

History of building diagnosis construction essay



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Building construction is the process of adding structure to real property. The numerous number of building construction jobs are small changes, such as room addition, or bathroom renovations. Often, the holder of the property acts as labor, paymaster, and designers team for the complete project. Nevertheless, all building construction projects include some elements in common – financial, design, estimation and legal considerations. Many projects differs sizes reach undesirable end results, such as structural failures, cost beat, and or litigation reason, those with proper knowledge in the field make detailed plans and sustain careful oversight during the project to ensure a desired positive outcome. Commercial building construction is acquired privately or publicly utilizing different delivery methodologies, including cost estimation, hard bid, negotiating price, traditional, management contracts, construction management-at-risk, build & design and design-build bridging. Residential building construction practices, technologies, and resources must make sure to local authority regulation and practice codes. Materials readily able to get in the area generally dictate the construction equipments used . Cost of construction on a per square meter basis for houses can vary dramatically based on site conditions, economies of scale, local regulations and the availability of skilled trades people. As residential construction can generate a lot of waste, cautious planning again is needed here. The most popular method of residential construction in some of the western countries preferred is wood framed construction. As code's of efficiency have come into effect in recent time, new construction technologies and methodologies have arise. Construction Management department are on the cutting edge of the new methods of construction intended to improve efficiency, performance and reduction of

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construction waste. Technical and specialized occupations require more training as a proper technical knowledge is needed. These professions hold more authorized responsibility. A list of the careers with an outline of the educational needs are given below: Quantity Survey – Particularly holds a master's degree in quantity surveying. Reserved status is gained from the Royal institute of chartered surveyors. Architectures -Particluarly holds 1, undergraduate 3 year degree in architecture + 1, post-graduate 2 year degree in architecture plus 24 months experience within the industry. Architect is the individual must be registrations must be conceived at Architects registration board register of ArchitectsCivil Engineers – Holds a degree in a related subject. The Reserved Engineer qualification is controlled by the Engineers council, and is often achieved through membership of the Institute of civil engineers. A new graduate must hold a master's degree to become authorized, persons with bachelor's degree may become an Incorporated engineer. Building service engineers – Often referred to as an " M&E Engineer" typically holds a degree in mechanical or electrical engineering. Authorized Engineer status is governed by the Engineers council, mainly through the Chartered institute of building council. Project manager – olds a 4-year or higher education qualification, but are often also qualified in another field such as quantity surveying or civil engineering. Structural Engineers – Typically holds a bachelors or master's degree in structural engineering, new graduates must hold a master's degree to gain chartered status from the Engineers counsilCivil estimators are experienced who typically have a background in civil engineering, construction, project management, or construction supervision.

Challenges faced by today's Construction companies

There are numerous challenges facing today's construction companies . Starting with construction manager's. Some are new to the industry, and some are centuries old. Many of these challenges are a direct result of construction sequences, while others a result of indirect, peripheral issues. A surprising number of challenges are not construction issues but must be addressed and managed by the construction manager (CM) to ensure project success. Some of the construction issues include workforce considerations, time constraints, safety and the changing nature of the work. Non-construction challenges that construction manager face that part of the business landscape include legal issues, – government adjustments, environmental care, and socio-political pressures. It is critical that the construction manager understands the demanding realities that he or she faces in the planning and control of construction operations. Construction projects represent a unique set of activities that must take place to produce a unique product. The success of a project is accessed by meeting the criteria of cost, time, safety, resource allocation, safety and quality as determined by the owner. The purpose of Project Management is to achieve goals and objectives through the planned expenditure of resources that meet the project's quality, time, cost, scope, and safety measurements. The manager must deflect, control, or diminish the effects of any occurrence or situation that could affect project success.

Nature of the Work

Construction is a complex array of interdependent activities that some would say is at best pre arranged chaos. The nature of construction will bring

challenges typically not encountered in other industries. For example, construction varies widely from manufacturing in that:

- the work is often seasonal
- each project is unique
- often involves out of the way sites with varying in access problems
- the process is not as anticipated
- Problem occurs in applying automation
- there is high potential for coming across unforeseen conditions
- costs can differs according to conditions
- difficult to handle and supply utilities and other sources.
- technical alterations are adopted slower.
- success is based upon the quality of its people.
- very custom-oriented
- product can be of mind-blowing size, cost, and much complexity
- the work is not performed in sustained conditions, therefore highly impacted by weather and other environmental conditions.

Weather and construction have been at odds since the beginning. Today's meteorologists have a vast array of tools such as Doppler radar, satellite, and computer modeling. These tools enable the meteorologist to predict weather patterns and events with some degree of definitive. Nevertheless, even with the most sophisticated technology available, forecasts are still subject to wide variability and questionable accuracy. Even if meteorologists could predict weather to a degree of accuracy of $\pm 5\%$, the impending weather events cannot be modified or delayed.

Work Force Considerations

As is the case in any business, people are a construction arrangement greatest resource. Construction operations rely on the experience and skills of people planning and perfecting the work. The quality of this most important resource: people, is what distinguishes one team or company from another. Having talented management in place to guide and direct

operations is critical. Obviously, having an adequate number of skilled and unskilled workers to perform the work is a bare necessity..

Safety

Safety remains an on going concern for the construction manager.

Construction by nature is inherently dangerous, with a highest degree of danger and risk. The number of construction accidents is high in terms of both costs and human damage. Accidents add a tremendous burden of needless and avoidable expenditure. Financial losses dim when compared to bodily injuries and death, and the resulting human suffering , social impacts. Construction accidents add \$10 billion annually to construction cost.

Insurance protects the contractor from certain direct expenses.

Time Constraints

Time is money to builders, owners and users of the constructed facility. From the owner's aspects there is lost revenue by not receiving return on endowing , cash flow, potential alienation and loss of clients/tenants, extended interest payments, and negative marketing impacts. Delays in constructing or rehabilitating infrastructure negatively affects businesses and the public at-large. Time implications from the constructor's perspective include liquidated damages and incentive/disincentive payments

Environmental Issues

The impact of environmental issues on construction has been escalating since the 1970's. Today, owners and constructors are bound to clearly defined duties and liabilities regarding the environment. Nearly all portions and sectors of the industry are affected by one or more environmental

issues. Strict management, permitting requirements, and enforcement are reassigned to protect human health and the natural environment

Permissible Issues

The Western countries has become a highly litigious society. The number of civil actions is growing at an caution rate. Various businesses across the board are at great risk because of liability and other legal associations . Not many industries are exposed to greater risks from legal issues than the construction industry. Construction business runs through contractual arrangements that at times results in disputes. Claims and disputes have been steadily on the rise for years.

Governmental Organizing

Increasing government regulation is another of the challenges facing today's CM. Along with increasing environmental and safety laws, the industry is coming under greater regulation through the construction codes and licensing requirements. State and local municipalities adopt model codes such as the Basic/National Building Code (BOCA Code), Uniform Building Code (UBC), or the Standard Building Code (SBC). The International Building Code 2000 (IBC) now replaces the first three codes. Other important model codes include the National Electric Code (NEC) and Life Safety Code by the NFPA under ANSI. These codes provide for public safety by establishing minimum construction standards for structural integrity and fire safety. Let us go through the building systems around the world and mainly concentrating on Western countries and Singapore. During the last 50 years the professional discipline of project management has become well established in the Western part of world. Until recently Singapore has been

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absolutely isolated from the influence of Western management routines , and there has in Singapore been no comparable parallel development of the profession of project management. However, since the Singapore economic conversion of the 1980s, Western project managements become increasingly recognized in Singapore as a management approach with potentially broad application. In the recent history of the Singapore construction sector, which had a legacy of poor performance, significant progress has been made towards the adoption of a marketing approach, including the introduction of Western management concepts and processes. Singapore concerns for relationships, group affinity and face limit the acceptance in Singapore of established aspects of Western human resource management practice.

Theoretical background

. Singapore and Western culture

Culture, consisting crucial of people's collective deep-held values and acceptance, is a critical factor in shaping people's conceptions of the world . There have been many studies targeting at understanding national cultures and identifying the influences of people different values and beliefs on their life and work. We explore below some apparent areas of difference between Singapore and Western cultures based on three dominant models, namely those of Hofstede , Trompenaars and Schwartz . For the sake of comparison the UK and USA are taken to represent the West in the discussion, because, first, the project management profession has been mainly developed in the UK and USA, and second, the UK and USA are in the same cultural cluster – Anglo – and have been classified as typical developed Western nations .

1. Hofstede's model

Hofstede first identified four dimensions of culture, labeled power distance (PD), femininity vs masculinity, collectivism vs individualism and uncertainty avoidance . These four dimensions were initially detected through a comparison of the values of matched samples working in 53 national subsidiaries of the IBM Corporation. A fifth dimension, long-term vs. short-term orientation was added based on a study of students in 23 countries using a questionnaire prepared by the Singapore Value Survey in Hong Kong . The data suggest that Singapore is somewhat different from the UK and the USA on range , and more distinctly different on dimensions LT, PD and LT.

2. Trompenaars' model

Trompenaars_ study involved 30 companies in 50 different countries. Seven dimensions of culture were identified. Five come under the broad heading of relationships with people, which includes . particularism vs universalism, communism vs individualism , emotional vs partial, particular vs. diffuse, and goal vs. ascription. The sixth dimension concerns attitudes to time and the seventh attitudes to the environment. Trompenaars_seven dimensions have been described as conceptually related_ to some of Hofstede_s dimensions and as such _can be interpreted as supportive of Hofstede s model..

3. Schwartz's model

Drawing on findings from his individual-level study of the content and structure of values Schwartz proposed a continuum of cultural values representing the relationship between personality and cultural factors. His model was based partly upon Hofstedes and Kluckhohn and Strodtbeck_s <https://assignbuster.com/history-of-building-diagnosis-construction-essay/>

work and was tested using data collected between 1988 and 1992 from respondents in 38 nations.. Because it arranges value types and broad dimensions into a continuum, Schwartz's model is concerned as a refinement of Hofstede's thesis. According to the works, the two broad educational archetypes of societies with different assumptions about life and work can be categorized as contractual cultures and relationship cultures. The former, like the USA, adopt autonomous values along with value tensions between mastery and egalitarian commitment/harmony. The latter, like Singapore, mainly adopt conservative values and accommodate value tensions between hierarchy and harmony.

Relationships

Important dimensional differences between Singapore and Western cultures [6-8, 11-13]

Singapore culture	Western culture (UK & USA)
Collectivism	Individualism
Large power distance	Small power distance
Strong uncertainty avoidance	Weak uncertainty avoidance
Long-term orientation	Short-term orientation
Outer-directed	Inner-directed
Relationship	Contractual
Conservatism, tension between hierarchy and harmony	Autonomy, tension between mastery and egalitarian commitment/harmony

Singapore vs. UK conceptions of construction project management

Singapore conceptions	UK conceptions
Relationship with Company	Team
Client	Subcontractors
Conflict resolution	Organizational structure preference
Attitude to uncertainty	Employee of the company
Working for own career achievements and the company's benefits	Family-like, mutual-care
Existing long-term team	'We', 'own' people
'Boss' of the project	Make the client happy
Working and personal relations	

Brothers/sisters of the family Long-term cooperation Negotiation first and last No claims Need good relationships Disliking Western-style matrix structures Preferring to use own stable, existing team Too many uncertainties and responsibilities Enjoying final achievement, but feeling pres-sured throughout Manager of the project Working for own career achievements and job satisfaction Friend-like, respect and trust New team, new people _You' and _I' work for this project Provider of project funds Keep the client informed Working relations A member of the team Cooperation for this project Negotiation first Claims when necessary Need good contract Accepting and being used to the matrix structures Liking to know new people through new project Enjoying experiencing new things Enjoying both final achievement and day-to-day challenge The individualism–collectivism dimension provides _structure for the rather fuzzy construct of culture_ and has been the focus of a great deal of research interest in cross cultural issues . The primary characteristics of ID include: (1) relationship between personal and collective interests and goals; (2) emotional dependence on the collective; (3) group solidarity, sharing, duties and obligations; (4) identity based in the social group; and (5) feelings of involvement in one another_s lives . Because their self-identity derives from and is enhanced by their group membership , their concern for the consequences of their actions for the company arguably leads to greater emotional dependence on the company. Whereas in the individualist West individual and collective interests and goals are acclaimed, priority is usually given to self-interests over those of the collective.. Project managers will pay greater attention than Western project managers to building and maintaining personal relationships within the project team, compared to the task. Project

managers will primarily associate their work identity with the company.

Western project managers will primarily associate their world identity with the self. Project managers will tend to conceive the client as superior and will value a long-term relationship with the client. Western project managers will tend to conceive the client as an equal contract .

Conflict resolution

In contrast to the West, Singapore's collectivism, harmony, outer-directed and relationship culture may have implications for project managers_ ways of experiencing and resolving conflicts [23, 24]. Consistent with the differences in conceptions of relationships identified above, Singapore project managers are likely to pay greater attention to group harmony, maintaining _face_, and relationships with all involved when resolving conflicts. They would try to avoid direct debate or confrontation and always try to get through conflicts quietly. Singapore project managers will pay greater attention than Western project managers to group harmony and lasting relationships when resolving conflicts.

Organizational structure

PD indicates the extent to which people accept the unequal distribution of power. UA refers to people_s discomfort with uncertain or unorganized, situations, and preference for analogy and stability. The two together may affect people_s preference for form of organizational structure. In Singapore culture larger PD and stronger UA are associated with greater centralization and formalization. Organizations are usually taller, more hierarchical pyramid structures. In contrast, Western organizational structures are usually flatter with a less distinctive hierarchy. Singapore project managers will tend to be

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more reluctant than Western project managers to use a matrix project organizational structure.

Methods

. Sample selection - The samples of project managers for this study were selected from construction firms in Singapore and the UK. In order to highlight the cultural influences on project managers' conceptions the Singapore and UK samples were matched as far as possible in terms of their work experience and the type and size of their current project. The samples for this in-depth, interpretive study consisted of 10 Singapore and 10 UK project managers, selected using a theoretical sampling process from 12 Singapore and 13 UK project managers interviewed. Data collection and analysis - The interpretive approach known as phenomenography guided the style of data collection and analysis in this study. Originally developed by an educational research group in Sweden in 1970s phenomenography is a research approach for mapping the qualitatively different ways in which people experience, gesture, behold, and understand different aspects of, and phenomena in, the world around them.

Findings

All the Singapore and UK project managers in our samples considered their fundamental task as being in charge of the management and delivery of a project within stipulated amount, on time, to a characterized scope. From their descriptions of their ways of experiencing and managing their work in order to fulfil the task, the similarities and differences of their conceptions of the work became evident. All the features of construction project

management work discussed in our propositions appeared as essential attributes of work for both sets of informants.

Relationship with company

Assigned by their company as the project manager for the current project, all Singapore and UK informants were managing the project on behalf of their company. However, their conceptions of their relationship with that company were markedly different. In contrast the UK informants saw themselves more as individuals. It appeared that their primary concern was which project to work on, with the choice of company secondary. All had changed companies minimum at once, most of the times.

Relationship with project team

All informants, Singapore and UK, placed a high value on teamwork as part of construction management, and all considered that a good relationship with their project team was important. However Singapore and UK informants differed significantly not only in the meaning they assigned to a good relationship with the project team but also in their approaches to building that relationship.

Relationship with client

Both Singapore and UK managers stated that a good relationship with the project_client was important, yet with different conceptions underlying their statements. The Singapore project managers conceived their client as _boss_ of the project. The client had the power to assign or not assign a contract, to appoint or dismiss a project manager and, consequently, his long-term team,

and to decide when and how much to pay for the work. It was therefore very important to make the client happy.

Conflict resolution

Singapore and UK project managers described different approaches to resolving conflicts with clients or subcontractors, and expressed different attitudes to the use of claims and penalties based on contracts, although they both valued negotiation.

Organizational structure preference

The matrix organization is a widely accepted structural form for UK project managers, yet Singapore project managers expressed their dislike of it. They preferred to use their own stable, existing team as if they were their own department members within the company, rather than organizing people from different departments as a temporary project team.

Attitude to uncertainty

Construction projects were conceived by both Singapore and UK informants as fraught with uncertainty. However, the Singapore and UK project managers had quite different attitudes to the resulting challenges. The Singapore project managers appeared to feel more pressured. Although they cherished the final sense of achievement, they complained of too much responsibility and suffering throughout the project.

Purpose.—The purpose of investigations by Teams is to improve the safety and structural integrity of buildings in the United States. Duties.—A Team shall—(a) Maintain the likely technical cause or causes of the building failure;(b) Calculating the technical aspects of evacuation and emergency response procedures(c) Recommend,

as necessary, particular advancements to codes, building standards and practices based on the findings made pursuant.

Procedure—

(1) Development.—Not later than 3 months after the date of the achievement of this Act, the Director, in conference with the Fire Administration and other appropriate Federal agencies, should improve procedures for the establishment and deployment of Teams. update such procedures are appropriate.

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(2) Publication.—The Director intend publish promptly in the Federal Register final methods, and subsequent updates there of, developed.

Construction strategies and methods.

Singapore Aim to be a caring and progressive organization that values its people, integrity, innovative spirits and service eminence. Ensure high safety standards and promote quality excellence in the built environment.

Champion barrier-free accessibility and sustainability of the built environment. Lead and transform the building and construction industry by:

- a. Enhancing skills and professionalism
- b. Improving design and construction capabilities
- c. Developing niche expertise
- d. Promoting export of construction related services.

Forge effective partnerships with the stakeholders and the community to achieve our vision. Building quality promotions. United States of America Caring and Progressive improvement in satisfying the public welfare through development in construction. Promise high level safety and standardized work. Provide appropriate infrastructure. Have a clear target

and take progressive steps. Identify how measurable benefits could be brought to the construction and post-occupancy management of assets.

Building safety enhancement. Regulations of building constructionGeneral interpretationsGeneral safety and health provisions. Environmental sustain and career health. Life preserving equipment and personal covering. Proper protection from fire. Barricades, signs and signals. Storage, use, disposal and material handling. Tools (Hand and Power)Welding and cutting. Electrical. Scaffolds. Regulations of building construction were seem to be considered to same in western countries and Singapore.

Building materials used in Singapore

Thermal savings, Thermoplastic Roofing, Tile Setting Materials, Tiles, Tilt-Up Precast Concrete, Toilets, Traffic Coatings, Traffic Doors, Transformers, Translucent Wall And Roof Assemblies, Treated Wood Foundations, Unit Kitchens, Unit Masonry Assemblies, Unit Masonry Cleaning, Unit Skylights, Unit Substations, Unitary Air Conditioning Equipment, Upvc Window & Door Fabrication, Urinals, Valves, Vapor Retarders.

Materials used in western countries

General Requirements

Site Construction

Concrete

Masonry

Metals

Wood

Plastics

Thermal Protection

Doors

Windows

Finishes

Specialties

Equipment

Furnishings

Special Construction

Conveying Systems

Mechanical

Electrical

Climatic conditions

Western countries.-The size of heating and cooling system is estimated using typical meteorology data. Pavement design and engineering are effected by temperature, precipitation, freezing and thawing. Storm water management

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systems, including retentions and detention ponds are sized using past precipitation data and current defination. Land scapes are designed with current precipitation patterns. Climatic difference, including changes in temperature and precipitations trends, may reduce the life. Singapore –Hot and Dry Conditions: It may be surprising to consider hot and dry weather as a problem. However, a lack of moisture can have dramatic effects on a construction project, especially on outside work stations. Cold Conditions: Concrete and Masonry: Cold weather can cause ice crystals to form and retain moisture. Cool temperatures can also slow the curing, which may affect concrete strength, promote spalling, and can ruin the finish. Wet conditions: Yes, wet weather is the opposite of dry weather and unlike dry weather, it can cause more problems, big delays, and increased costs. Wet weather is frequently the reason contactors use to request increased contract time or money. Culture in construction: The culture of building construction is considered to be similar. The Culture of Building describes how the built world, including the numerous number of buildings that are the settings for people's lives, is the product of building cultures complex order of people, building types, relationship, methods, and habits in which design and building are anchored. The product of these class, which functions building after building, is the buliting world of settlements and cities . In this book, Howard Davis uses contemporary, historical and cross-cultural examples to describe the nature and influence of certain cultures..

Diagnosis procedure of buildings.

Diagnosis system in Western countries
Architecture and Project management
& related consultants
Arson and fire investigation
Attorneys and expert

witness specializing in environmental law, construction law , and related fields. Air conditioning and cooling system Building codes also see Standards Chimneys, fireplaces, and woodstoves including heating with wood Construction Practices, Inspection, Diagnosis, Research. also see Steel Construction, Site Work, & individual trades Electrical inspection, codes, hazardous products, Al wire. Energy conservation and alternative energy also see Green Construction. Exteriors , Decks, EIFS, Siding, Stucco, Trim, Windows, Doors, roof drainage, gutters, leaders, landscaping Foundation and structure, structural inspections. also see Home Inspection Government agencies also see Emergency Green construction also see energy Conservation, Environment and Steel recycling Historic buildings identification, inspection, Sears Catalog Houses, Dating a House, Old House Materials & Repairs. Home owners and buyers Indoor Air Quality also see Environment and Mold Insulation and ventilation

Diagnosis system in Singapore

Order to be examined

Whole building Chillers Pumps Cooling tower Air handler Local micro-climate Miscellaneous (lights & plug) Sears Catalog Houses, Dating a House, Old House Materials & Repairs. Indoor Air Quality also see Environment Equipment: inspection and diagnosis for Building inspectors. Test equipment, infra red, therm graphy, moisture meters, electrical test equipment, etc Green construction also see energy Conservation, Environment and Steel recycling. Case study

Collapse of buildings

In his report, Adeoye (1998) noted that between December 1976 and January 1995, there were over 30 cases of collapse of buildings reported across the country, with well over 250 persons losing their lives and several others being severely injured. In addition, Amanda-Ayafa (2000) noted that between May 1987 and April 2000 over 22 cases of building failure were reported in Lagos State. Between January 2005 and August 2006, over eight cases of building collapse were recorded in the country. Hence, as a matter of responsibility, the Federal Government, Ministry of Works and Housing, State and Local Governments, including private individuals and professional bodies should be concerned.

Reinforced concrete structures

In the current construction industry in Nigeria, concrete has emerged as the most common building material. It is also worth noting that 100 per cent of the collapsed buildings in Nigeria were constructed from reinforced concrete. Hence, careful consideration must be given to factors that affect the strength of reinforced concrete. The constituent materials for concrete are: cement, fine aggregate, coarse aggregate and water. Concrete is a very variable material, having a wide range of strengths. Concrete basically increases its strength with age. The precise relationship will depend on the type of cement used (Mosley et al , 2007). It is important that the aggregates for making concrete should be free of all sorts of impurities (BS 882, 1992). The maximum percentage of silt / clay content of sand for which the compressive concrete strength will not be less than 21 N / mm² is 3.4 per cent for mixed ratio 1: 2: 4 (Olanitori and Olotuah, 2005). It is very

important to control the quality of the aggregate to be used in concrete making. Most importantly, the effect of the silt / clay content of sand on the compressive strength of concrete must be controlled. There are two basic methods by which the effect of silt / clay content of sand on the compressive strength of concrete can be controlled. These are by washing the sand free of silt / clay or by adding some extra percentage of cement to neutralize the effect of the silt / clay content (Olanitori, 2006).

MATERIALS AND METHODS

The materials used for this study are structural detailing, the PUNDIT 6 (Portable Ultrasonic Non-destructive Digital Indicating Tester), portable rotary drilling machine, 15 samples of 75 mm diameter cores of concrete, soil samples and a manually operated universal testing machine. The clients of the collapsed building were not willing to provide the architectural plans and structural detailing. Consequentially, as-built architectural plans and the structural detailing were produced from site inspection and by exposing the structural components such as slab, beams and columns. From the as-built structural detailing in conjunction with the as-built architectural plan, enabled reassessment of the structural integrity of the building was carried out. Results of the reassessment of structural elements for tension reinforcement are given in Table 1 , whereas the summary of the results of the reassessment of the structural elements for anchorage length is presented in Table 2 and the summary of the reassessment of the beam for shear reinforcement is presented inTable 3 . Fifteen samples of 75 mm diameter cylindrical cores of concrete were taken from slabs, beams and columns. Five samples each were taken from each structural element. The

cores were vertically and horizontally drilled with a portable rotary drilling equipment using water as the drilling fluid and diamond impregnated bit.

The retrieved cores. Table 1 : The results of the reassessment of the structural elements for area of tension reinforcement

Member checked for area of reinforcement Remark

Floor Slab (150 mm) Area of reinforcement provided ok Beam (250 mm × 400 mm) Area of reinforcement provided ok Column (250 mm × 250 mm) Area of reinforcement provided ok Redesign information : Use of building: Hotel.

Imposed load: 2.1 kN / m² (BS 63399-1). Table 2 : The summary of reassessment results of the structural elements for anchorage length

Serial no.	Member	Diameter	Provided anchorage	Required anchorage	Remark
1	Slab	12	75	144	Not ok
2	Beams	16	75	192	Not ok
3	Columns	16	75	192	Not ok

(mm) length(mm) length(mm)

Table 3 : The summary of the reassessment results of beam for shear reinforcement

Serial no. Spans Provided shear Required shear Remark

1	Span 1	Y10@300	Y10@250	Not ok
2	Span 2	Y10@300	Y10@250	Not ok
3	Span 3	Y10@300	Y10@250	Not ok

Non-destructive test was carried out on the building using the PUNDIT 6 instrument. The PUNDIT 6 can be operated on the AC mains; however, for field use, an internal nickel cadmium battery, when fully charged, will supply power for about 12 hours continuous use. The instrument is used to measure the time of pulse transmission through the material tested. The distance that the pulses travel in the material must also be measured to enable the velocity to be determined from

$$\text{Pulse velocity} = \frac{\text{Distance}}{\text{Time}}$$

path length/transit time The instrument indicates the time taken for the earliest part of the pulse to reach the receiving transducer measured from the time it leaves the transmitting transducer when these transducers are placed at suitable points on the surface of the material. For this to work, the transducers are arranged on the surface of the selected specimen, with the transmission being direct. Selected specimens could be any part of the structural components from the collapsed buildings, which seem not to have been adversely affected by the collapse. Table 4 : Results from UTM (universal testing machine) and the PUNDIT

Member's mm P UNDTIT (N / mm 2) Universal testing machine (N/ mm²)

Beam 10. 6 10. 2 10. 4 9. 7 10. 4 9. 5 Column 10. 4 10. 5 10. 7 7. 8 10. 7 10. 6 Slab 11. 8 9. 7 10. 3 10. 7 9. 4 8. 4

RESULTS AND DISCUSSION

The results of the structural reassessment of the collapsed building are presented in Tables 1 – 3 . Table 1 shows that the design of the structural elements for tension reinforcements (for slab and beam) and compression reinforcements (for column) is adequate and could not have been the cause of the collapse. However, Table 2 shows that the anchorage length provided for tension reinforcements is not adequate. An anchorage length of 75 mm was provided for slab reinforcement, whereas the required anchorage length is 144 mm. An anchorage length of 75 mm was also provided for beam and column instead of 192 mm. Table 3 indicated that the stirrup spacing provided is inadequate. Spacing was provided at 300 mm instead of 250 mm. From Table 4 , the cube strength ranges between 8. 5 and 11. 5 N / mm

2 for the PUNDIT 6, whereas for the universal testing machine the result of the cube strength ranges between 7.9 and 10.8 N / mm². The characteristic strength of the concrete from the PUNDIT 6 is 8.8 N / mm², whereas that of universal testing machine is 8.2 N / mm². The results of the sieve analysis and field settlement test. The percentage content of silt / clay in the sand used for the construction of the collapsed building is 10.24 and 10.78 per cent for sieve analysis and field settlement test, respectively. The average value of the percentage content of silt / clay from the two tests is 10.5 per cent. The variation of strength against percentage content of silt / clay. Reference's Adeoye, O. (1998) Analysis of the causes of and effects of foundation failure in building. Post Graduate Diploma Thesis, Federal University of Technology, Akure, Nigeria. Amanda-Ayafa, A. (2000) Failures in building (a case study of Lagos Metropolis). Post Graduate Diploma Thesis, Federal University of Technology, Akure, Nigeria. Brown, M. D., Bayrak, O. and Jirsa, J. O. (2006) Design for shear based on loading conditions. ACI Structural Journal 103 (4) : 541 – 550. BS 1881. (1983) Testing Concrete – Part 120: Method for Determination of the Compressive Strength of Concrete Cores. London: British Standards Institution. Olanitori, L. M. and Olotuah, A. O. (2005) The effect of clayey impurities in sand on the crushing strength of concrete (a case study of sand in Akure metropolis, Ondo State Nigeria). In: C. T. Tam, K. C. G. Ong and T. H. Tan (eds.) Proceedings of the 30th Conference on Our World in Concrete & Structures, 23 – 24 August, Singapore. Peurifoy, Robert L., Clifford J, Schexnayder and Aviad shapira, Construction Planning, Methods and Equipment, 8th edition, New York, McGraw-Hill, 2006.

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Building failure - A guide to diagnosis, remedy and prevention, Addleson
Lyll -Chapter 3.