papers it has been found that steel fibre carry considerable strength more than normal concrete. In this paper, some research shows compressive and tensile strength are increase linearly but also some research shows that the compressive and tensile strength increase non-linearly with increasing of steel fibre. In another one research, shows that such mentioned mechanical strength of concrete increases up to a certain volume fraction in fibre and get reduces after increasing the fibre volume fraction in the concrete.*

**Keywords:** steel fibre, SFRC, aspect ratio, fibre volume fraction, strengths.

### INTRODUCTION

As we know the concrete is a quasi brittle material. So it is obviously strong in compression but weak in tension. To overcome such brittleness there is interruption of conventional reinforcement in the concrete. By considered such mechanism we only counter balance the compression load by concrete and tension load by steel reinforcement. However we cannot overcome the inherent weakness of plain concrete in post cracking stage. It has been recognised that the addition of closely spaced and uniformly dispersed fibres to concrete would act as crack arresters and also would improve its various mechanical properties like compressive, split tensile and flexural strength etc.

### REVIEW STUDY

D.B.Mohite and S.B.Shinde<sup>1</sup> presents, the study of compression strength on concrete mix of M70 grade, without steel fibre & with steel fibres. The steel fibres of hooked ended, flat and waved shape having aspect ratio of 50. The fibre volume fraction has been varied from 0.5% to 4% with an interval of 0.5% by weight of cement. Compression test carried on 150mm size cube specimens. Table no. 1 to 3 shows the results of compressive strength of steel fibre reinforced concrete compared with normal concrete for 7 and 28 days curing respectively. But in actual practice 28 days test result are more preferably used rather than 7 days test.





## WATER SUPPLY SYSTEMS AND HIGH RISE BUILDINGS

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### ABSTRACT

Along with constant rise of land prices in densely populated cities, high rise buildings continuously are gushing out. This high rise housing trend increases energy required for water supply & corresponding green gas emission. Therefore it is necessary to evolve methods which result into energy savings. This paper addresses the issue of appropriate water supply system to be employed for high rise buildings in India. Optimizing energy requirement of water supply systems in high rise buildings is a way towards sustainable development. This paper brings out a case study of a 11 to 24 floor residential building wherein the gravity system and Hydropneumatic system and intermediate tank system methods of water supply schemes are compared on energy consumption profile, all systems being sized as per National Building Code 2005 guidelines. The result shows that the corresponding annual electricity energy can be saved via intermediate tank system than gravity system for scenario considered.

**Keywords:** High rise buildings, Water supply systems, intermediate tank system, energy consumption profile.

### 1. INTRODUCTION

Along with constant rise in land prices in densely populated cities high rise buildings are continuously gushing out. This high rise housing trend across our great nation increases energy required for water supply. Reducing energy consumption of water supply system in buildings is a way of reducing carbon emission now days. As the water pressure head at the government water mains is insufficient to supply whole building (or to reach topmost floor of building), gravity tank system and Hydro pneumatic systems are designed, for water distribution through pipes [1].

Although energy consumption is a major concern for sustainable high-Rise developments, there is no existing measure that systematically addresses the issue with respect to the optimal design and operation of high rise water supply systems. Design solutions which integrate effective energy use into water planning and supply



## ROOT CAUSE ANALYSIS OF DELAYS ON RESIDENTIAL CONSTRUCTION PROJECTS IN KOLHAPUR CITY

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### ABSTRACT

The construction industry has much complex in nature as it involves large number of activities involved within. Managing all these activities is very difficult task even though a proper management some factors affect the project. So the method to track and mitigate these causes affecting the project is needed.

In this research, paper the causes affecting delays on residential projects in Kolhapur city, Maharashtra are taken to study. The questionnaire designed for collection of data and then data analyzed using RII (Relative Importance Index) method. In this paper, the 37 individual causes affecting project duration are categorized into 8 main groups for the study purpose. And the delays are considered as the planned duration with actual duration of the activity. This paper is aimed on knowing the causes of delays occurrence. The causes which vary the planned duration and actual duration of task during construction stage are considered as delays for this research purpose. These causes in construction task can affect the cost of the project so this study is important in cost saving manner as well as for improvement of the organizational method, which are currently used in construction industry. The RII (Relative importance index) method is used to know the effect of such causes on performance. This study helps in knowing the exact causes of delay occurrences with the help of questionnaires prepared and analysed using 'Relative importance index'.

The RII ranking shows that the causes like Delay in progress payment by owner, Unqualified workforce, Low productivity of labour, Personal problem of labour, Difficulties in financing project have very high RII which are most affecting factors causing delays of construction of residential buildings in Kolhapur city. Cause and effect relationship will act as the base of this study and will help develop suitable and sustainable method. Time and money saving factors interdependency will strategically produce outcomes. The results obtained from this study help produce high end graphs which seizes all the details of delays and overall performance of the project.



## APPLICATION AND VALIDATION OF REGRESSION ANALYSIS IN THE PREDICTION OF STABILITY VALUE IN COLD BITUMINOUS EMULSION MIX

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### ABSTRACT

Regression analysis is one of the statistical technique which is used for estimating the relationship between various variables. For establishing the relationship between a dependent variable and independent variable regression analysis is used. The Regression analysis with one dependent variable and two or more independent variable is called as multiple regression analysis. It is required to establish a relationship between variables in many civil engineering practical problems. In this study, Marshall Stability test results of cold bituminous emulsion mix are analyzed and the relation between stability values and values of air void with different variables is established. Emulsion content, Aluminum dross, and Cement content these three variables are considered as an independent variable. In this study, total thirty different combinations are analyzed. Comparison between actual stability values and predicted stability values shows that there is very little error and prepared model can be used effectively.

**Keywords:** Cold Bituminous Emulsion Mix, Marshall Stability Value, Ordinary Portland Cement, Regression Analysis.

### 1. INTRODUCTION

#### 1.1 Regression Analysis

Regression analysis is a technique that allows finding a functional relationship (model or equation) between dependent variables and independent variables. If only one dependent variable is considered then the regression analysis is called univariate regression; while if two or more dependent variables are considered then the regression is called multivariate regression. There are two main types of regression analysis techniques



## EXPERIMENTAL INVESTIGATION OF EFFECT OF SHRINKAGE REDUCING ADMIXTURE ON SHRINKAGE CRACKING OF CONCRETE

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### ABSTRACT

One of the main factors that contribute to the cracks in concrete is shrinkage. One of the causes that result in the early deterioration of reinforced concrete involves volume changes in concrete due to autogenous shrinkage and moisture loss. As concrete cures and dries, tensile stresses are created due to hydration and loss of moisture. When a concrete's tensile strength is exceeded by an applied stress, a crack forms in the concrete. Concrete has a relatively low tensile strength compared to its compressive strength and experiences a variety of volumetric changes depending on environmental conditions, curing conditions, and applied stresses. Practically speaking it is difficult to make concrete which does not shrink and crack. It is only the question of magnitude. Now the question is how to reduce the shrinkage and shrinkage cracks in concrete structures. As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics.

In this dissertation an attempt is made to study the shrinkage characteristics and of concrete, containing admixture Shrinkage Reducing admixture. The shrinkage characteristics of concrete like length, width, total number and total area of cracks etc. are measured on concrete panels.

**Keywords:** Cracking in concrete, Concrete, Shrinkage, Shrinkage reducing admixture.

### 1. INTRODUCTION

As shrinkage is an inherent property of the concrete, it demands greater understanding of the various properties of concrete, which influence its shrinkage characteristics. In general, the "gel" structure of the cementitious paste in concrete undergoes swelling when it is wetted and shrinkage when it is dried. Such cracking adversely affects durability of the concrete, integrity and aesthetics of the structure. It is only when the mechanism of all kinds of shrinkage and the factors affecting the shrinkage are understood, an engineer will be in a better position to control and limit the shrinkage in the body of concrete.

The volume instability results in response to moisture, chemical, and thermal effects. In addition, various deleterious chemical reactions involving the constituents of concrete or embedded materials can play significant roles causing localized internal expansions. The impact of cracking on durability, especially corrosion, is detrimental to many transportation structures. In particular, cyclic or tidal exposures initiate dry-wet cycles and



## EFFECT OF FLY ASH AND ARTIFICIAL SAND ON THE COMPRESSIVE STRENGTH OF CONCRETE

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### ABSTRACT

Slurry infiltrated fibrous concrete (SIFCON) is a unique fiber concrete with high percentage of fiber. SIFCON has tremendous potential for application in areas where high compressive strength is required. The SIFCON consists of cement slurry in which steel fibers are preplaced in the mould, after placement of fibers, cement slurry is poured into the fibre network.

To study the performance of SIFCON in compression strength, the cube specimens of dimension 150x150x150 mm were cast. In this paper effect of addition of fly ash, artificial sand & steel fiber on the properties of SIFCON is reported. Waste steel fibers were used in SIFCON. In this study aspect ratios of steel fiber like 80, 90, 100 and 110 are used with 6%, 8% and 10% fibers percentage. Specimens are cast by adding fly ash at varying percentages like 10%, 15%, 30% and 40% by weight of cement and 100% artificial sand. The compressive strength is evaluated.

Test results revealed the superior characteristics of SIFCON as compared with normal FRC

**Keywords:** SIFCON, aspect ratio, waste steel fibers, fly ash, artificial sand, compressive strength.

### INTRODUCTION

Continuous use of natural sand in construction activity has needed a full or partial replacement, and one of the alternative is artificial sand. On the other hand fly ash is widely used material all over the world. The use of fly ash in concrete not only improves technical advantages to the properties of concrete but also contributes to the environmental pollution control. If it is possible to use this in making concrete by replacement of cement, then it will solve the problem of its disposal.

Concrete is a commonly used material in construction engineering all over the world. Concrete, by desirable quality of its low cost, easy availability, comparatively simple





## DESIGN AND DEVELOPMENT OF POMEGRANATE DESEEDING MACHINE

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### ABSTRACT

Pomegranate has various medicinal properties. The first step in processing the pomegranate is to separate edible part from the outer hard shell. Traditionally a pomegranate is deseeded by hand. It is cut into pieces and arils are separated from the shell. It is labour intensive and consumes lot of time. Alternatively to deseed the pomegranate, it is cut in half and is hit with a spoon on the hard outer shell. This method is mechanized for faster processing. The main objective of this project is to automate the process of deseeding. Two large spoons are used as cantilever beam. These spoons provide the tapping force required to deseed the pomegranate. Spoons are coupled to a shaft which provides the spoons with force and movement. This movement of spoons is carried out for specified time, with time delay, gives hammering act over the fruit. The seeds are collected in a tray below the machine. The machine is turned off after all the arils are removed.

**Keywords:** *Pomegranate, Spoons, Bell and drum mechanism, Innovative design and manufacturing*

### I. INTRODUCTION

The pomegranate (*Punicagranatum*) originated in the region of modern-day Iran, and has been cultivated since ancient times throughout the Mediterranean region and northern India. Nearly all parts of this fruit can be utilized but the crop is important mainly for its arils (the edible portion of the fruit). The fresh arils can be used as a garnish in fruit cups, compotes, salads and desserts, and as a snack. The fruit peel is well regarded for its astringent properties. After the pomegranate is opened by scoring it with a knife and breaking it open, the seeds are separated from the peel and internal white pulp membranes. Pomegranate juice has long been a popular drink in Europe, the Middle East and is now widely distributed in the United States and Canada. Pomegranate seeds are used as a spice known as *anardana*, most notably in Indian and Pakistani cuisine. Traditionally pomegranate is peeled by hand and it takes lot of time. The main aim of the deseeding machine is to reduce human effort and time with its simple design and ease of use. The machine will consist of parts readily available and easy to maintain [1].

### II. LITERATURE REVIEW

The extensive literature review carried out for development of Method and a System for Extracting the Seeds (Arils) from Pomegranate Fruits - from Concept to Commercial Utilization





## AUTOMATIC BAR FEEDING AND CUTTING MACHINE

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### ABSTRACT

*Machining of a shaft requires the shaft to be cut to appropriate length and then put it on machining. Today it is a time consuming task as the process of cutting the bar to required length happens manually. This is not only time consuming but also erroneous marking may result in rejection of the job. Most of the industries use band saws or hacksaws as current equipment for the purpose of cutting operations. This process is not only slow but is also error some. The project deals with the concept of smart automated multi bar feeder and cutter. In this project a concept is proposed to feed multiple bars at once and cut it accordingly to length input given by input panel. The developed machine is smart mechatronic system which can automatically feed the bar to required length and accordingly cut it. The number of pieces as well as length to be cut can be altered using the control panel.*

**Keywords:** Buttons, Feeding, Bar cutting, Automation, Input panel, Length, Number of pieces etc.

### INTRODUCTION

Bar cutting is employed almost every industry. This includes small industries such as fabrication to very large industries from hydraulic to aerospace. This involves bars of different engineering materials, pipes of various diameters and shafts. Conventionally bar is measured of required length as per the application manually using tape or any other measuring instrument. Then the bar is mounted over the cutting machine and cut to required length. This is a time consuming procedure and requires effort for loading and unloading the bar on the cutting machine. The common cutting machines used in the industrial application are hacksaws, abrasive cutters, reciprocating hacksaws etc. Thus this is a lengthy procedure and involves the following steps:

- 1) Measuring the bar to required length and marking it.
- 2) Loading the bar on the cutting machine.
- 3) Setting up for the cutting procedure.
- 4) Cutting the bar to marked length.
- 5) Unloading the cut bar.

# Study of Effect of Process Parameters on Quality of Workpiece in Turning Operation - A Review

1. Miss. P. T. Jarag, 2. Prof. P. B. Patole, 3. Prof G. J. Pol

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2,3 Professor, Department of Mechanical Engineering, Bharati Vidhyapeeth's college of Engineering, Kolhapur, India

## ABSTRACT

*This paper deals with the literature review of various factors that affect the surface roughness during turning operation. Process parameters like speed, depth of cut, feed, nose radius, etc. are studied. This study will help us in understanding, which parameters is significant parameter for Surface Roughness, Material Removal Rate, Feed Force, Tangential Force, Tool Life, etc.*

**Keywords:** Turning, Surface Roughness, Tangential force, Tool life.

## I. INTRODUCTION

Machining operations such as turning, milling, drilling and grinding are material removal processes that have been widely used in manufacturing, since the industrial revolution of these processes. Turning is one of the most common machining operations in manufacturing. During a turning operation various parameters like speed, feed, depth of cut, tool material and coolant acts on the surface roughness, tool wear and material removal rate.

The utilization of Inconel has increased significantly over the last decades. Today many applications for Inconel 718 are found in aerospace and automobile as well as naval or underwater goods sector. Some of the parts made from Inconel are bearings, gears, bushing, pulley components, gas tanks, intake manifolds and washers among many others. Inconel 718 material is the most difficult material to machine. Improper selection of machining parameters causes cutting tools to wear and break quickly as well as economical losses such as damaged work piece and rejected surface quality. Machining parameters and tool geometry are the important parameters which affect the machinability properties Nalbant et. al [1].

## II. LITERATURE REVIEW

A brief literature review of the research carried out for understanding the issues involved in machining. There are number of cutting parameters have general effect on quality of finished component and on machinability such as tool wear, cutting chips, material removal rate (MRR) etc. so considerable research has taken place to study the effect of cutting parameters are as follows.

RavinderTonk and Jasbir Singh Ratol (2012), the study was aimed to investigate the effect of several input parameters of turning operation (cutting tool, cutting oil, cutting speed, feed and depth of cut) on the different response parameters such as thrust force and feed force in turning process on EN31. Experiments were conducted on conventional lathe machine in a completely random manner to minimize the effect of noise factors present while turning EN31 under different experimental conditions [2].

# Design of Attenuator for FSAE Car for Improved Impact Performance

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**Abstract:** *The objective of this paper is focused on detailed analysis of the crash behavior of the Impact attenuator structure that was designed to equip the formula SAE car is presented. The design of the energy absorbing structure has to allow a progressive force evolution, avoiding force peaks (i.e. deceleration peaks). It is very important to design impact attenuators in order to protect the driver from any serious wound, in case of any mishap. The impact attenuator serves dual purpose, it protects the race car structures as well as the driver. It absorbs the crash energy in a controlled manner, thus offering the required protection. So, the goal of crashworthiness is an optimized vehicle structure that can be absorbed the crash energy by a controlled vehicle deformations while maintaining adequate space so that the residual crash energy can be managed by the restraint systems to minimize crash loads transfer to the vehicle occupants. This paper is dealing with the study of different material for impact attenuator using honeycomb structured sandwich panel and its analysis by using Hypermesh and explicit solver LS-DYNA. The results of this paper show that the impact attenuator absorbs the total kinetic energy at the time of collision.*

**Keyword:** *Crashworthiness, Formula SAE, Honeycomb structures, Impact attenuator, LS-DYNA.*

## I. Introduction

Automobile industry has progressed through different phases. As a part of this progression since 1950's, Motor sports and Auto racing are the most famous sports in the world. Despite of being a dangerous sport, a lot of people get attracted towards it. Many drivers have lost their lives in the fatal crashes occurring during these sports. Racing cars may roll over the track causing the car to be shattered, which is one of the clichéd images at any car racing accident.

Formula 1 motorsport is a platform for maximum race car driving performance resulting from high-tech developments in the area of lightweight materials and aerodynamic design. In order to ensure the driver's safety in case of high-speed crashes, special impact structures were designed to absorb the race car's kinetic energy and limit the decelerations acting on the human body [1]. The impact attenuator serves dual purpose - it protects the race car structures as well as the driver. It absorbs the crash energy in a controlled manner, thus offering the required protection. Crash tests and numerical simulations carried out for designing the safety elements in a car.

A sandwich construction provides excellent structural efficiency, with high ratio of strength to weight. Other advantages offered by sandwich construction are elimination of welding, superior insulating qualities and design versatility. Even if the concept of sandwich construction is not very new, it has primarily been adopted for non-strength part of structures in the last decade [2]. Sandwich structures were widely used in

# Study of Effect of Process Parameters on Quality of Workpiece in Turning Operation - A Review

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## ABSTRACT

*This paper deals with the literature review of various factors that affect the surface roughness during turning operation. Process parameters like speed, depth of cut, feed, nose radius, etc. are studied. This study will help us in understanding, which parameters is significant parameter for Surface Roughness, Material Removal Rate, Feed Force, Tangential Force, Tool Life, etc.*

**Keywords:** Turning, Surface Roughness, Tangential force, Tool life.

## I INTRODUCTION

Machining operations such as turning, milling, drilling and grinding are material removal processes that have been widely used in manufacturing, since the industrial revolution of these processes. Turning is one of the most common machining operations in manufacturing. During a turning operation various parameters like speed, feed, depth of cut, tool material and coolant acts on the surface roughness, tool wear and material removal rate.

The utilization of Inconel has increased significantly over the last decades. Today many applications for Inconel 718 are found in aerospace and automobile as well as naval or underwater goods sector. Some of the parts made from Inconel are bearings, gears, bushing, pulley components, gas tanks, intake manifolds and washers among many others. Inconel 718 material is the most difficult material to machine. Improper selection of machining parameters causes cutting tools to wear and break quickly as well as economical losses such as damaged work piece and rejected surface quality. Machining parameters and tool geometry are the important parameters which affect the machinability properties Nalbant et. al [1].

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A brief literature review of the research carried out for understanding the issues involved in machining. There are number of cutting parameters have general effect on quality of finished component and on machinability such as tool wear, cutting chips, material removal rate (MRR) etc. so considerable research has taken place to study the effect of cutting parameters are as follows.

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## INTRODUCTION and OVERVIEW of ICE CRUSHING MACHINE

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### ABSTRACT

*Today there are many methods used for crushing the ice. These methods are widely used but they have to face many problems and limitations. These problems affect on production rate of crushing of ice. Also these methods are more hazardous and harmful for user. To overcome these problems occurring in present methods we are constructing this machine. This paper presents the design and development of automatic crushing of ice.*

**Keywords:** Automatic, Crushing, Ice, Production Rate

### I. INTRODUCTION

With the ever changing weather conditions due to climate change, the already hot and humid climate here in the India is getting even hotter and more humid each year, especially during the summer season. Hence, there has been an ever increasing demand for ice-cold refreshments.

Almost every restaurants, cafes & others eating places, there will be menus of cold drinks. The need of fast serving of cold drinks is essential in this field of business. There are ways to quickly serve cold drink such as refrigeration or by adding ice. Most mobile business use tube ice crushers while most permanent business uses block ice crushers.

Shaved ice belongs to a large family of ice-based desserts made of fine shavings of ice or finely crushed ice topped with sweet condiments or syrups. The dessert is consumed world-wide in various forms and manners. Shaved ice can also be mixed with large quantities of liquid to produce shaved ice drinks. Shaved ices are sometimes confused with "Italian ices". The shaved ices are made from plain ice and are flavored after being shaved at point of sale; whereas the Italian ices, also known as "water ice", have the flavor incorporated into the ice and are usually not flavored after production.

### II. LITERATURE REVIEW

The purpose of this chapter is to study the parameters that are involved in designing the ice crusher machine. The scope of the project is based on the objectives that are stated in the first chapter. The relevant subjects are



## DESIGN and FABRICATION of CHAKALI MAKING MACHINE

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### ABSTRACT

*This machine is related to food industry. It helps to reduce the labour cost as well as time. It also reduces the work load. We are trying to manufacture a machine which will give high speed with more accurate shape of chakali. This machine has high efficiency also the production rate as compare to manual and conventional process.*

**Keywords:** Food Industry, Chakali, Efficiency

### 1. INTRODUCTION

Chakali is a savory snack from India. It is a spiral shaped, pretzel like snack with a spiked surface. Chakali is typically made from flours of rice, Bengal gram and black gram. It is several variations, depending on the type and proportion of flours used murukku, a similar snacks typically made without the Bengal gram flour, is also sometimes called chikki.



**Fig: Manual Chakali Making Process**

This machine is related to food industry. It helps to reduce the labour cost as well as time. It also reduces the work load. We are trying to manufacture a machine which will give high speed with more accurate shape of chakali. This machine has high efficiency also the production rate as compare to manual and conventional process. We provide you with high quality of Automatic Chakli Making Machine. Our Automatic Chakli Making Machines are used for making Quality Chakli in Uniform Shape and Sizes. Our Automatic Chakli





## A CASE STUDY: KAIZEN AND 5S IMPLEMENTATION IN SMALL SCALE INDUSTRY

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### ABSTRACT

In India many small & medium scale industries are present. Lack of productivity, greater lead time, processing time, stock out situation are major problems faced by industry. In order to solve the faced problem, we make a pin point on two major methodology are Kaizen and 5S. Kaizen implementation focuses on reducing the lead time of production by means of which the productivity of industry will be improved & 5S implementation is emphasize on most effective use of space, time, money, energy, and other resources their organization. This Technique reduces problems and bottle neck in the work flow. 5S and kaizen techniques in the small scale industry have been analyzed and implemented in a case study of the machine shop. On the basis of the case study, we can bring great changes in the organization by introducing the 5S and kaizen techniques.

### INTRODUCTION

Globalization has brought world closer, especially through a common medium like the economy or job sharing. In this process, most of the developed nations like USA, Japan outsource their workloads especially in manufacturing to low cost countries such as India, China etc. Thus, the people in the developed nations get the benefit of cheap products available at high quality; whereas the people in the low-cost countries get the benefit of more jobs creation in their country. In addition, the customers are very knowledgeable, informative and they demand the highest quality product. They constantly seek the products in the market this has the highest quality. The company which fails to adopt new change would either lose their market share or sell at less profit. Therefore, the company should produce its product at high quality, in minimum cost to the customer and meet customer demand on time. Kaizen and 5S are those technique use to organize, standardize and continuous improve the work area. This is the best efficient technique and tools of the lean manufacturing for the continuous improvement and development of the organization.

### II. LITERATURE REVIEW

Lean manufacturing is a systematic method for waste minimization ("Muda") within a manufacturing system without sacrificing productivity. Lean also considers waste created through unstandardize ("Muri") and waste created through non uniformity in workloads ("Mura"). Lean manufacturing makes emphasize on what adds value, by reducing which is not adding value. Waste is defined as any activity that does not add value from the customer's



## DESIGN AND FABRICATION OF BATTERY OPERATED REMOTE CONTROL ARTICULATED FORKLIFT

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### ABSTRACT

Industrial operations require continuous flow of material from one workstation to another in industries. This is done manually in most of the small scale industries due to the lack of high initial investment in powered material handling equipments and also the increased maintenance costs of the same. The proper and timely flow of material not only reduces the transit time across the industrial floor but ultimately reduces the time required for the production resulting in increased profits and increased production. This project deals with the concept of portable electric remote controlled forklift for material handling industries. The proposed project consists of development of portable electric remote controlled forklift which can operate with material handling forklift attachment incorporated to the same. This is not only cost effective but also helps in increased industrial productivity.

**Keywords :** Base (Chassis), DC motor, Chain drive, Differential gear box, Remote Controlled System

### 1.INTRODUCTION

Nature of problem: When you're working with forklifts, any problem can be serious trouble. You need to know how to recognize the faults, and assess the risks, both in terms of onsite safety and downtime caused by mechanical or other failures. Regular forklift maintenance reduces the risks enormously, but be aware that problems will occur, sooner or later.

In general the forklift can be defined as a tool capable of lifting hundreds of kilograms of weight. A forklift is a vehicle similar to a small truck that has two metal forks on the front used to lift cargo. The forklift operator drives the forklift forward until the forks push under the cargo, and can then lift the cargo several feet in the air by operating the forks. The forks, also known as blades or tines, are usually made out of steel and can lift up to a few tons.

## SEMI AUTOMATIC DISHWASHING MACHINE

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### ABSTRACT

*In this paper the construction and performance of dish washing machine is discussed. Performance of machine is compared with manual and automatic dish washing. The parameter includes time and quantity of water. This machine is used for the dish of diameter 20 cm.*

*Keywords: Semi-automatic Dish Washing Machine, Scruber, Dish*

### INTRODUCTION:-

In India, Dish washing activity is manual process involving considerable human efforts or with automatic dish washing machines available in market which are expensive manual dishwashing activity requires more number of people and also it is time consuming process involving human effort cost required for labor work is considerably high.

It is require to improve the dish washing process by automation, "semiautomatic dishwashing machine" should manufacture to reduce human efforts and time with its innovative simple design which is environment friendly.

The model of semi automatic dish washing machine is new concept which in its one washing cycle does all the operations of convention dishwashing i.e spraying soda water, scrubbing with brush and clean water similar to fully automatic dishwashing machine in a market.

Different work has done for development of dishwasher machine is as following:

Dhale A.D " Design and development of semi automatic dish washer" This paper discusses the problem faced in usage of automatic dish washer and solutions on those problem . By separating assembly in 3 parts for washing of dishes, rinsing of dishes and washing of glasses large amount of work can be done in considerably lesser time.



## ELECTROMAGNETIC SHEARING MACHINE

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### ABSTRACT:

As industrial is coming up across the globe various invention and innovations are being carried by human to fasten various processes associated with manufacturing and align things. One such thing is industrial automation unit. In these automation units various machines those can be adopted easily are also getting developed. Considering the examples of piping industry (manufacture of small pipes) where plastic are PVC pipes are needed to be cut, shearing machines are used. There can be various types of shearing machines depending on parts to be cut process of cutting, requirement of cutting length, etc. now a day's hydraulic shearing machine, pneumatic shearing machine and mechanical type shearing machine are popular type of shearing machines used in above industries. These machines are certainly good at work but as with almost all types of machines there are certainly pros and prones association with them to for the purpose various work is being carried out to solve the dilemma. In this project shearing m/c of a new type i.e. electromagnetic shearing m/c is decided to be fabricated. Along with it has also been decided to develop automation unit for the same so that m/c can easily be adopted in today's automated plants.

**Keywords:** automation, electromagnetic shearing machine, electromagnet, medium density fibre, microcontroller,

### 1 INTRODUCTION

Mr. Frederick York Wolseley of Eureka Station, Walgett invented the world's first successful shearing machine in 1887. After years of effort Wolseley eventually perfected his power driven mobile machine to Melbourne with Eureka's best shearer and in front of amazed onlookers, showed that the new machine could equal the fastest hand blade shearer and produce a better clip, closer to the animal with fewer nicks. On June 1887, a comprehensive patent was issued for the machine. Shearing machine is mechanical power shears are self-



## A REVIEW ON LOW COST AUTOMATION USING PNEUMATIC SYSTEM - A CASE STUDY ON USE OF PNEUMATIC GRIPPERS AND PNEUMATIC POWER CLAMPS

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### ABSTRACT

Globalisation is taking place at very high pace. Industries are getting automated to compete in the market. This paper emphasizes on Low cost automation (LCA) using fluid power i.e. pneumatics. This paper also involves case studies of various industries which got automated or solved their problems using pneumatics as low-cost automation. Pneumatic technologies are compact, easy to handle and also safer to use. This Paper provides the usage of various pneumatic technologies in transfer lines, working stations etc.

**Keywords:** Computer Numeric Control (CNC), Fluid Power System (FPS), Pneumatics, Pneumatic grippers, Pneumatic clamps, Low cost automation (LCA), Vertical Machining centre (VMC)

### 1. INTRODUCTION

Automation is a set of technologies that results in operation of machines and systems without significant human intervention and achieves performance superior than manual operation. It means to minimize the human control in industry or any work field to increase productivity, increasing product quality, reducing manufacturing time, reducing cost and increasing safety in working operations[1].

With increasing globalisation, industrialization and increasing demand of certain products in market, Industries are concentrating on more and more automation by different methods to increase productivity and to increase competitiveness in the market. Automation requires huge capital investment to replace conventional machines by CNC's, VMC's etc. Large Scale Industries which do have large scale production and sells can afford huge cost automation. But Medium and Small-Scale Industries which do not have that much production cannot afford such huge cost automation, at such case alternative Low-CostAutomation(LCA) proves to be best solution.

Low Cost Automation (LCA) is the technology that is effective or promises to be helpful for any kind of manufacturing organisation.

#### 1.1 Concept of Low Cost Automation (LCA)





## Automatic Braking System and Fuel Flow Measurement

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### ABSTRACT

*The major cause of collision during road accidents is drink and drive situation. If the driver is drunk, he usually loses the control over the vehicle and this results in collision. This is not only dangerous to the driver's life but also may take the life of the person if the car collides with the person. Another reason of vehicle collisions and loss of life is the inexperienced driver driving the car. The driver is risking his own life as well as the life of others and can cause serious injuries resulting in death if the car collides.*

*Thus whatever the cause of collision of the vehicle there is the need to develop an efficient system which automatically detects the obstacle in the path of car at particular distance and then if the distance crosses the particular threshold then it automatically brakes the car which can avoid the collision and also possible life injuries. Thus the project is to control the vehicle's speed automatically and avoid the accident and save the life. Another aim is to implement smart fuel metering system in vehicle.*

*Key words:- Adaptive cruise control, collision, ultrasonic sensor, Hall-Effect sensor, Smart fuel metering.*

### 1. INTRODUCTION

Road accidents are increasing day by day. With this loss of human lives and injury is also increasing. The death rate due to road car accidents in India is increasing day by day. With more than one death and four injuries every minute, India has the dubious distinction of reporting highest number of road fatalities in the world and the government says the prime reason is "drivers' fault". "During the previous year, there were around 490,000 road accidents, which resulted in the deaths of 125,660 people and injured more than five lakh persons in India.

The majority of road crashes are caused by human error. Research has shown that driver error accounts for over 80% of all fatal and injury crashes on road collisions. The main causes of death and injury on roads remain speeding, drink driving and non-wearing of seat-belts.



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With increasing globalisation, industrialization and increasing demand of certain products in market, Industries are concentrating on more and more automation by different methods to increase productivity and to increase competitiveness in the market. Automation requires huge capital investment to replace conventional machines by CNC's, VMC's etc. Large Scale Industries which do have large scale production and sells can afford huge cost automation. But Medium and Small-Scale Industries which do not have that much production cannot afford such huge cost automation, at such case alternative Low-Cost Automation(LCA) proves to be best solution.

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#### 1.1 Concept of Low Cost Automation (LCA)



## DESIGN AND DEVELOPMENT OF IC ENGINE

### GO-KART

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#### ABSTRACT

Go-kart (a simple racing car) is not a factory made product. It can be made by Mechanical and Automobile engineers for racing competitions. Team BVC dragsters aims at designing and fabricating GO-kart having high fuel economy and maximum driver comfort without compromising on kart performance. The goals of the team also include designing kart for the performance and serviceability. Compliance with the rulebook of INDIAN KARTING CHAMPIONSHIP-2018 is compulsory and governs a significant portion of the objectives. The aspects of ergonomics, safety, ease of manufacture, and reliability are incorporated into the design specifications. Analyses are conducted on all major components to optimize strength and rigidity, improve vehicle performance, and to reduce complexity and manufacturing cost. The design has been modeled in Solid works2015 and the analysis was done in ANSYS 14.5. The developed go-kart was participated in an event IKC2018 Season 2.

**Index term:** Go-Kart (Racing Car), Roll Cage, Power Train, Steering and Brakes Assembly, Finite Element Analysis.

#### INTRODUCTION

Go-Kart is a racing vehicle having very low ground clearance and can be work on only flat racing circuits. The design process of this single-person go-kart is iterative and based on several engineering processes.

The Go kart has been designed by team BVC dragsters consisting of under-graduate students from the Bharati vidyapeeth's college of Engineering affiliated to the Shivaji University. The Team BVC dragsters began the task of designing by conducting extensive research of each main assembly and components of the kart. The entire kart is designed by keeping in mind that it should be able to withstand the racing conditions without failure. Each component has been considered to be significant, so the kart could be designed as a whole trying to optimize each component while constantly considering how other components would be affected. Taking cost as a major parameter, the entire vehicle is designed to integrate the usage of standard parts reducing manufacturing cost. Combining this design methodology with the standard engineering design process enabled us to achieve a perfect match of aesthetics, performance, and ease of operation.



## Design of Human Powered Forklift

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### ABSTRACT

*Many industries used forklifts for lifting heavy goods etc. These are applicable for large scale industries and highly automated industries. Since the small scale industries requires repeated movement of load from one station to another the use of these forklift will not be economical, hence we decided to design of forklift which helps small scale industries in transporting the load in easy and cost efficient way.*

*The idea was to lift and shift the material on shop floor where very low frequency of shifting is required and the object being heavy enough for humans to shift the material. Where the lifting could be done by rope and pulleys provided in approachable place near to foot pedal. And once the load is lifted by the fork the vehicle could be propelled with the operator itself by his pedal effort just like bicycle. The vehicle could be stressed easily without any problem in the job floor as well meant for flat floor.*

### 1. INTRODUCTION

Now a days due to heavy work load environment in the mechanical industrial lines workers are been depressed for carrying a heavy load, where the workers are prone to unhealthy conditions. Due to these factors some load carrying machines were developed in the recent past years.

Working in the mechanical workshops or any other large fabrication unit, where load is to carry (bars, plates, machined jobs etc.) from one unit of the factory to the other unit this device is useful. The In-plant goods carrier system is user friendly as designed. The device finds greater use in the industrial lines for transport of the machined jobs, carrying goods internally in the fabrication plant.

The present In-plant goods carrier system is used for the industrial applications which can be moved from one place to other and hence the work such as carrying goods or any other is done within the time schedule and the particular cycle time for that operation is saved, the handling, fixing and the other time wasted in carrying goods can be better utilized to carry out the production.

The device works on the simple mechanism of the motion transmission. It consists of bevel gear mechanism where motion from wheel is transmitted to rear wheels with the help of chain and the device moves further.





## DESIGN OF MULTI SPINDLE CHAMFERING AND TAPPING ATTACHMENT FOR SPECIAL PURPOSE MACHINE OF HYDRAULIC LIFT COVER

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### ABSTRACT

The main aim of mass production is to increase productivity with maximum accuracy. While manufacturing job in mass scale it is important to reduce set up cost and manual fatigue. Most of the manufacturing industries are going for automation to increase the productivity and to overcome shortage of skilled labor. The purpose of this project is to reduce the cycle time by replacing radial drilling machine and by attachment to special purpose machine (SPM) for chamfering and tapping operation. The concept is that the hydraulic lift cover has drilling, chamfering and tapping operations and is performed on two different machines. All the operation performs on same machine having two separate multi spindles. This paper gives the detail information of design and analysis of attachment for special purpose machine and compares the cycle time for conventional method. This machine is containing automation by using hydraulic system. Modeling is done using CATIA software.

**Keywords:** Tapping Attachment, Form tool, SPM, CATIA Software

### 1. INTRODUCTION

The present work relates to chamfering and tapping attachment and more particularly to a relatively compact type of device which operates automatically to milling, drilling plus chamfering and tapping operations and design which is very easy to handle and simple in operation by a single person. Special purpose machine is part of multi-tasking machine. This is new approach to increase the productivity of organization. If we compare between ordinary machine and special purpose machine in terms of time, costs, number of steps involved etc. The technology of SPM is decided upon the principles of minimization of cost, improved productivity and improved safety, which possess with high initial investment, higher maintenance cost. The following studies are carried out, time saved by component handling (loading and unloading), increase in productivity both qualitative and quantitative, less human intervention, indirectly reduction in operator fatigue, increase the profit of company. In this paper the SPM for milling, 3 multi drilling plus chamfering ( $\Phi$  9.3), tapping operation for these 3 drilled holes. Multiple-spindle machines are used for mass production, a great time saver where many pieces of jobs having many holes are to be drilled and tapped. Multi-spindle head machines are used in mechanical industry in order to increase the productivity of machining systems.



DESIGN AND FAILURE ANALYSIS OF SUSPENSION BALL  
JOINT USING FINITE ELEMENT ANALYSIS

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**Abstract**

This study describes the analysis and investigation of the causes of the sudden failure of a Mac Pherson strut suspension system ball joint. The axis of the ball joint element showed a complete fracture which occurred midway between the top and bottom section changes of the element. It is seen the ball joint of this car fails suddenly without any sign of consumption and this case is a dangerous as well as disturbing factor for traffic and driver. So there should be something else supports car when the ball-joint fails. This research has a modification of this ball joint for this purpose. The modification has depended on the results obtained from the numerical analysis of the loaded ball-joint in two situations. Measurements of parts of ball joint of Nissan pickup car have been made and these parts have been drawn in two forms (situations) by using CATIA software imported to ANSYS WORKBENCH software where a three-dimensional model was created and maximum load is applied to ball-joint.

**Keyword:** Ball joint, Suspension system, Fatigue, Contact stress, analysis

**Introduction**

Ball joints are used on the front end of almost every car, truck and minivan. Ball joint is an important part of car suspension system. Ball joints act as the pivot point between two parts: the suspension and car's tires. Ball joints help support car's weight and, as is the case with some vehicles, ball joints may be used to help set the alignment. The ball joint is one moveable part of a control arm assembly. It is steel bearing stud and socket enclosed in a steel casing. The socket enclosed in steel casing is connected to the control arm. The bearing stud is tapered and threaded so that it fits into a tapered hole in the steering knuckle and the latter connects the tire. Ball joints are a critical part of any car's suspension and steering. They attach the wheel hub, which the wheel and tire are mounted to the rest of the suspension. This connection needs to be able to rotate horizontally for steering and vertically for shock absorption, hence the use of ball joints that can move in all directions. While ball joints last for a long time, they do wear. The polished metal ball rides in a polished metal cage. Space between the two is filled with grease to reduce wear. However, if the grease leaks out of the ball joint or any dirt and impurities get into the grease, the ball joint may become worn or damaged. There is a rubber boot over the joint to help keep dirt out, but that does not mean that there is no way in which dirt can enter. In an automobile, ball joints are spherical bearings that connect the control arms to the steering knuckles. They are used on virtually every automobile made and work similarly to the ball-and-socket design of the human hip joint. A ball joint consists of a bearing stud and socket enclosed in a casing; all these parts are made of steel. The bearing stud is tapered and threaded, and fits into a tapered hole in the steering knuckle. A protective encasing prevents dirt from getting into the joint assembly. Usually, this is a rubber-like boot that allows



## EFFECT OF FLY ASH AND ARTIFICIAL SAND ON THE COMPRESSIVE STRENGTH OF CONCRETE

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### ABSTRACT

Slurry infiltrated fibrous concrete (SIFCON) is a unique fiber concrete with high percentage of fiber. SIFCON has tremendous potential for application in areas where high compressive strength is required. The SIFCON consists of cement slurry in which steel fibers are preplaced in the mould, after placement of fibers, cement slurry is poured into the fibre network.

To study the performance of SIFCON in compression strength, the cube specimens of dimension 150x150x150 mm were cast. In this paper effect of addition of fly ash, artificial sand & steel fiber on the properties of SIFCON is reported. Waste steel fibers were used in SIFCON. In this study aspect ratios of steel fiber like 80, 90, 100 and 110 are used with 6%, 8% and 10% fibers percentage. Specimens are cast by adding fly ash at varying percentages like 10%, 15%, 30% and 40% by weight of cement and 100% artificial sand. The compressive strength is evaluated.

Test results revealed the superior characteristics of SIFCON as compared with normal FRC

**Keywords:** SIFCON, aspect ratio, waste steel fibers, fly ash, artificial sand, compressive strength.

### INTRODUCTION

Continuous use of natural sand in construction activity has needed a full or partial replacement, and one of the alternative is artificial sand. On the other hand fly ash is widely used material all over the world. The use of fly ash in concrete not only improves technical advantages to the properties of concrete but also contributes to the environmental pollution control. If it is possible to use this in making concrete by replacement of cement, then it will solve the problem of its disposal.

Concrete is a commonly used material in construction engineering all over the world. Concrete, by desirable quality of its low cost, easy availability, comparatively simple



## INTELLIGENT MODULAR ROBOTIC VEHICLE FOR DEFENCE AND DISASTER MANAGEMENT

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### ABSTRACT

*Detection and removal of buried landmines is a serious concern all over the world. As manual method will no longer work and requires large man power in higher risk area of work is much larger. At natural disasters and gas leak conditions it is difficult for the rescue team to operate at instance. So a smart robotic system must be generated to operate in such conditions. This work deals with development of a smart robotic system which can operate easily as well as can detect landmines, hazardous gases and fire in the way and informing the operator. Also it is capable of surveillance, most of all modular base which makes it versatile for any further applications.*

**Keywords:** land mine, modular, robotic vehicle, surveillance, etc

### 1. INTRODUCTION

In 21<sup>st</sup> Century, use of technology in every field is increased and it must be used as it eases the operation to be carried out. In similar ways defense is a field where new technology is used for surveillance, assisting the soldiers in various field operations like mine detection, disaster management etc.; which results in reduced risk, efforts with minimum human interface.

Use of landmines in battlefield is a threat to enemy. But the buried landmines many times cost the country in loss of lives of their own soldiers as keeping track of the buried landmines is difficult task. Also detecting and removing the landmines by using manual method is going to take a lot of time as there are reportedly around 50 to 100 million landmines buried all over the world. So generation of smart robotic system having a metal detector, an arm to handle the landmines and manipulator to operate the mines with a robust design is need of current era.

Also in populated areas natural disasters and gas leakages in mines a responsive and smart system should be generated. As it becomes difficult for rescue team to operate at that instance and provide help. So a smart robot which can navigate through areas and provide sufficient information is important.



## DESIGN OF IMPELLER FOR OPTIMIZATION

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### ABSTRACT

*This paper presents a simplified, impeller and vane profile design procedure by using 3D model. The intent of this paper is to offer a detailed picture of impeller and vane profile design procedure based on fundamental understanding of published procedures using 3D model. There are limited number of published vane profile design procedures by Val S. Lobanoff, John S. Tuzson, A. J. Stepanoff, and others. There is also a lack of explanation and detailed step by step procedure available for designers to systematically design and develop impeller and vane profile design, so the designers are encouraged to reverse engineer the vane profiles popularly available in the market. In the case of published procedures great problem arises while following them since some of them are contradictory to each other. In this paper while designing the vane profile, the overall dimensions of an existing impeller were not changed. Commercial 3D CAD software is used to create the 3D model. Simplification in vane profile design procedure will encourage the designers to enhance the performance of existing as well as new models of pumps.*

**Keywords-**3D model, vane profile design procedure, published procedures, vane profile, CAD software.

### 1. INTRODUCTION

In recent years lots of efforts are being made by pump manufacturers to simplify the impeller vane profile design procedure with improvement in pump performance. In pump industry efforts have been taken to simplify the vane profile design procedure for centrifugal pumps only, but very few efforts have been taken to simplify the vane profile design procedure for other pumps. There are limited numbers of published vane profile design procedures by Val S. Lobanoff, John S. Tuzson, A. J. Stepanoff, and others. There is lack of explanation as well as detailed step by step procedure available for the designer to systematically design and develop impeller and vane profile. A great problem arises while following these procedures, since some of the procedures are not matching with each other. So the designers have to use their own judgmental skills for designing the vane profile. The simple method of constructing vane profile is to draw a single radius circular arc using the calculated angle  $\beta_1$ ,  $\beta_2$  and radii  $R_1$ ,  $R_2$  but this may have serious implications in the performance of the pump.





## DESIGN OF CUSTOMIZED HEAT EXCHANGER FOR OPTIMIZATION

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### ABSTRACT

Heat exchangers are equipments used to transfer heat from hot fluid to cold fluid. These can be used as condensers as well as evaporators. The one proposed in the paper will be used as evaporator which is used as chiller in market. These chillers are used in various industries like printing press, food industries etc.. Currently, immersed type heat exchanger is used for the purpose which has issues due to its big size, frequent cleaning requirement. Here, designed heat exchanger is a customized shell and coil type heat exchanger as a replacement of this current system which will reduce overall size of the system which ultimately reduces the production cost. Also required chilling effect is obtained in lesser time.

**Keywords:** Immersed type Heat exchanger, Kern's method, shell and coil heat exchanger.

### 1. INTRODUCTION

Heat exchanger is a device which transfers heat from hot fluid to cold fluid. The current type of heat exchanger is immersed type of heat exchanger, in which, heat transfer takes place through natural convection. Heat transfer rate is less due to stagnant water. It requires more space causing wastage of usable area. It needs to be clean daily. We have designed shell and coil type of heat exchanger which transfers heat through forced convection also increases heat transfer rate as compare to immersed type. The proposed type of heat exchanger requires less space. It does not require to be cleaned on daily basis. It reduces running time for same result. Basically, this heat exchanger is said as customized because it is combination of helical coil heat exchanger and shell & tube heat exchanger. Kern's method for design of heat exchanger is used in designing this heat exchanger.

REVIEW PAPER ON DESIGN AND ANALYSIS OF AUTOMOTIVE WHEEL  
RIM USING FINITE ELEMENT ANALYSIS

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**Abstract**

This work involves the application of radial load fatigue test to study the fatigue life of the rim with weight reduction. In this work we are going to carry out the radial load fatigue test on newly designed rim with material and design optimization. For finite element analysis we are going to use software like ANSYS. Results obtained by these two methods will be compared to each other for validation of work.

**Introduction**

A wheel rim is a highly stressed component in an automobile that is subjected to bending and torsional loads. Because of the long life and high stresses, as well as the need for weight reduction, material and manufacturing process selection is important in rim design. There are competitions among materials and manufacturing processes, due to cost performance, and weight. This is a direct result of industry demand for components that are lighter, to increase efficiency, and cheaper to produce, while at the same time maintaining fatigue strength and other functional requirements.

In the fatigue life evaluation of aluminum wheel design, the commonly accepted procedure for passenger car wheel manufacturing is to pass two durability tests, namely the radial fatigue test and cornering fatigue test. Since alloy wheels are designed for variation in style and have more complex shapes than regular steel wheels, it is difficult to assess fatigue life by using analytical methods. The newly designed wheel is tested in laboratory for its life through an accelerated fatigue test. Based on these test results the wheel design is further modified for high strength and less weight. But stress analysis will not yield the optimum wheel design described a probability based model for prediction of fatigue failure of automotive wheel rim. Aluminum alloys, magnesium alloys and structural steel are the three important materials by which rim of wheel is casted and then manufactured. Fatigue life of all of these three components gets varied. It is necessary to know the fatigue life of each of these materials. By conducting design of experiments best parametric design can be done. Also thickness of the rim can be varied for each of these materials. It is stated that by varying the thickness level we can get varied fatigue strength for different materials. It is recommended to use optimum thickness which gives higher strength without compromising the fatigue life of the rim. Weight reduction can cause high level of cost saving.