

Distributed Pharmaceutical Manufacturing Environment Monitoring System Using Hybrid Communication Channel: A Layered Software Architecture Approach

Dr. Pramod U. Chavan^{1*}, Dr. Ramadevi R.², Dr. M.Murugan³, Pratibha P. chavan⁴

^{1*}Department of E&TC, K.J College of Engineering and Management Research, Pune, India

²Department of BME, Saveetha School of Engineering, Chennai, India

³Department of ECE, SRM Valliammai Engineering College, Chennai, India

⁴Department of E&TC, Trinity College of Engineering & Research, Pune

dr.pu.chavan@gmail.com rama_adarsh@rediffmail.com dr.m.murugan@gmail.com
pratibhap.chavan1981@gmail.com

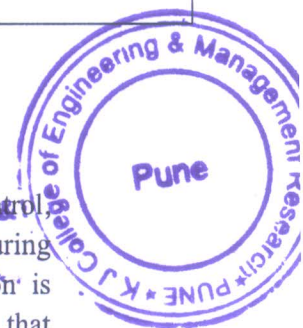
<i>Article History</i>	<i>Abstract</i>
<i>Article Received:</i> 11/04/2021 <i>Article Revised</i> 13/05/2021 <i>Article Accepted:</i> 16/06/2021	<p>The novel contribution of this paper is to address the key issues of pharmaceutical automation like efficiency, productivity, production time, decision making, scalability, testability, etc. for pharmaceutical process automation. It aimed to develop and deploy a Layered Software Architecture (LSA) on Distributed Pharmaceutical Manufacturing Environment Monitoring System (DPMEMS) with effective utilization of hardware and software resources. The system consists of the master and spatially distributed heterogeneous slave units communicated using Hybrid Communication Channel (HCC). The feasibility of system performance, in terms of the average round-trip time, estimated using histogram and probability distributions, validates the LSA for distributed monitoring and control in the modern DPMEMS. The LSA eases the identification and elimination of premature flaws before the actual system has been built. Hence, the proposed architecture suggests flexibility in the design lessening configuration time, cost and less vulnerability to errors.</p> <p>Keywords – Pharmaceutical Automation, Layered Software Architecture, Distributed System, Communication Network, Heterogeneous.</p>

I. INTRODUCTION

The distributed control is a prevalently used methodology to monitor and control environmental conditions in different application areas like pharmaceutical manufacturing process, marine, robotics, industrial automation, etc. Pharmaceutical industry automation is rapidly adapting towards the digitalization and automation of manufacturing process that involves many sensors, actuators, robots, controllers, and softwares. It helps in data analytics and decision making, that in turn improves the overall efficiency. In the recent past, the evolution


Dr. Suhas S. Khot
Principal

K.J. Somaiya Institute of Engineering & Management Research
Pharmaceutical Research
Pune
K.J. Somaiya Institute of Engineering & Management Research
Pune
K.J. Somaiya Institute of Engineering & Management Research
Pune



Contactless Entry System For Covid-19 Prevention Using Hybrid Architecture

Dr. Pramod Chavan¹, Dr. R. Ramadevi², Dr. M. Murugan³, Sanket Wagh⁴,
Sunil Mane⁵

^{1,4,5}Department of Electronics and Telecommunication Engineering, K.J College of Engineering and Management Research, Pune, India

²Department of BME, Saveetha School of Engineering, Chennai, India

³Department of ECE, SRM Valliammai Engineering College, Chennai, India

Email : dr.pu.chavan@gmail.com¹, rama_adarsh@rediffmail.com²,
dr.m.murugan@gmail.com³, sanketwagh147@gmail.com⁴, smane7415@gmail.com⁵

Abstract: The outbreak of the COVID-19 pandemic has brought the entire world to a standstill. The pandemic caused by the SARS-CoV-2 virus affects the respiratory tracks and spreads rapidly when it comes in contact. Though the Vaccines are now available, the cure took significant time and the pandemic has severely impacted our lives. As prevention is always a better step than to find a cure, the objective of this project is to showcase some preventive measures which will allow residential societies, institutes and organization to prevent contact between the security personnel and the person entering or exiting the premises. The controller uses Raspberry Pi, temperature sensor, mask detection and QR code to get the details of the individual. The main feature is that it will allow the use of mobile phones rather than pen and paper to provide entry details thus further preventing the spread of the virus. Usage of this standalone system did prove to be effective as it was able to monitor the temperature, detect the mask and register the names of individuals entering the premises without any human intervention and the data stored was logged digitally, which can be further analyzed if needed.

Keywords: Covid-19, Prevention, Mask, Temperature, Sensor, Security, Raspberry, QR code.

1. INTRODUCTION

Pandemics have a history of being cruel to mankind. The pathogens do not spare the rich or the poor the virus does not discriminate. They cause harm to anyone who is careless and do not prevent themselves from getting infected. The world had faced many brutal pandemics in the past and is facing one right now. Sadly, the history repeats itself and it might repeat again in the future. As we evolve as human race we must develop some stringent rules and preventive measure to diminish the impact caused by the pandemic.

We, humans, are social beings we love to interact and communicate with each other however the pandemic forced us to stay inside our house without physically interacting with each other. Even though we were disconnected physically, with the use of smartphones and the



Online Product Recommendation System using Sentiment analysis and Spam Filtering: A Review

Mayuri Chaudhari, Prof.Nagaraju Bogiri

Department of Computer Engineering, KJ College of Engineering and Management Research, Pune, India

ABSTRACT: E-commerce has recently concentrated on the rise of internet retail platforms and can be recommended by multiple consumers who refer to product review opinions to pick their goods and products from their purchasing experience. But, if current product evaluation programs include customers' problems (eg. cost, power, structure, function, etc.) conventional recommendation systems do not recommend alternative products, it is also difficult to meet user requirements. In this paper, we suggest therefore a new product recommendation framework that analyses two forms of information: information on grievances and information on satisfaction from e-commerce review comments. Alternative things can be recommended to meet the needs and can resolve the product issue details as you browse. In this article, we would identify the extraction of complaint information by removing both negative information and positive information from product feedback and clarify alternative product recommendation approaches for complaints resolution and check the efficacy of complaint information extraction and alternative product recommendations.

KEYWORDS: Machine Learning, Social Media, Text Mining, Text Classification, Sentiment Analysis, Online Reviews.

I. INTRODUCTION

Many businesses and software sectors store their data in Social networking creation provides the customer with an ability to share his or her views. That means the organization can't monitor the contents of the virtual universe now. Complaints in social media are submitted by customers who are not pleased by a company's services or goods. On the other hand, consumers are still optimistic for a commodity in the social media. This view could affect other potential clients, including positive or negative ones. Potential consumers can find out about a certain product before deciding to purchase goods.

An appraisal of the sentiment is expected to immediately decide whether the feeling is negative or positive. Feeling analyses are a subset of text mining that focuses in the text of a person's feeling, mood and attitude. The fundamental theory of sentiment analysis consists of categorizing the polarity of texts and determining whether they are positive or negative. Sentiment analyses are commonly used as rapid social network growth. For different places public opinion is becoming really critical. There have been some difficulties in collecting public examination.

Many product evaluation pages have recently been published on the Internet. It invites scientists to carry out a consumer review sentiment analysis. On product evaluations, customer opinion was evaluated in this paper.

II. RELATED WORK

In this paper [1], author proposes an approach which integrates content and usage information to detect fake product reviews. The proposed model exploits both product reviews and reviewers' behavioral traits interlinked by specific spam indicators. In this paper, fine-grained burst pattern detection is employed to better examine reviews generated over "suspicious" time intervals. Reviewer's past reviewing history is also exploited to determine the reviewer's overall "authorship" reputation as an indicator of their recent reviews' authenticity level.

This study [2] adopts a big data analytical approach to investigate the impact of online customer reviews on customer agility and subsequently product performance. authors develop a singular value decomposition-based semantic keyword similarity method to quantify customer agility using large-scale customer review texts and product release notes. Using a mobile app data set with over 3 million online reviews, our empirical study finds that review volume has a curvilinear relationship with customer agility. Furthermore, customer agility has a curvilinear relationship with product performance. this study contributes to innovation literature by demonstrating the influence of firms' capability of utilizing online customer reviews and its impact on product performance. It also helps reconcile inconsistencies

“SEISMIC ANALYSIS OF MULTISTOREY BUILDING WITH AND WITHOUT FLOATING COLUMN”

Aarati Andhare^{1*}, Dr. Santosh Patil²

¹ME Student, Department of civil engineering, K.J. college of engg and management research pune.

²Head of Department, Department of civil engineering, K.J. college of engg and management research pune.

ABSTRACT: Modern multi-storey buildings are constructed with irregularities such as soft storey, vertical or plan irregularity, floating column and heavy loads. These types of structures have become a very common construction practice in urban India. It is observed that most of the RC structures with such irregularities constructed are highly undesirable in seismically active areas from the results of past earthquake studies. These effects occurred due to various reasons, such as non-uniform distribution of mass, stiffness and strength. This study explains the seismic analysis of a multi storey building with floating column constructed in seismically active areas observing its reactions to the external lateral forces exerted on the building in various using the Staad Pro software. Thus highlighting the alternative measures involving in improvising the nonuniform distribution in the irregular building such as multi-storied building with floating column, and recommended the safer design of such building in seismically active areas considering the results observed from storey displacement, Base shear, Bending Moment, Shear Force, Deflection.

Key words: Floating column, Seismic analysis, Staad Pro.

1. Introduction

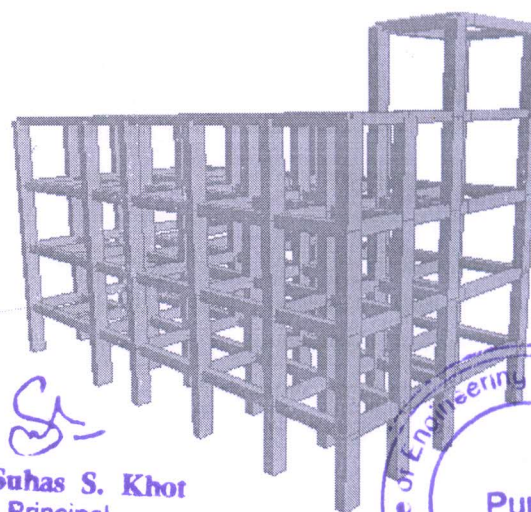
India is a developing country, where urbanization is at the faster rate in the country including adopting the methods and type of constructing buildings which is under vast development in the past few decades. As a part of urbanization multi-storey buildings with architectural complexities are constructed. These complexities are nothing but soft storey, floating column, heavy load, the reduction in stiffness, etc. Now a day's most of the urban multi-storey buildings have open first storey as an unavoidable feature. Accommodation of parking or reception lobbies is the primary use of this open first story in the multi-storey buildings constructed. But Conventional Civil Engineering structures are designed on the basis of strength and stiffness criteria. Usually the ground storey is kept free without any constructions, except the columns which transfer the building weight to the ground. “A column is supposed to be a vertical member starting from foundation level and transferring the load to the ground, and the term “Floating Column” is also a vertical element which at its lower level rests on a beam which is a horizontal member”.

2. Methodology

2.1 Modelling Of RC Building

This paper studies with the response spectrum analysis of the multi-storey building with floating column at different positions of the building. As per the code IS 1893-2002 (part 1) the response spectrum analysis of multi-storey building is summarized. The models details are,

2.1.1 Model 1: G+4 building without floating column i.e. normal building



Dr. Suhas S. Khot
Principal

College of Engineering & Management Research
Pune
Fig. 2: 3-D view in STAAD.Pro without floating column

Sr. No. 25 & 27, Kondhwa Saswad
Bonder Ghat, Pune

A REVIEW ON COMPARATIVE STUDY ON STRUCTURAL ANALYSIS AND DESIGN OF PRE-ENGINEERED STRUCTURE (PEB) AND CONVENTIONAL STEEL STRUCTURE (CSB)

Pritam Rajkumar Gulve¹, Dr. Santosh Patil², Dr. Atul Pujari³

¹PG Student, Department of Civil Engineering, KJCOMER Pune, India.

²Guide & HOD, Department of Civil Engineering, KJCOMER Pune, India

³Co-guide & Associate Professor Department of Civil Engineering, KJCOMER Pune, India

Abstract: The Pre-Engineered and Conventional Steel Building became admired today. Before a few years, we are not recognizable with PEB and its capacity. However, today this is not seen, surely there is something very implausible in PEB. That is why the entire world construction switches over to PEB from the conventional method of building constructions. In recent years, the introduction of Pre-Engineered Building (PEB) design of structures has helped in optimizing design. The construction of PEB in the place of Conventional Steel Building (CSB) design concept resulted in many advantages, as the members are design as per bending moment diagram and thus reducing the steel requirement. In this study, an industrial structure PEB Frame & CSB Frames analyzed and designed according to the Indian standards, IS 800-1984, IS 800-2007. The economy of the structure is discussed in terms of its weight comparison, between Indian codes (IS800-1984, IS800-2007) & in between PEB & CSB building structure. Cost of steel is rising day by day and use of steel has become inevitable in the construction industry in general and in industrial building in particular. Hence, to achieve economic sustainability it is necessary to use steel to its optimum quantity. Long span, Column free structures are the most important in any type of industrial structures and Pre-Engineered Buildings (PEB) fulfill this requirement along with reduced time and cost as compared to conventional structures. This methodology is adaptable not only due to its quality pre-designing and pre-fabrication, but also due to its lightweight and economical construction.

Key Words: Pre-engineering building (PEB), Conventional steel building)(CSB), hot rolled sections, STAAD-pro V8i

1. Introduction:

Steel is the material of alternative for design because it is ductile and flexible. Steel industry is mounting rapidly in almost all the parts of the world. The use of steel structures is not only cost-effective but also ecological at the time when there is a threat of global warming.

Steel members have high strength per unit weight and the properties of the steel members mostly do not change with time. Also, addition and modification can be made easily in steel structures.

Typically, conventional construction occurs step by step excavation and foundations are constructed before framing begins. Each component must be completed before moving to the next step, so scheduling is dependent upon each trade's efficiency. Design impacts schedule immensely, particularly if it is a complex design and because each component has designed from scratch, the project duration averages about six to ten months.

Conventional construction is ideal for complex designs. However, conventional construction not only takes longer, but it also costs more than pre-engineered construction.

Pre-engineered buildings are alternative option for Conventional steel buildings. Pre-engineered buildings are nothing but steel buildings in which surplus steel has avoided by tapering the sections as per the bending moment's requirement. One may think about its possibility but it is a fact, many people are not aware about Pre-Engineered Buildings.


Dr. Suhas S. Khot

Principal

K J College of Engineering & Management Research

Sr. No. 25 & 27, Kondhwa-Saswad Road
Fondrev Ghat, Pune - 48.



DESIGN OF INSPECTION FIXTURE OF PLASTIC COMPONENTKanishk Pradip Jawale*¹, Gayatri Patil*²^{1,2}Department Of Design Engineering (M.E.), K. J. College Of Engineering & Management Research, Pune, India.**ABSTRACT**

In this paper, a simplified approach of Design of Inspection Fixture which is one easiest way to inspect the mass production of automobile component. Inspection Fixture is used to check the area of the component occupied and its every needed point, the position of holes and its dimensions profile tangency of surface and shrinkage of the part also can be check in the inspection fixture. Loading of the part can be easily done with the inspection fixture as same like its fitment in vehicle with its surrounding and it can be easily unload. The chances of the part damage while unloading is none with the inspection fixture. This fixture is light weighted and can be easily transferred everywhere. This is the most adopted way of checking the components in automobile industry as it is affordable to everyone.

Keywords: Design, Manufacturing, Cmm Analysis, Inspection.

I. INTRODUCTION

In this project customer demanded a solution to his moulded plastic part problem, his query is about checking feasibility of the mass production parts with its mating, while actual fitting in vehicle. Is the flush of surface and trim of the edge is smooth and as per the standard for fitting and visual purpose?

My vision is to settle the queries and find the permanent feasible solution for his mass production. So I searched for this and found the concept of 'Inspection Fixture' and started to work on this.

As per the customer demands in this inspection fixture we provided the fixture body to check the trim edge gap along tis periphery and flush of the surface adjacent to the trim edge. Also the locking of part with is mating provided by using mechanism, locator and insert. And for checking some of the point as per customer specification we provided dial checking specification.

II. BACKGROUND & HISTORY

It is very difficult to check the newly moulded part by fitting with its original mating data. If there is a problem with newly moulded part and if it fitted with its mating then while removing it there is a large probability of damaging mating and newly moulded part.

A vehicle has many subparts in its assembly so it is also not possible to check every part by fitting with its original mating data.

For this purpose a concept of Inspection fixture has invented. In inspection fixture actual fitting using mating data can be provided by making it movable and removable with the concept of mechanism, slider, locator, insert, clamp, removable locking pin, removable checking pin, also the flush and trim can be check by providing uniform fixture body.

III. INSPECTION FIXTURE DESIGN**Design of Inspection Fixture**

The three dimensional Parts of an inspection fixture designed by using CATIA V5 R26 software. The following steps show the construction of inspection fixture parts by using different tools. After designing the inspection fixture it looks like as shown in figure.

The fixture is to be a special tool for holding and checking a moulded part in desire position during inspection operation. For the supporting and clamping the part, gauge is provided. Common checking, positioning, individual marking and non-uniform quality in inspection process are to be eliminated by fixture shown in Fig 1: inspection fixture.

Dr. Subhas S. K. Khe
Principal
K J College of Engineering & Management Research
Sr. No. 25 & 27, Kondhwa
Rohdev Ghat P.



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Miss. Mayuri Chaudhari, Prof. Nagaraju Bogiri

Computer Department
K J College of Engineering and Management Research
Pune, India

ABSTRACT

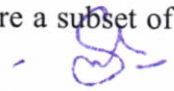
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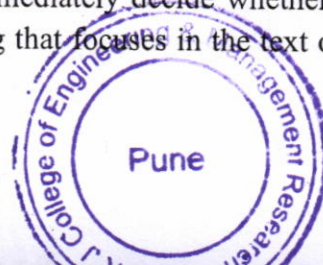
Keywords— Machine Learning, Social Media, Text Mining, Text Classification, Sentiment Analysis, Online Reviews.

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Dr. Suhas S. Khot
Principal
K J College of Engineering &
Management Research
Sr. No. 25 & 27, Kondhwa-Saewad, Pune





Seismic Behaviour of Multistorey Prefabricated Modular Building

Shashikant H. Chaudhari¹, Dr. Atul B.Pujari²

¹PG Student, Department of Civil Engineering, K.J. College of engineering and management research, Pune,

²Head of Department, Department of Civil Engineering, K.J. College of engineering and management research, Pune

³Professor, Department of Civil Engineering, K.J. College of engineering and management research, Pune

ABSTRACT

Modular building construction relies on prefabricated modules which are assembled onsite to form complete buildings. The assembly requires modules to be connected at discrete locations and results in the formation of discontinuous diaphragms. Generally, prefab can be categorized into components, panels (2D), modules (3D), hybrids, and unitized whole buildings. On average, greenhouse gas emissions from conventional construction were higher than for modular construction, not discounting some individual discrepancies. The work undertaken is an attempt to understand the fundamentals of prefab modular building, its design & behavior under seismic loading. As, no specific guidelines are available for design of building with modular building in Indian code IS 1893-2016 (Part I). Two types of modular structures are compared one with bracings and another with shear wall in G+20 building.

Keywords: Prefab Modular Building, Greenhouse, Shear Wall, Bracings, Diaphragm

INTRODUCTION

An emerging trend in the construction of medium-rise structures is modular construction or three-dimensional “prefabricated construction systems”. It differs from conventional construction as it involves the prefabrication of individual volumetric units (modules) off-site in factory-controlled settings (off-site manufacture or OSM) which are then assembled on-site, expediting the construction process while maintaining quality and safety standards. The concept of prefabricated modular structures has arisen in recent times as an effective solution to the AEC industry to achieve both speedy constructions as well improved and sustainable quality of the final product. Prefabricated building modules (such as apartments, office spaces, staircases etc.) can be fully constructed with architectural finishes and services inside a quality-controlled factory environment, ready to be delivered and assembled on site to form a safe and stable structure. Most manufacturers will nowadays cater for any architectural design with innovative modular units accordingly. Such building modules are mass produced in factories where the intense labour which would have otherwise been required at a conventional building site is replaced with specialist workmanship and machine handling in a mass production facility. As more innovative and unconventional designs are generated through modern architecture, prefabricated modules with different shapes and sizes will be demanded.

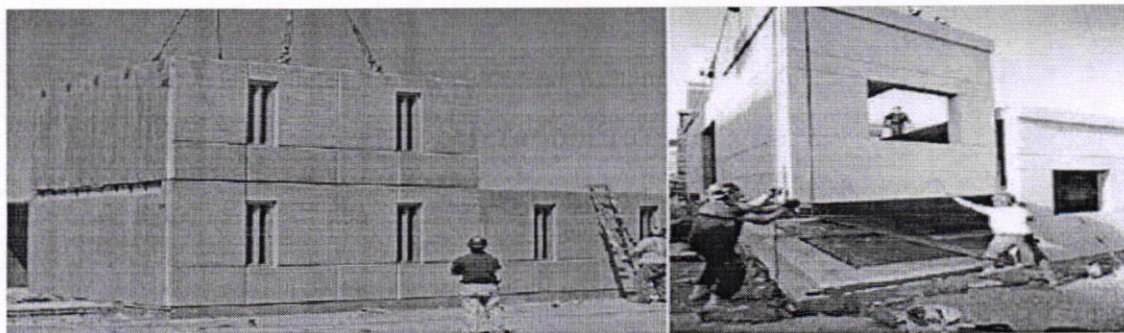
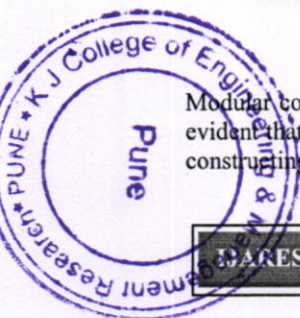


Figure 1: Prefabricated modules made with timber

Modular construction has gained a lot of popularity in the recent few years, and from what is already constructed it is evident that there are various types of prefabricated modules as well as various structural systems that are employed in constructing buildings out of them. This section will systematically categorise the various types of prefabricated



Dr. Subhas S. Kulkarni
Principal
K.J. College of Engineering & Management Research

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25 & 27, Kundhwa-Saswad Road
Bundev Ghat Pune - 411



Comparative Study of High-Rise Residential Building for Progressive Collapse as per Indian & American Code

Anurag Jamankar¹, Prof. Atul B. Pujari²

^{1,2}ME Structure, KJCOMER, Pune, Savitribai Phule Pune University.

Abstract: The progressive collapse is the condition where the collapse of one or few structural members occurs which tends to collapse of other members and then progresses to partial or whole collapse of structure. Progressive collapse RCC structure G+20 building is analyzed using the General Service Administration (GSA-2016) guidelines. To use linear static analysis method as per GSA (2016) guidelines for the axial force, bending moment, shear force, joint displacement of member and also to check on the basis of ETABS G+20 building software. Design of the buildings is performed using ETABS 2018 for three different threat-independent column removal conditions. To check performance of structure at all load combination in linear static and nonlinear static analysis Performed along with two different codal provisions. And then also checked performance for Demand Capacity Ratio as per GSA (2016) guidelines. From the result it is concluded that the parameters given in ASCE codes are taken by considering many structural failures which include progressive collapse as well. Also, ASCE codes are clearer and well explained about progressive collapse. Hence if observed the results, structure analyzed with ASCE code seems more stable and susceptible to progressive collapse.

Keywords: Progressive Collapse, RCC frame structure, IS code, ASCE-07, Linear Static Analysis, Nonlinear static analysis, GSA 2016, ETABS 2018.

I. INTRODUCTION

Progressive collapse was appeared not so long time ago. For the first time engineers faced with this phenomenon in 1968 when the Ronan Point apartment building was destroyed. A gas explosion in a corner on the 18th floor blew out the exterior wall panel and failure of the corner bay of the building spread upward to the roof structure and down till the ground level, but the entire building did not suffer. progressive collapse has been used to describe the propagate of an initial local failure in a manner like a chain reaction that causes to partial or total collapse of the structure. The basic characteristic of the progressive collapse that the end state of the destructions is disproportionately greater than the failure that made the collapse. Catastrophic failures of structures, due to progressive failure, have occurred, therefore highlighting the need to design against such events. Extensive research has been conducted into steel structures; however, the response of existing RCC frame structure located in to accidental or malicious events is not fully understood while its design. Residential building are prone to have any accidental event like bursting of gas cylinder, removal of key structural element for internal renovation, therefore many structures may be at risk of progressive collapse. These structural forms have alternative load paths which can protect such structures after the loss of a key element, but the capacity of these can be difficult to assess due to the nonlinear material and geometric factors. Additionally, the sudden removal of a structural element is a dynamic event, and so such factors must be included to obtain accurate indication into the response. Study of structural response leads to decide the preventive measures for the progressive collapse.



Fig 1 collapse of a part of the Ronan Point apartment



Fig 2 Plasco Building Progressive Collapse

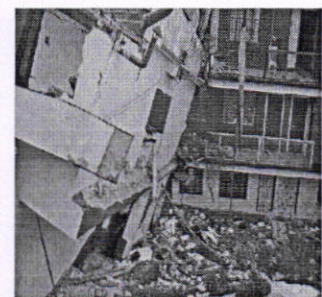
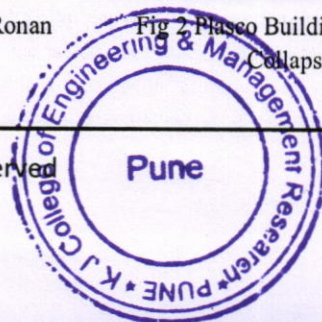


Fig 3 Sikkim Earthquake Caused Collapse of Government Building





Seismic and Wind Analysis of RC Structures with Base Isolator and Fixed Base

Chaitanya Patale¹, Dr. S. K. Patil², Dr. Atul B. Pujari³

¹Student, ^{2,3}Professor, Dept of Civil Engg., KJCOEMR Pune, Maharashtra, India

Abstract: This Conventional seismic design attempts to make buildings that do not collapse under strong earthquake shaking but may sustain damage to non-structural elements and to some structural members in the building. This may render the building non-functional after the earthquake, which is not acceptable for important buildings, like hospitals, fire stations, etc. Special techniques are required to design buildings such that they remain practically undamaged even in a severe earthquake. Buildings with such improved seismic performance usually cost more than normal buildings do. However, this cost is justified through improved earthquake performance. One of the technologies used to protect buildings from damaging earthquake effects is "Base Isolation". The idea behind base isolation is to detach (isolate) the building from the ground in such a way that earthquake motions are not transmitted up through the building, or at least greatly reduced. In this project static and dynamic earthquake and wind analysis performed and compared the results. The fundamental goal of base isolation is to reduce substantially the absorption of the earthquake induced force and energy by the structure. This is accomplished by placing a structure on a support mechanism with low lateral stiffness so that in an event of earthquake, when the ground undergoes strong motion, only moderate motion is induced in the structure itself. Base isolation system significantly reduces the super structure lateral stiffness and ductility compared to un-isolated structure which is demonstrated by the results of this work. This allow cost saving from less material being spend on lateral system and implication of structural detailing.

Keywords: Base isolation system, Lead rubber bearings (LRB) Friction pendulum bearings (FPB), Elastomeric rubber bearing (ERB) High damping rubber bearings (HDRB), Low damping rubber bearing (LDRB) Earthquake

I. INTRODUCTION

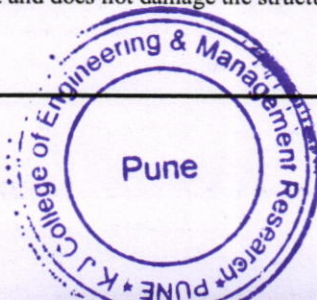
A. General

The field of seismic design is a subject directly concerned with both life safety and cautious and slow to innovate. Like other code-dominated issues, and like airplane safety, seismic safety has never been much of an important issue. In short, seismic safety is generally taken for granted. Improvements in seismic safety, since the time of the San Francisco earthquake of 1906, have been due primarily to acceptance of ever-increasing force levels to which buildings must be designed. Development of structural systems that perform reasonably well and enable materials such as steel and reinforced concrete is necessary. The choices for lateral resistance lie among shear walls, braced frames, and moment resistant frames.

The codes have mandated steadily increasing force levels, in a severe earthquake a building, if it were to remain elastic, would still encounter forces several times above its designed capacity. This situation is quite different from that for vertical forces, in which safety factors ensure that actual forces will not exceed 50% of designed capacity unless a serious mistake has been made. For vertical forces, this is easy to do. But to achieve similar performance for seismic forces, the structure would be unacceptably expensive.

This disagreement between seismic demand and capacity is traditionally accommodated by reserve capacity, which includes uncalculated additional strength in the structure and often the contribution of portions and exterior cladding to the strength and stiffness of the building. In addition, the ability of materials such as steel to dissipate energy by permanent deformation—which is called ductility—greatly reduces the likelihood of total collapse.

Modern buildings contain extremely sensitive and costly equipment. These building contents are more costly and valuable than the buildings themselves. Furthermore, hospitals, communication and emergency centers, and police and fire stations must be operational when needed most immediately after an earthquake. Conventional construction can cause very high floor accelerations in stiff buildings and large interstorey drifts in flexible structures as shown in FIGURE 1. These two factors cause difficulties in ensuring the safety of the building components and contents. Hence, it's necessary to incorporate a new design approach which will reduce the earthquake forces up to an extent and does not damage the structure.



Hybrid Architecture for Network Control System using Wired Communication Protocol

Dr. Pramod Chavan* Associate Professor & Head, Department of Electronics & Telecommunication, K J Institute's, K. J. College of Engineering & Management Research, Pune. (MS), India.

Pratibha Chavan Assistant Professor, Department of Electronics & Telecommunication, K J Institute's, Trinity college of Engineering & Research Pune. (MS), India.

Kaiyum Shikalgar R&D Engineer, Infistics Solutions Pvt. Pune. (MS), India.

Abstract

With the progression of technology, things are becoming very easier and simpler for us. Automated systems are being preferred over manual systems. Along with the fulfillment of the basic technical needs, it is necessary to control various applications in industries, agricultural sector, home automation, environmental based projects, health sector, etc. using a network controlled system. These various application based system may face problems due to sudden disconnection, design complexity, incrimination of system potential. Introduction to failure detection or disconnection of device is further improved using this system. The advantage of the Network control system is that it can handle the growing amount of work or complexity of network. Controlling and monitoring of sensors connected to ARM and AVR modules is done. A Wired network is most likely required to provide a backbone to the wireless network. The communication between server and controllers is established using RS-485 bus. In RS-485 bus, one master controls many slaves, this communication is implemented by half duplex (2 wire) or full duplex (4 wire). A GUI is introduced which provides security to the system. This paper introduces a methodology where monitoring of all the controllers and their applications is done from a single server (PC). Therefore, it provides a platform which is flexible and can be used for various applications. This paper also completes the requirement of ease, comfort and safety.

Keywords: Network Control System, RS-485, RS-232, Hybrid Architecture.

Introduction

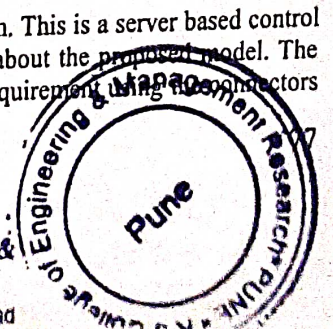
Application areas for wired network controlled systems have been growing from last decade at a very rapid rate. The distributed control systems usually consist of master and several slaves who are connected to each other through communication link such as TCP/IP, RS-232, and RS-485. RS485 is a flexible standard for automation system, it is a standard communication protocol for connecting computer and its peripheral devices to allow serial data exchange. The master unit controls the flow of communication process and in contrast the slave is just receiving any incoming commands from the master and several slaves are realized by certain communication protocol. Field bus is an industrial network that is specifically designed for the communication between various controllers and the field mounted sensors and actuators to the controller I/O. Remote I/O stations can also be used with the field bus wiring. Field bus has main advantages over conventional point to point wiring such as the significant reduction in installation cost (typically 20-40%) saving, system expansion and modification is simpler and less expensive since only the additional cable run from the offered network to the new device must be installed. As communication is digital, accuracy is not affected by noise, interference or electrical loading effect etc.

The aim of this paper is to bring forth protocol implementation through a model which can be used to map various future applications. This model can be further extended as per user requirement. The approach is to implement the distributed system as an experimental platform using RS485 an electrical standard.

Wired communications are well thought-out to be the most stable and reliable of all types of communication services. They are relatively impervious to unfriendly weather conditions when compared to wireless solutions. With some form of wired services, the strength and speed of the transmission is superior to other solutions, such as satellite or microwave transmissions. These have allowed wired communications to remain popular, even as wireless solutions have continued to advance. This bridges the gap between field devices such as sensors and central computer in many applications. Network reliability is measured by accuracy, failure rate, establishment time and robustness.

The standard USB to RS485 converter is a non-isolated adapter which is used for many businesses, office and personal devices. USB to RS485 converter allows users to easily extend serial port for the system, to connect the serial devices to the PC. Simultaneous conversion of differential voltage levels of RS485-RS232 takes place by converters by enabling the use of both AVR and ARM microcontrollers. Monitoring is done through the PC. Few connectors can be removed and kept for the future application purpose.

Further illustration includes examining the hybrid architecture model for the distributed system. This is a server based control system from which it can control and detect various nodes. A single server keeps us updated about the proposed model. The other end of the cable which is bare, tinned wire ended connections can be customized as per requirement using connectors



STUDY OF BIOFILTER PLANTED WITH BASIL FOR REMOVAL OF AMMONIA IN AQUAPONIC WATER

Bharat Nandkumar MULAY^{1, 2,*}, Konda Rajasekhar REDDY¹

¹ Department of Civil Engineering, K. L. University, Andhra Pradesh, India.

² Department of Civil Engineering, K J College of Engineering and Management Research, Pune, India.

* corresponding author: bharatmulay1@gmail.com

Abstract

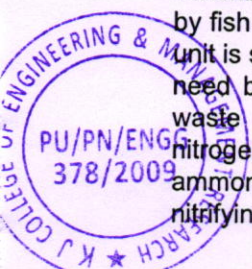
This experimental investigation of a laboratory scale aquaponic system included testing of a biofilter with basil plant as the biofilter part on aquaculture water quality. Irridescent shark was selected as aquaculture species. The biofilter consist of natural biomaterials such as coconut husk, coco peat, and coarse aggregates. The experiment was carried out for three short water recirculation durations of 2, 3, and 4 h/day. The influent and effluent ammonia NH₃, total ammonia nitrogen (TAN), nitrites NO₂ and nitrates NO₃ levels were measured and analysed. The results showed that the biofilter effectively removed NH₃ (65 - 71 %), TAN (34 - 58 %), and NO₂ (60 - 67 %) from the aquaculture water. The dissolved oxygen (DO) levels were maintained between 3 - 7.0 mg/l during all the recirculation durations. The significance of water recirculation period was assessed by calculating the differences between the means of water quality parameters with a statistical test named one-way analysis of variance (ANNOVA) with significant level P taken as 5 %, i.e., P ≤ 0.5. The effluent mean NH₃ levels 0.030 mg/l, 0.033 mg/l, and 0.022 mg/l exhibited significant difference at 4 h/d periods while effluent TAN levels 0.81, 0.77, and 0.77 showed no difference with varying periods.

Keywords:

Biofilter;
Ammonia;
Dissolved oxygen;
Recirculation;
Aquaponic.

1 Introduction

Aquaponics is an innovative agricultural production technique that combines two major components named aquaculture (fish tank) and hydroponics (soil less media) [1]. Unlike in hydroponics, the aquaponic method is capable of avoiding the complete dependence on nutrients and its sources [2]. It has the potential to solve the water scarcity problems and its hazardous effects [2]. The world's western part like US at Woods Hole Oceanographic Institute done strong developments in aquaponics since the 1960s [3]. Since then, the developed and developing countries like America and Australia adopted this system and carried out major research projects and programs on aquaponics [2]. These projects focused major objective of reducing the load of nutrient wastes and their environmental effect to increase the efficiency of nutrients for production of edible plants. The less availability of water is making the aquaculture production costlier and the only possible solution to overcome this problem is the effective recirculation of aquaculture wastewater to produce edible crops and fish [4]. The closed loop technique of aquaponic includes the recirculation of aquaculture water allowing the interaction of aquatic species, nitrifying bacteria and plants [5]. This method is capable of minimizing the need of micro and macronutrients essential for plant growth [4, 5]. The waste generated by fish (fish excreta) that contains nitrogen rich contents like urine and ammonia from the aquaculture unit is supplied to the hydroponic unit in this mechanism [1, 6]. Thus, the mechanism fulfills the nutrient need by minimizing its demand through hydroponic aquaculture integration [7]. The fish generated waste works as a fertilizer for edible plant growth and production in this mechanism [6]. The nitrogenous wastes generated by fish have major contents like the unionized ammonia NH₃, ammonium NH₄⁺, nitrite NO₂, and nitrate NO₃. The vital nutrients like Ammonia NH₃ are oxidized by nitrifying bacteria named *Nitrosomonas* and *Nitrobacter* into the forms like NO₂ and NO₃ which plants



A Vision-based Social Distancing and Critical Density Detection System for COVID-19

Sonali V. Bhingarkar, Samiksha R. Kad , N. Afreen , Prof. Rohini Agawane

Dept. of Computer, KJCOEMR, Pune, Maharashtra, India

ABSTRACT: The ongoing COVID-19 corona virus outbreak has caused a global disaster with its deadly spreading. Due to the absence of effective remedial agents and the shortage of immunizations against the virus, population vulnerability increases. In the current situation, as there are no vaccines available; therefore, social distancing is thought to be an adequate precaution (norm) against the spread of the pandemic virus. The risks of virus spread can be minimized by avoiding physical contact among people. The purpose of this work is, therefore, to provide a deep learning platform for social distance tracking using an overhead perspective. The framework uses the YOLOv3 object recognition paradigm to identify humans in video sequences. The transfer learning methodology is also implemented to increase the accuracy of the model. In this way, the detection algorithm uses a pre-trained algorithm that is connected to an extra trained layer using an overhead human data set. The detection model identifies peoples using detected bounding box information. Using the Euclidean distance, the detected bounding box centroid's pairwise distances of people are determined. To estimate social distance violations between people, we used an approximation of physical distance to pixel and set a threshold.

KEYWORDS: Social Distancing, Covid-19, Computer Vision, YOLO Object detection, Python, OpenCV, Deep Learning, Social health, Social surveillance, Coronavirus.

I. INTRODUCTION

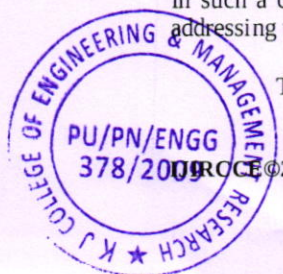
COVID-19 is a disease caused by a new coronavirus which appeared in China in December 2019. COVID-19 symptoms include mainly fever, cough, chills, and shortness of breath, body aches, loss of taste, and smell. COVID-19 can be severe, and in many cases, it has caused death. The coronavirus can spread from one person to another as diagnosed by researchers in laboratories. This pandemic has spread to over 188 countries around the world . On October 15, 2020, WHO (World Health Organization) declared that there have been 38,394,169 confirmed COVID-19 cases and 1089,047 deaths around the world. The uncertainty, underpinning, and complexity of the coronavirus have made it difficult to predict the duration and spread of this pandemic. As of yet, there is no vaccine available.

Prevention involves wearing masks and washing hands frequently. An infected person should stay at home when people are sick to prevent spreading this pandemic to the others. This situation forces the global community and governments to find the best mitigation plan to stop the spread of coronavirus. Nations stopped their business and closed the border and public places such as schools and workplaces to avoid people's interactions. It has been reported that all infected countries who applied the lock-down for their communities achieved a reduction of the number of COVID-19 cases and the number of deaths from this pandemic.

Fever or chills are common symptoms of coronavirus. Researchers in China found that 99% of people infected with the coronavirus presented with a high temperature. Thermal cameras and non-contact infrared thermometers, which are non-contact instruments, can be used to measure body temperature. This approach can monitor a person's surface temperature to limit the spread of coronavirus infections.

Based on the information from the World Health Organization, social distancing is the best practice where individuals can minimize physical contact with possible COVID-19 carriers by maintaining a certain distance between one person and another. The main target is to provide a comprehensive tool and effective technologies that can be utilized to enforce social distancing. Technologies could play an important role to facilitate social distancing practice. In such a context, Artificial Intelligence (AI) and information and communication technology (ICT) can be used in addressing this challenge.

This research aims at mitigating the spread of this virus in communities and saving the lives of people. In



Comparative Study of Slender and Squat Steel Silos Under Dynamic Analysis

Kapil Anand Kolekar¹, Dr. Santosh K.Patil², Dr. Atul B.Pujari³

¹PG Student, Department of Civil Engineering, K.J. College of engineering and management research, Pune, India

²Head of Department, Department of Civil Engineering, K.J. College of engineering and management research, Pune, India

³Professor, Department of Civil Engineering, K.J. College of engineering and management research, Pune, India

Abstract: The present work aimed at the study of seismic behavior or performance of a steel silos with different aspect ratio. Slender silos and Squat silos are the two types of silos being used for the analysis with medium type of soil. In order to study the seismic performance of slender silos and squat silos under different zones with medium types of soil have been considered. In total 6 models were modeled, Response Spectrum Analysis has been carried out on all 6 models. Time History Analysis has been carried out on slender and squat silos. All the modeling and analysis has been done using STAAD.Prov8i Software package by following all the standard procedure. After analyzing all the models, the results of parameters like Base shear reactions, Time vs Displacement and deflection are compared.

Keywords: Response Spectrum Analysis, Time History Analysis, Slender Silos, Squat Silos, Base shear reactions, STAAD Prov8i

1. INTRODUCTION

A Silo is a cylindrical/rectangular shape structure usually with hopper bottom shaped at bottom used for storing bulk of materials like grain, coal, cement, fly ash, iron ores etc. Steel silos are much lighter than the concrete silos and can be easily erected carrying the loads by different structural mechanism. Steel silos are recently being built in various chemical industries and RMCs for storing of materials. There are mainly three types of silos tower silos, bunker silos, & bag silos. Classification of silos as per aspect ratio is as follows.

Aspect ratio range	Silo slenderness category
$H/D \geq 2.0$	Slender
$1.0 < H/D < 2.0$	Intermediate Slender
$1.0 < H/D \leq 2.0$	Squat
$H/D \leq 2.0$	Retaining silo (Flat Bottom)

Generally gravity loads are more prominently to act on the structures, but recently seismic activities has caused more damage to this structures, therefore structures are need to be analyzed for the seismic activity.

Silos are structurally important in industries. Failure of silos due earthquakes is highly damaging, recently silos have been damaged due to earthquakes. Failure of silos can recently in adulteration of materials stored. Silos failed during earthquakes have resulted in loss of materials stored resulting heavy loss to the industries. Silos are subjected to differential pressure as per amount of material stored. Silos behavior generally depends on diameter to depth ratio.



“COMPARATIVE STUDY OF DIFFERENT BRACING PATTERN FOR INDUSTRIAL SHED STRUCTURE AT DIFFERENT LOCATION”

Shruti Benichetage^{1*}, Dr. Santosh Patil²

¹ME Student, Department of civil engineering, K.J. college of engg and management research pune.

²Head of Department, Department of civil engineering, K.J. college of engg and management research pune.

Abstract: Now a day, Bracings in steel structure are commonly used because it can withstand lateral loads due to earthquake, wind as well as minimizes effect of temperature. It is one of the best methods for lateral load resisting systems. This system provided to minimize the lateral deflection of structure. In this thesis industrial shed is analysed for the rectangular plan of 48mx16 m by considering Zone-VI for soil type-Medium.

The analyse were done by using the STAAD PRO software. In this Study models are compared for different types of bracing such as X, A, and diagonal bracing by placing in different locations like Outer Edge, Inner Edge and at centre in X and Z-directions for the bracing. Results are obtained by considering the parameters like storey displacement, storey deflection and storey shear.

Key words:- STAAD PRO, Displacement Storey Shear, Diagonal Bracing, longitudinal winds.

1. Basic Information:

A shed is typically a simple, single-story roofed structure that is used for storage, workshop. Structural shed used in industries to store raw materials or for product manufacturing, known as industrial Sheds. These industrial sheds are used for warehouse, factories, godowns, workshops, storage plants etc. Industrial sheds can be small or big in size depending on the requirement.

Wind load is the main load effect in the design of industrial buildings, even in low wind areas. It is therefore important to carefully evaluate wind loads. Usually, the end spans are the critical area of wind design. This is because the end spans not only have higher bending moments and higher deflections for a given uniform loads, but also higher loads because external suction including load pressure effects are highest at the windward end under

As steel bracing is economical, easy to set up, occupies minimum space and also have flexibility in nature to design for meeting the required strength and stiffness. Braced framed structures are usually considered to resist the lateral forces (Wind and earthquake loads). Braced system provides due to their strength, stiffness to the structures. They provide more stiffness against the horizontal shear because the diagonal member elements work in axial stress.

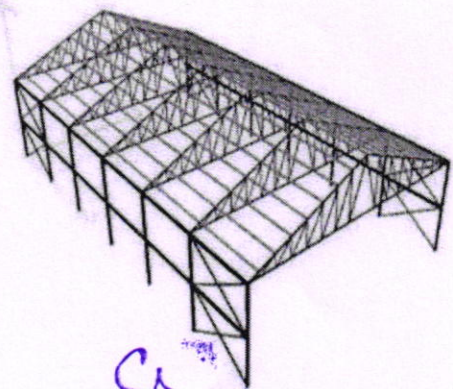


Fig.1. Basic model of Industrial Shed