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FAILURE IN COMMERCIAL BUILDING AND MANAGEMENT - CASE STUDY

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Abstract:- *Building designers' decisions affect long term quality and life cycle cost of buildings. Designers' decisions are usually latent in nature and hard to detect at the early stage of construction. This research looks at failure mechanisms that caused design-related latent defects and the design parameters that could prevent these defects. A 9-month building survey on 74 buildings found that the three most important design-related failure causes were weather impact, impacts from occupants, and loads and moisture from the wet areas. Insufficient considerations for these failures causes were found to be the key in preventing these defects. The design strategies that could successfully prevent triggering these defects include aligning material performance against adverse weather conditions, preventing impacts from occupants and loads, preventing water leakage, improving specifications and improving design clarity, details, and layout. There are huge amount of standards and codes available internationally, however, each is designed specifically to overcome regional problems.*

Key Words: Failures, Building, Construction Project *etc…*

1. LITERATURE REVIEW

The objective of this research is to identify the most important design strategies and failure causes that could help prevent latent defects from poor design decision. Latent defects from the most reliable sources were first collected and evaluated. Defects that were caused by design were then grouped together for further analysis.

Since most building defects become visible 2 years after occupancy and prevailing Singapore law requires buildings to be repainted once every 5–6 years and defects were usually rectified during repainting, defects data were collected from buildings be- tween 2 and 6 years old. Defects were only collected from com- monly constructed buildings in Singapore to ensure that the data are representative of the defects commonly found in the country.

(Wai-Kiong Chong, M.ASCE[1]; and Sui-Pheng Low[2], ''LATENT DEFECT IN BUILDING''.) survey on 11 major groups of defects through literature and interviews showed that defects were generated from civil design, architectural design, design issues on maintenance practicality and adequacy, defects due to consultant firm admin- istration and staff, defects due to construction drawings, defects due to contractor administration, defects due to construction ma- terials, defects due to construction equipment, and defects due to specifications[1].

(*A Study of Contribution Factors to Building Failures and Defects in Construction Industry N. Ahzahar*, N.A. Karim, S.H. Hassan, J. Eman.)* Determining responsibilities through legal concept can be a hassle since no contractual document is readily available at the time when defects occurred. However, it is rather clear that defective specifications are usually associated with the designers. had shown that design is the most important driver of latent defects in building as the condition survey showed that design could have prevented at least 66% of all latent defects found during the early stage of occupancy].He found that managerial errors accounted for more than 82% of all errors committed and that managerial errors have hidden or latent characteristics, suggesting that these errors are not visible at the construction stage and both clients and designers might have huge impact on such defects[2].

(Institute of earthquake Engineering, China Academy of Building Research, Beijing 30 Bei San Huan Dong Road, Beijing 100013, P.R. Chinat). analysis showed that the distress on the spalling brickwall that caused vapor infiltration was due to defi- ciencies in workmanship, material, and design. An adjustment to the interior environment, i.e., the ventilation system, was recom- mended to control humidity and air flow which in turn reduce the effect on vapor infiltration[3].

The garden roof alternative design proposal in (*Understanding Common Building Defects, Solutions & Maintenance Management- [Excerpts from the website www.bd. gov. hk/english/documents/ code/bmg].)*can help reduce the amount of roof defects by reducing the possibility of roof leakage and increase the life of the roof, high- lighting designers' ability to contribute to defect reductions with their designs. It also suggested that designers' ability to design against the environment would help eliminate many latent defects.He found that poorly worded specifications and un- clear designs often lead to lower construction quality[4].

(Investigating the Causes for Failures in Construction by Taking a Case Study - Yogen Sadashiv Masurkar1, Abdulrashid Chand Attar 2) exhibited the chain effects of building defects, highlighting the importance of process con- trol, management, knowledge, and the integration of existing knowledge to stop the chain reactions that would result in build- ing defects[5].

1.1 CONCEPT

Broad Classification of Causes of Failure- The broad classification of causes for failure can be done in two type's i.e. controllable and uncontrollable causes. Controllable causes are the causes which can be controlled by taking proper preventive measures and through inspection during the construction of the structure. Uncontrollable causes are those which are out of control of human beings. The best example is failure caused due to earthquake, tsunamis, etc which are termed as unpredictable causes of failure.

2. INTRODUCTION

Paragraph comes content here. Paragraph comes content When planning a new building or renovation of the existing buildings, the best possibilities to effect on the costs, performance and conditions of the building is the pre-design and design phase. If the requirements for the building are properly set and also the possible evident risks have been evaluated, the implementation of the conditions and their matching to needs and requirements can be checked following a commissioning procedure (or, in general, mutually accepted quality control procedure) [1] . The main reasons, why the building does not fulfil the prerequisites can be divided roughly into three parts: 1) faults in pre-design and design stage, 2) defects in implementation stages and 3) malfunctions in TAB (testing-adjusting-balancing) and in use stage. The energy performance, energy efficiency and indoor conditions, as thermal comfort and indoor air quality, depend on the proper integration of build ing envelope, functioning of the ventilation system, heating systems, cooling systems, BAS (building automation system) and internal and external loads (weather conditions, use, etc). The crucial matter is how the operations of these factors are integrated together, and how these factors will cohere. In the pre-design phase, the building owner should set his requirements and demands as well as possible matching the needs. The problem has been earlier, that these requirements have not been properly set. In some cases, for instance, when planning a shopping mall or commercial building, the owner probably does not know the final users, or not all of them. The needs of individual end users may vary, which would cause e.g. the use of distributed ventilation system.

Controllable Causes of construction failures are as follows.

- Error in Design
- Improper Detailing and drafting
- Improper selection of Materials
- Poor Workmanship
- Lack of proper Inspection
- Formwork failure
- Geotechnical failure
- Technical failure
- Failure Due To Errors
- Maintenance failure

3. CONCLUSIONS

This research shows that it is possible to design a simple and flexible decision framework that designers can rely on for design evaluation and to eliminate latent defects from their designs. There are too many defects and designers are unable to eliminate all of them effectively. Many designers are not aware of standards and codes, like the American Standard for Testing of Materials (ASTM), British Standard (BS), and Singapore Standards (SS). Many defects continue to be repeated in every building as design- ers failed to obtain important feedback from property managers on these defects. This research confirmed designers can improve overall building quality by consolidating efforts on a few major defects and gathering existing knowledge from the property man- agers. Designers are also encouraged to adopt and refer to existing regional standards since there are many solutions in these standards and codes.

Cost and other design issues should be just as important as eliminating latent defects. Designers should also be encouraged to explore new knowledge and technologies. Other than referring to existing standards, designers should be encouraged to explore new ideas and they should rely on existing knowledge of the property managers to identify problematic areas of their designs that current standards and codes fail to provide for. Developing a database and decision framework can also help simplify the pro-cess of identifying defective designs.

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