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DETAILS OF VARIOUS TYPE OF THE AGENCIES WORKING FOR REPAIR AND MAINTAINCE OF STRUCTURE

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Abstract: This project aims to analyze the different methods adopted for the protection, maintenance and repair of RCCstructures. The company chosen for this project is Sree Nakshatra Builders & Developers India Pvt.Ltd, Trivandrum, and Kerala. The aim is to study about RCC, main reason for its corrosion and eliminate the damagesby maintenance, protection and repair. As in different cases the climatic conditions, bearing capacity of soil
, capital for the construction varies we mainly focus in finding out the most common and cheapest way for theprotection of RCC. The study of RCC structure was carried out with these concerns as the bottom line, The reinforcements are already covered by a thick layer of cement, While mixing with cement itself some reactions start to take place, any lack of proper maintenance done would seriously affect the RCC and resultin the slow destruction as a result of which lack of load bearing capacity of the construction occurs from timeto time.
The purpose of the project is to gain fundamental and practical understanding on concrete repair and rehabilitation of the structures. Large number of reinforced concrete (RC) structure are deteriorating, of ten prematurely, and need remedial measures to reinstate their safety and/or serviceability. Consequently, theneed for repair and protection has grown considerably in recent years. While costs associated with repair of deteriorating concrete structures can be substantial, costs resulting from poorly designed or executed repairs may be even higher.

IndexTerms **- Building components, building maintenance, maintenance and repair works, structural repair, maintenance, agencies, civil engineering firms, construction companies, structural engineering consultancies, maintenance contractors.**

I. INTRODUCTION

Poor and improper building maintenance will cause more damages and costly repair works if ignored. Aging, obsolescence and general deterioration of buildings and their systems and components can adversely affect the ability of building to sustain and operate properly. Priorities should be set for various aspects of maintenance works. This paper explores the different causes of need for maintenance and repair work and strategies of maintenance management in residential building. First of all questionnaire is prepared based on literature study and then data is collected from residents of building by interviewing them.
Concrete is the most widely used and versatile construction material possessing several advantages over steel and other construction material. Very often one comes across with some defects in concrete they are inthe form of cracks, spalling of concrete, exposure of reinforcement, excessive deflections or other signs of distress. Corrosion of reinforcement may trigger off cracking and spalling of concrete, coupled with deterioration in the strength of the structure such situations call for repairs of affected zones and sometimes for replacements of entire structure.
In the realm of infrastructure and construction, ensuring the longevity and safety of structures is paramount. Various agencies specialize in the repair and maintenance of structures, ranging from residential buildings toindustrial complexes. These agencies play a crucial role in upholding structural integrity, enhancing safety standards, and prolonging the lifespan of infrastructure. This comprehensive overview will delve into the diverse types of agencies involved in structural repair and maintenance, highlighting their functions, specialties, and significance in preserving the built environment.

Civil Engineering Firms:
Civil engineering firms are key players in structural repair and maintenance, offering expertise in assessing, designing, and implementing solutions for various infrastructure needs. These firms employ skilled engineers, architects, and technicians who specialize in structural analysis, rehabilitation, and maintenance planning. Theyundertake projects ranging from bridge restoration to building refurbishment, utilizing advanced techniques and technologies to address structural deficiencies effectively.
Construction Companies:
Construction companies often extend their services beyond initial construction projects to encompass repair and maintenance activities. These companies possess the necessary resources, equipment, and personnel to undertake structural repairs, renovations, and upgrades. Whether it's repairing damaged concrete structures or reinforcing steel frameworks, construction companies leverage their construction expertise to ensure structuralintegrity and compliance with building codes.

Structural Engineering Consultancies:
Structural engineering consultancies provide specialized expertise in evaluating and addressing structural challenges. These firms employ structural engineers with in-depth knowledge of material properties, load analysis, and structural behavior. They offer services such as condition assessments, retrofitting solutions, andrisk mitigation strategies. Structural engineering consultancies play a vital role in optimizing the performance and resilience of structures against external forces and environmental factors.

Specialty Repair Firms:
Specialty repair firms focus on addressing specific types of structural damage or deterioration, such as concretespalling, foundation settlement, or waterproofing issues. These firms possess niche expertise in specialized repair techniques and materials, catering to unique structural challenges. Whether it's using epoxy injection for concrete crack repair or employing cathodic protection for corrosion control, specialty repair firms offer tailored solutions to restore structural integrity and performance.

Preservation Societies and Nonprofit Organizations:
Preservation societies and nonprofit organizations advocate for the conservation and preservation of historic structures and landmarks. These organizations raise awareness about the importance of heritage preservation and provide resources for restoration and maintenance efforts. Through fundraising campaigns, educational programs, and collaborative initiatives, preservation societies contribute to safeguarding architectural heritageand promoting cultural appreciation.

Government Agencies and Regulatory Bodies:
Government agencies and regulatory bodies oversee compliance with building codes, standards, and regulations governing structural integrity and safety. These agencies establish guidelines for structural design, construction practices, and maintenance requirements to ensure public safety and environmental sustainability. They conduct inspections, issue permits, and enforce corrective actions to address non-compliance issues and maintain quality assurance in the built environment.

Research Institutions and Academia:
Research institutions and academia contribute to advancing knowledge and innovation in structural repair and maintenance through scientific research and academic programs. They conduct research on emerging materials,technologies, and methodologies for enhancing structural durability and resilience. Additionally, they offer educational programs and professional development courses to train the next generation of engineers and practitioners in the field of structural engineering and maintenance

II. LITERATURE RIVEW

Externally bonded, FRP sheets are currently being studied and applied around the world for the repair andstrengthening of structural concrete members. Strengthening with Fiber Reinforced Polymers (FRP) composite materials in the form of external reinforcement is of great interest to the civil engineering community. Also, the non-corrosive and nonmagnetic nature of the materials along with its resistance to chemicals made FRP an excellent option for external reinforcement. Research on FRP material for use in concrete structures began in Europe in the mid 1950's by Rubinsky and Rubinsky, 1954 and Wines, J.

Structure repair and rehabilitating is a process whereby an existing structure is enhanced to increase the probability that the structure will survive for a long period of time and also against earthquake forces. This can be accomplished through the addition of new structural elements, the strengthening of existing structuralelements, and/or the addition of base isolators.

Civil Engineering Firms:
"Civil Engineering: Conventional and Objective Type" by R. Agor provides a comprehensive overview of civil engineering principles, including structural analysis and maintenance.
"Structural Renovation of Buildings: Methods, Details, & Design Examples" by Alexander Newman offersinsights into structural rehabilitation techniques employed by civil engineering firms.

Construction Companies:
"Construction Project Management" by Frederick Gould and Nancy Joyce focuses on the role of construction companies in managing repair and maintenance projects.
"Construction Management: Principles and Practice" by Alan Turner and Robert Simister discussesconstruction methodologies applicable to repair and maintenance activities.

Structural Engineering Consultancies:
"Handbook of Structural Engineering" edited by W.F. Chen and E.M. Lui covers various aspects of structuralengineering, including consultancy services for repair and maintenance.
"Structural Renovation of Traditional Buildings: Details and Design Examples" by Alexander Newmanprovides case studies and design examples relevant to structural engineering consultancies.

Maintenance Contractors:
"Maintenance Planning and Scheduling Handbook" by Richard Palmer offers guidance on effective maintenance strategies and scheduling, relevant to maintenance contractors.
"Total Facilities Management" by Brian Atkin and Adrian Brooks discusses the role of maintenance contractors in managing building facilities and systems.

Specialty Repair Firms:
"Concrete Repair, Rehabilitation and Retrofitting II" edited by Mark G. Alexander and Hans-Dieter Beushausen presents state-of-the-art techniques and materials used by specialty repair firms in concrete repair.
"Structural Restoration of Old Buildings" by M. Paul Guyer provides guidance on structural restorationtechniques applicable to specialty repair firms

Preservation Societies:
"Preservation and Rehabilitation of Historic Bridges" edited by D.J. Sanders and D.E. McDonald explores therole of preservation societies in protecting historic structures.
"A Future for Our Past: The Preservation of Historic Bridges" by David B. Simmons examines theimportance of preservation societies in advocating for the conservation of historic bridges.
Government Agencies:
"Building Codes Illustrated: A Guide to Understanding the 2018 International Building Code" by Francis D.K.Ching and Steven R. Winkel provides insights into building codes enforced by government agencies.
"Regulatory Mechanisms for Building Safety: A Comparative Study of Selected Asian Countries" by RajivSharma analyzes regulatory frameworks governing building safety and maintenance.
Research Institutions:
"Structural Health Monitoring: A Machine Learning Perspective" edited by Jayantha Kodikara and David W.Easterling discusses research advancements in structural health monitoring relevant to research institutions.
"Advanced Materials for Infrastructure Sustainability and Eco-Efficient Construction" edited by H.M. Launey and M.E. Wissemeier explores innovative materials for sustainable repair and maintenance practices,relevant to research institutions

III. METHODOLOGY

Grouting Process : - Grouting is the process of placing a material into cavities in concrete or masonry structures for the purpose increasing the load bearing capacity of a structure, restoring the monolithic natureof a structural member, filling voids around pre cast connections and steel base plates, providing fire stops, stopping leakages, placing adhesives and soil stabilization.
Assessment and Preparation:
The first step in the grouting process is to conduct a thorough assessment of the structure to identify areasof concern such as voids, cracks, or leaks.
Site preparation involves cleaning the surface and ensuring it is free from debris, dust, and othercontaminants that could interfere with the grouting process.
Injection points are identified based on the location and extent of the defects, and access holes may bedrilled as necessary.
Selection of Grout Material:
The selection of grout material depends on factors such as the type of defect, substrate material,environmental conditions, and desired properties of the repaired area.
Common types of grout materials include cementitious grouts, epoxy grouts, polyurethane grouts, andacrylate grouts, each with specific characteristics and applications.
Mixing and Preparation:
Grout materials are mixed according to the manufacturer's instructions, ensuring the proper ratio ofcomponents and consistency of the mixture.
Special additives or admixtures may be included to enhance flowability, strength, adhesion, or otherproperties of the grout.
Monitoring and Control:
During the injection process, monitoring techniques such as pressure gauges, flow meters, and visualinspection are used to ensure proper distribution and penetration of the grout.
Injection parameters such as pressure, flow rate, and volume are carefully controlled to achieve the desiredresults while avoiding over-pressurization or excessive grout consumption.
Curing and Post-Treatment:
After injection, the grout is allowed to cure and harden, typically following the manufacturer's recommendedcuring time and conditions.
Depending on the type of grout used, post-treatment measures such as surface sealing, coating, or finishingmay be applied to protect the repaired area and enhance durability.
Quality Assurance and Testing:
Quality assurance measures such as sampling, testing, and inspection may be performed to verify theeffectiveness and integrity of the grouting repairs.
Non-destructive testing techniques such as ultrasonic testing, ground penetrating radar, or thermal imagingmay be used to assess the condition of the repaired area and detect any remaining defects or anomalies.
Documentation and Reporting:
Documentation of the grouting process, including materials used, injection procedures, monitoring data,and test results, is important for record-keeping, future maintenance, and compliance purposes.
A detailed report summarizing the grouting repairs, including observations, recommendations, and anyfollow-up actions required, may be prepared for stakeholders and regulatory authorities.
Guniting Process:
Guniting is an effective technique, which has been extensively used in the rehabilitation of structurally distressed RC members. There have been cases of heavy rusting of the mesh inthe form of powder or in the form of a sheet coming out.
Surface Preparation:
The first step in the gunite process is to prepare the surface to be repaired. This typically involves cleaning thearea to remove dirt, debris, loose material, and any contaminants that could affect adhesion.
Any existing coatings, paints, or sealants may need to be removed to ensure proper bonding of the gunitematerial to the substrate.

IV. MIXING OF MATERIALS

Gunite is a mixture of dry cementitious material (such as Portland cement) and aggregate (typically sand orsmall stones). Water is added to the dry mix to form a wet mixture suitable for spraying.

The proportions of cement, aggregate, and water are carefully controlled to achieve the desired consistency andproperties of the gunite mix.

Application Process:
The gunite mix is fed into a hopper and pneumatically conveyed through a hose to a nozzle.
The mix is sprayed onto the prepared surface using compressed air, resulting in a dense and cohesive layer ofmaterial.
The spraying process allows for flexibility in application, enabling the repair of irregular surfaces, complexshapes, and hard-to-reach areas
.
Layering and Building Thicknes
Gunite can be applied in multiple layers to build up thickness and achieve the desired structural strength anddurability.
Each layer is allowed to partially set before the next layer is applied, ensuring good bonding between layersand minimizing the risk of delamination or cracking.

Finishing and Shaping
After the gunite has been applied, it may be shaped and finished using trowels, floats, or other tools to achievethe desired surface texture, contour, and appearance.
Surface imperfections, such as voids, air pockets, or rough areas, may be smoothed out or filled in during thefinishing process.

Curing and Moisture Control
Proper curing of the gunite is essential to achieve optimal strength and durability. Curing methods may includemoist curing, wet covering, or the application of curing compounds.
Moisture control is important during the curing process to prevent rapid drying, shrinkage, and cracking of thegunite material. Measures such as covering with plastic sheeting or misting with water may be employed to maintain adequate moisture levels.

Quality Control and Testing:
Quality control measures may include visual inspection, thickness measurements, and adhesion tests to ensurethat the gunite repairs meet specified requirements and standards.
Non-destructive testing techniques such as ultrasonic testing or rebound hammer testing may be used to assessthe integrity and properties of the repaired surface.

Protection and Maintenance:
Once the gunite repairs have cured sufficiently, protective coatings, sealants, or waterproofing treatments maybe applied to enhance durability and resistance to environmental factors.
Regular inspection and maintenance of the gunite surface are important to identify and address any signs ofdeterioration, cracking, or damage over time.

V. MATERIALS USED IN REPAIRS

Polymer modified concrete/cement mortar Polymer cements concrete, which is prepared by adding polymeror monomer to ordinary fresh cement concrete during mixing.
Epoxy resins the epoxy resins are widely used in the repairing of cracks, patching and grouting of concrete,industrial flooring, structural adhesives, anti-corrosive linings, etc.
Polymer-based materials Polymer-based materials are being widely used in the building industry in variousforms such as coatings, membranes, adhesives, sealants, etc because other high durability.

Concrete: Used for patching, resurfacing, and structural repairs, concrete offers durability and strength,making it ideal for various applications.

Steel: Structural steel is employed for reinforcement, retrofitting, and strengthening of existing structures,providing high tensile strength and ductility.
Fiber-Reinforced Polymers (FRP): FRP composites are used for strengthening and retrofittingapplications, offering lightweight, corrosion-resistant, and high-strength properties.

Grouts and Sealants: Cementitious or epoxy-based grouts and sealants are used for filling voids, cracks,and joints to prevent water infiltration and enhance structural stability.

Construction Companies:
Construction companies utilize a wide range of construction materials for repair and maintenance projects,including:

Asphalt and Bitumen: Used for road repairs, asphalt and bitumen provide a durable and flexible surfacethat resists wear and weathering.

Masonry: Bricks, blocks, and stone are commonly used for masonry repairs, providing strength,durability, and aesthetic appeal.

Waterproofing Membranes: Bituminous membranes, liquid-applied membranes, and polymer-based membranes are used for waterproofing basements, roofs, and foundations to prevent water intrusion anddamage.

Protective Coatings: Epoxy coatings, polyurethane coatings, and acrylic coatings are applied to concretesurfaces to protect against corrosion, abrasion, and chemical exposure.

Structural Engineering Consultancies:
Structural engineering consultancies employ specialized materials for structural rehabilitation andstrengthening, including:

Carbon Fiber Reinforced Polymers (CFRP): CFRP sheets or strips are used for strengthening beams,columns, and slabs, providing high strength-to-weight ratio and corrosion resistance.

High-Performance Concrete: High-strength, high-durability concrete mixes are used for structural repairs, offering enhanced compressive strength, durability, and resistance to environmental degradation.

Anchoring Systems: Expansion anchors, adhesive anchors, and mechanical anchors are used for securingstructural elements and attachments, providing reliable load transfer and stability.

Corrosion Inhibitors: Corrosion inhibitors are added to concrete mixes or applied as surface treatments tomitigate corrosion of reinforcing steel and extend the service life of structures.

Maintenance Contractors:
Maintenance contractors utilize various materials for routine upkeep and repair tasks, including:

Patching Compounds: Cementitious patching compounds and epoxy mortars are used for repairing spalls,cracks, and surface defects in concrete structures.

Joint Sealants: Silicone sealants, polyurethane sealants, and polysulfide sealants are used for sealing expansion joints, control joints, and construction joints to prevent water infiltration and maintain structuralintegrity.

Protective Coatings: Anti-corrosion coatings, concrete sealers, and elastomeric coatings are applied tosurfaces to protect against moisture, chemicals, and abrasion.

Waterproofing Systems: Cementitious waterproofing systems, liquid-applied membranes, and drainageboards are installed to waterproof below-grade structures, retaining walls, and plaza decks.

Crack Injection Resins: Epoxy injection resins and polyurethane injection resins are used for repairing cracks in concrete structures, providing structural reinforcement and waterproofing.

Cathodic Protection Systems: Impressed current cathodic protection (ICCP) and galvanic anode systemsare installed to mitigate corrosion of steel reinforcement in concrete structures, extending service life and reducing maintenance costs.

Carbonation Inhibitors: Surface-applied or admixed carbonation inhibitors are used to mitigate carbonation-induced corrosion of concrete, preserving the durability and structural integrity of buildingsand bridges.

Expansion Joint Systems: Modular expansion joint systems, compression seal systems, and elastomericjoint seals are installed to accommodate thermal movements and prevent water intrusion in bridges,
Parking structures, and stadiums.

Preservation Societies and Nonprofit Organizations:
Preservation societies and nonprofit organizations advocate for the use of traditional building materials andtechniques for historic preservation projects, including:

Lime Mortar: Traditional lime mortars are used for repointing historic masonry, offering compatibilitywith historic materials, flexibility, and breathability.

Natural Stone: Authentic natural stone materials are sourced for repairing historic facades, retainingwalls, and architectural details, preserving the character and authenticity of historic structures.

Timber: Salvaged or reclaimed timber is used for repairing historic timber structures, offeringsustainability and compatibility with traditional construction methods.

Historic Paints and Finishes: Traditional lime washes, mineral paints, and natural finishes are applied tohistoric surfaces to match historic color schemes and maintain visual continuity.

VI. APPLICATION

After the concrete surface has been prepared, a bonding cost should be applied to the entire cleaned exposedsurface.
The bonding cost may consist of bonding agent such as cement slurry, cement and mortar, epoxy, epoxymortar, resin materials etc.
Adequate preparation of surface and good workmanship are the ingredients of efficient and economicalrepairs.
The mechanism of corrosion of reinforcing steel in concrete.

Conducting structural assessments to identify defects, deterioration, and vulnerabilities in buildings, bridges,and other infrastructure.
Designing and implementing repair strategies, including reinforcement, retrofitting, and rehabilitation ofexisting structures.
Providing engineering oversight and project management for repair projects, ensuring compliance withregulatory requirements and safety standards.

Developing maintenance plans and schedules to address ongoing structural maintenance needs and optimizeasset management strategies

A. CONSTRUCTION COMPANIES

Construction companies extend their services to include repair and maintenance activities, leveraging theirconstruction expertise and resources.

Applications:

Executing repair projects, including concrete repairs, waterproofing, and facade restoration, using skilledlabor and specialized equipment.
Conducting emergency repairs to address structural failures, damage from natural disasters, or unforeseen
Events that compromise the safety and integrity of structures.
Implementing preventive maintenance measures, such as roof inspections, caulking, and sealant replacement,to prolong the lifespan of building components and systems.
Providing construction management services for repair and maintenance projects, coordinatingsubcontractors, scheduling work activities, and ensuring quality control.

B. STRUCTURAL ENGINEERING CONSULTANCIES

Structural engineering consultancies offer specialized expertise in evaluating and addressing structuralchallenges, providing tailored solutions for repair and maintenance.

Applications:

Performing condition assessments and forensic investigations to diagnose structural defects, failures, andperformance issues.
Designing repair solutions, such as strengthening of structural members, foundation underpinning, andseismic retrofitting, to enhance the resilience and performance of structures.

C. MAINTENANCE CONTRACTORS

Maintenance contractors specialize in ongoing upkeep and repair of structures, offering preventivemaintenance programs and reactive maintenance services.

Applications:

Conducting routine inspections and condition assessments to identify maintenance needs, such as crackrepairs, concrete spalling, and corrosion control.
Performing scheduled maintenance tasks, including cleaning, painting, lubrication, and minor repairs, toensure the continued functionality and safety of building systems and components.
Responding to emergency repair requests, such as plumbing leaks, electrical failures, or HVACmalfunctions, to minimize downtime and mitigate risks to occupants and assets.
Implementing energy efficiency upgrades and sustainability initiatives, such as lighting retrofits, HVACsystem upgrades, and green building certifications, to reduce operating costs and environmental impact.

D. SPECIALTY REPAIR FIRMS:

Specialty repair firms focus on addressing specific types of structural damage or deterioration, offeringspecialized techniques and materials for repair and maintenance.

Applications:

Providing specialized repair services, such as concrete restoration, masonry repair, and waterproofing, toaddress localized defects and deterioration in building envelopes and structures.
Utilizing advanced repair technologies, such as carbon fiber reinforcement, epoxy injection, and cathodic
Protection, to restore structural integrity and prevent further deterioration.
Collaborating with other agencies, such as engineering firms, construction companies, and maintenancecontractors, to develop integrated repair solutions for complex structural challenges.

E. PRESERVATION SOCIETIES AND NONPROFIT ORGANIZATIONS

Preservation societies and nonprofit organizations advocate for the conservation and preservation of historic structures and landmarks, promoting cultural appreciation and heritage preservation.

Applications:

Conducting research and documentation of historic structures, including architectural surveys, materialanalysis, and historical research, to inform preservation efforts and advocacy campaigns.
Providing technical assistance and guidance to property owners, architects, and contractors on appropriaterepair and maintenance practices for historic buildings and landmarks.
Organizing educational programs, workshops, and events to raise awareness about the importance of historicpreservation and engage the community in heritage conservation initiatives.
Fundraising and grant-making to support preservation projects, such as restoration of historic facades, adaptive reuse of heritage buildings, and interpretation of cultural landscapes, to ensure their continuedrelevance and significance.

F. GOVERNMENT AGENCIES AND REGULATORY BODIES

Government agencies and regulatory bodies oversee compliance with building codes, standards, andregulations governing structural integrity and safety.

Applications:
Enforcing building codes and standards through permitting, inspections, and compliance assessments toensure that repair and maintenance activities meet minimum requirements for safety and performance.
Providing technical guidance and assistance to property owners, designers, and contractors on regulatoryrequirements, best practices, and alternative compliance options for repair and maintenance projects.
Conducting research and development initiatives to advance building science, materials technology, andconstruction practices related to repair and maintenance of structures.
Collaborating with industry stakeholders, professional associations, and academic institutions to developcodes, standards, and guidelines that reflect current knowledge and best practices in the field.

G. RESEARCH INSTITUTIONS AND ACADEMIA
Research institutions and academia contribute to advancing knowledge and innovation in structure repair andmaintenance through scientific research and academic programs.
Applications:
Conducting fundamental research on materials, technologies, and methodologies for repair and maintenanceof structures, including durability testing, performance modeling, and life cycle analysis.
Developing advanced materials and construction techniques, such as self-healing concrete, smart sensors,and robotic repair systems, to enhance the resilience, sustainability, and efficiency of repair processes.
Offering educational programs and professional development courses to train the next generation ofengineers, scientists, and practitioners in the field of structure repair and maintenance.
Collaborating with industry partners, government agencies, and nonprofit organizations to transfer researchfindings into practical applications and promote adoption of innovative solutions in the built environment.

VII. ADVANTAGE

1) **Comprehensive Expertise**: Civil engineering firms possess a deep understanding of structural analysis,design, and rehabilitation, offering comprehensive solutions for repair and maintenance projects.
2) **Construction Efficiency**: Construction companies bring efficiency to repair projects through their skilledlabor,
3) Specialized equipment, and streamlined project management, ensuring timely and cost-effective execution.
4) **Specialized Knowledge:** Structural engineering consultancies offer specialized knowledge in diagnosingstructural issues and designing customized repair solutions tailored to the specific needs of each project.
5) **Responsive Maintenance:** Maintenance contractors provide responsive maintenance services, addressing routine upkeep and emergency repairs promptly to minimize downtime and mitigate risks to occupants andassets.
6) **Innovative Techniques:** Specialty repair firms employ innovative techniques and materials, such as carbon fiber reinforcement and epoxy injection, to achieve durable and long-lasting repairs for various structural defects.
7) **Research Advancements:** Research institutions and academia contribute to advancements in repair technologies and materials, fostering innovation and sustainability in the field of structure repair andmaintenance.
8) **Education and Training:** Academic institutions offer education and training programs to develop skilledprofessionals and equip them with the knowledge and expertise needed to address complex structural challenges.
9) **Collaborative Partnerships**: Collaboration among agencies fosters synergy and knowledge sharing, enabling interdisciplinary approaches and integrated solutions for addressing structural issues and enhancing infrastructure resilience.

VIII. DISADVANTAGE

1) **Limited Resources:** Some civil engineering firms may lack the resources or specialized expertise needed toaddress complex structural issues effectively, leading to suboptimal repair solutions.
2) **Cost Overruns:** Construction companies may encounter cost overruns and scheduling delays in repairprojects due to unforeseen challenges, changes in scope, or inadequate project planning.
3) **Overreliance on Standard Solutions:** Structural engineering consultancies may tend to rely on standardrepair solutions without considering innovative or customized approaches, potentially overlooking opportunities for optimization.
4) **Delayed Response:** Maintenance contractors may experience delays in responding to repair requests, particularly during peak periods or when resources are stretched thin, resulting in prolonged downtime foroccupants and assets.
5) **Limited Specialization**: Some specialty repair firms may have limited specialization or expertise in addressing specific types of structural defects, potentially leading to subpar repairs or ineffective solutions.
6) **Funding Constraints:** Preservation societies and nonprofit organizations may face funding constraints orlimited resources for preservation projects, hindering their ability to undertake comprehensive repairs or restoration efforts.
7) **Bureaucratic Hurdles:** Government agencies may encounter bureaucratic hurdles or administrative delays inpermitting, approvals, and regulatory compliance, slowing down repair projects and increasing costs.
8) **Research Gaps:** Research institutions and academia may face gaps in research funding or resources, limitingtheir capacity to address emerging challenges or develop innovative solutions for structure repair and maintenance.
9) **Skill Shortages:** Academic institutions may struggle with skill shortages or gaps in industry-relevanteducation and training programs, resulting in a mismatch between graduate skills and industry needs.
10) **Communication Breakdowns:** Lack of effective communication and coordination among agencies can lead to misunderstandings, delays, or conflicts in repair projects, undermining collaboration and hindering projectsuccess.

IX. CONCLUSION

Every building has some life span after time passes certain problems arises like paint deuteriation, corrosion,seepage problems, deflections in beams etc. Buildings will become unstable due to all these problems. So, repair works should be done in order to gain the strength of the structure. Repair and Rehabilitation is necessary to save hazardous failure of structures.

From the results found and study of literature survey we can conclude that there are some building components which contribute more to the maintenance and repair of building. By taking appropriate actionsto those components useful life of building can be extended and safety of occupants increased.

The repair and maintenance of structures are vital for ensuring the longevity, safety, and functionality of built environments. Various types of agencies play essential roles in this process, each bringing unique expertise, resources, and perspectives to address structural challenges effectively. Civil engineering firms provide comprehensive solutions and expertise in structural analysis and rehabilitation, while construction companies offer efficiency and project management capabilities. Structural engineering consultancies contribute specialized knowledge and tailored solutions, while maintenance contractors provide responsiveupkeep and emergency repairs

Specialty repair firms employ innovative techniques and materials, preservation societies advocate for heritage conservation, and government agencies ensure regulatory compliance and oversight. Research institutions and academia drive advancements in repair technologies and materials, while collaborative partnerships foster synergy and knowledge sharing among agencies. Despite facing challenges such as resource constraints, skill shortages, and bureaucratic hurdles, these agencies collectively contribute to preserving infrastructure, enhancing resilience, and promoting sustainability in the built environment. Through continued collaboration, innovation, and investment, they play a crucial role in shaping the futureof structure repair and maintenance for generations to come.

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