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BUILDING FAILERS ON HIGHRISE BUILDINGS IN THE CENTRAL BUSINESS DISTRICT OF HARARE

Prof. Dries Hauptfleisch and Tawanda Goronga*



SUMMARY

The purpose of the research was to identify the main causes of building defects and possible solutions to avoid or minimize building failures. The focus is on highrise buildings in the Central Business District of Harare (CBDH). The situation and findings regarding the CBDH can be generalized for the rest of the towns and cities in the country and most likely other developing countries in the region.

1. Introduction

Building failure is the deterioration of buildings permanently or temporarily as a result of some malfunction or old age. It is the failure resulting from malfunction rather than old age that is dealt with in this article. It may therefore be described as *premature failure*. Building failures are becoming a common phenomenon in Zimbabwe, like in other developing countries. New buildings continue to be built and it is questionable if the buildings will have an economic life span of more than twenty to thirty years. Millions of dollars are being lost as a result of premature failure. Building failures has cost Zimbabwe at least Z\$150 million over the last two decades. In the current crisis of expectation and the reshaping of the country's destiny, like other developing countries in the region, there is no room for inefficiency and waste of resources. Premature failure is avoidable if adequate measures are put in place.

The broad pattern of the research was to identify the major causes of building failures, do a defects diagnosis and give light on how the defects can be avoided. In order to give direction, building failures on highrise buildings in the CBDH are proffered to act as a yardstick against which failures can be evaluated. This information could be useful to other developing countries in the region. Therefore the aim is to give hope to developers (including governments) who are spending large sums of money in maintenance costs. The benefit of the research could be awakening the role players in procurement processes, which are currently marred by avoidable failures.

2. Brief review of existing literature on building failures world wide

There is hardly a building structure in existence in which there are not building failures that could have been avoided by better engineering and careful construction. More often than not, designers, contractors, suppliers, developers and users will each blame someone else. According to Feld (1968, p.3), one of the worst indictments of the building profession is in the statement: "Doctors bury their mistakes, architects cover them by ivy, engineers write long reports which never see the light of the day..... and contractors call their lawyers and notify their insurance carriers". It is unfortunate that the stakeholders in the building process do not want to shoulder the blame for the

failures, which continue to rise year after year. The questions, which are asked by many authors, are:

- Why do design problems continue to rise?
- Why do material problems continue to rise?
- Why do workmanship problems continue to exist unsolved?

In view of the fact that the impact of the failures is increasingly becoming severe, especially on fragile economies of developing countries, solutions should be found as a matter of urgency.

3. Causes of building failures

The major causes of building failures as identified by Seeley (1987, p.16) are:

- Design problems.
- Labour deficiency.
- Defective materials.

The major causes identified in the CBDH are the following, reported on under the sub-headings below:

- Inadequacy of design.
- Errors in construction.
- Faulty materials.

Therefore the major causes as identified in existing literature in the developed world are applicable to the CBDH and probably also a reality in other developing countries. All stakeholders can not afford to continue to skirt around the problems and continue to waste resources.

3.1 Inadequacy of design

Design entails the total design process, which includes the component detailing, specification of materials and workmanship or alternatively, performance. It is usually not conceptual design which is at fault but the detailing (Crocker, 1990, p. 6). Some of the design problems in existing literature are:

- Changing the design without the knowledge of the engineer.
- Poor drafting and insufficient checking of drawings.
- Lack of thorough scrutinizing for errors.
- Design oversight.
- Lack of provision for supervision and inspection.

The corresponding design problems existing in the CBDH are:

- Lack of co-ordination by the principal agent.
- Rushing of schemes by architects, engineers and clients without sufficient interfacing.
- Inadequate briefing by architects and engineers with clients.
- Lack of inspection by architects and engineers.
- No indication that total quality management is practiced.
- Inadequate information and/or knowledge about materials.
- Lack of enough detailing.

The research conducted in the CBDH revealed that design problems account for 55% of the building failure problems. Therefore design problems are the major generators of building failures.

3.2 Errors in construction

Faulty workmanship can be sometimes of a nature that should be seen, in part by inspection of the work in progress. According to Crocker (1990, p.7) there may be deficiencies in the labour of both the main contractor and the subcontractors as a result of lack of skill, lack of care and interest, or a lack of knowledge of the special care required in the execution of some vital piece of work. It was observed through the research conducted in the CBDH that some of the problems related to errors in construction are blamed on the design team, the contractor and the supplier. The main problems identified in the CBDH are:

- Lack of supervision (quality management).
- Lack of inspection.
- Use of inappropriate technology.
- Misapplication of material and technology.
- Lack of knowledge.

Most built environment professionals such as engineers, architects and quantity surveyors, complained that the majority of contractors do not supervise their work adequately. On the other hand contractors and clients think that the design team do not carryout adequate inspections to check on misinterpretation of the design. Some suppliers indicated that contractors do not follow the instructions on their products and the design team tends to instruct contractors to use inappropriate technology. Problems related to errors in construction in the CBDH account for 30% of the causes of building failures. Therefore labour deficiency on sites is the second largest contributor of building failures.

3.3 Faulty materials

Materials are the fundamental components of buildings. They determine the structure, the overall form and quality of the building. Dean (1996, p.3), stresses that the choice of building material is critical at the earliest stage. The most successful buildings are always constructed with an attitude to materials that uses knowledge to understand the full possibilities and appropriateness of choice. It is common practice that the transfer of technology is not measured carefully against the real needs of the local region, translating to the wrong choice of materials.

It was observed in the CBDH that both suppliers and the design team should shoulder some of the problems arising from faulty materials. The main problems identified are:

- Neo-productivism (new technology used out of context)
- Transfer of technology from industrialized countries without proper assimilation structures in place.
- Inadequate testing.
- Misapplication of products.

Some highly engineered buildings have details and components that signify mass production methods, which are illusory. Most display individual craftsmanship. Harare, like many other developing countries in the region, is on the receiving end as a result of "neo-productivism". "Neo-productivism" refers to individual craftsmanship not relevant to the local needs. This practice leads to the designing of buildings to satisfy individual objectives with little respect for the long-term life of the building. It is of great concern that:

- Some suppliers advertise and sell products, which are not tested or certified.

- Assuming responsibility for shortcomings in the performance of materials, or compiling priorities for investigation such as economic viability to ensure buildings last longer, is lacking.

The research conducted in the CBDH show that material problems account for 15% of the building failure problems. Although failures in materials in the true sense are comparatively rare, the possible failings should not be played down.

4. Implications of building failures

4.1 Cost effect of building failures

Building maintenance costs are increasingly becoming severe. In the UK about 20% of 9,000 million pounds spend on maintenance per annum is as a result of unnecessary failure rather than reasonable and legitimate maintenance. About 1,000 million pounds is spent annually on correcting defects, which are the direct consequence of premature failure (Crocker, 1990, p.1). It is perhaps clear from the quoted experience elsewhere that building failures have far-reaching financial consequences. About 90% of the buildings researched on in the CBDH have building failures. The estimated annual costs of maintenance are too high relative to the size and value of the property. Most prominent developers with large property portfolios are incurring about Z\$1 million annually on maintenance costs.

4.2 Reduced production

The construction industry differs in many ways from other forms of economic activities. Severe disturbances of users/tenants resulting from premature failure have far-reaching effects on the construction industry. Some property developers in Harare are hiring external experts. Some are becoming reluctant to embark on construction products. All this has had the effect of reduced production in this sector of the economy.

4.3 Credibility of the design team

Building failures have tarnished the image of the design team in Harare. Some clients are hiring foreign experts to twin up with local experts on their projects. It is important for the design team to seriously consider the problems identified above and put in place corrective measures.

4.4 Reputation of contractors and suppliers

Contractors and suppliers have not been spared either. Contractors have been called back to attend to building failures. Notable problems on most buildings are poor workmanship. Examples are the cracking of walls, penetration of moisture into buildings, and raising of floor finishes such as wood blocks and ceramic tiles. Most of the problems noted in the CBDH could have been prevented by better supervision (total quality management). Therefore, the image of most contractors in Harare and their suppliers is not favourable. Some designers are recommending foreign companies and foreign products on projects.

5. Quality improvement approaches for the stakeholders

There are a number of approaches, which can be used by the stakeholders to enhance the quality of buildings in Harare and other cities and towns. These are namely:

- Project management.
- Partnering.
- Value management.
- Integrated design.
- Increased co-ordination.
- Emphasizing the importance of details.
- Importance of briefing.
- Not rushing schemes off the drawing board and on to the site.
- Knowing the behavior of materials.
- Building failures should be foreseen at design stage.
- Drawings should be produced with full awareness of how the work is to be executed for sustainability.
- Joint ventures.
- Improved supervision.
- Use of qualified tradesmen.
- Proper use of materials.
- Identification of design errors before implementation.
- Transfer of technology should be measured against the local needs.
- Neo-productivism is not recommended.
- Testing of materials.

All the stakeholders in Harare agreed that building failure problems are avoidable if the general laxity and tardiness in the communication process amongst the building team are improved.

6. Highly recommended new quality improvement approaches

6.1 Project management

Project management is defined in PM BOK (1996, p.6) as ".....the planning, organizing, monitoring and control of all aspects of a project and motivation of all involved to achieve the project objectives safely and within agreed time, cost and performance criteria". Therefore, project management aims to balance the project constraints, that is time, cost and quality. A project manager looks after the interests of the stakeholders. All activities are well co-ordinated. The design team and clients in Harare are slowly accepting this new approach. Less than 5% of the companies interviewed are at this stage practicing professional project management. The traditional fragmented serial procurement process is still by far the most prominent.

6.2 Partnering

Partnering is a management approach used by two or more organizations to achieve specific business objectives by maximizing the effectiveness of each participant's resources (Bennett and Jayes, 1995, p.2). Partnering aims to avoid conflicts and fosters project improvement. It aims for zero defects. The concept is new in Harare. This approach must also be encouraged in other developing countries in the region as it encourages openness, settles disputes, encourages togetherness and fosters co-operation amongst the people in partnership. The very essence of partnering is non-adversarial and fosters co-operation between independent organizations.

6.3 Value management

Value management is an organized approach, which aims to identify and eliminate unnecessary costs but still to provide the required functions and necessary quality. Clients are encouraged to use this approach. This is a new concept in Harare and other developing countries and has not yet received the support it deserves.

6.4 Joint ventures

Many companies in Harare are now working together in joint ventures. Most of the buildings, which were built by joint ventures, have had only minor defects. Therefore, this is an important approach too to be pursued. It encourages the sharing of ideas and resources to achieve the best quality.

7. Major players in implementing building quality control measures

The following stakeholders are critical in the implementation of quality control measures and consequently the avoidance of premature maintenance:

- The design team.
- Main contractors and subcontractors.
- Property developers.
- Suppliers.
- Users.
- Standards Associations.
- Statistics offices.
- Training institutions.

Any serious study of the construction industry in Zimbabwe is hampered by lack of detailed statistics. The little information which is available, is outdated. Statistics have an important role to play in the prevention of building failures. Studies on building failures will be much more meaningful when related to reliable information. The construction industry should co-operate and provide the Central Statistics Office with the necessary information required.

Training institutions should also equip tradesmen and other experts with relevant skills to control building failures. It was revealed in Harare that "in-house" training is crucial and must be promoted as it provides relevant practical experience.

The Standards Association of Zimbabwe (SAZ) should seek to ensure that quality is achieved on building projects. There is need for SAZ to be more involved in the building process. The priorities for SAZ are identified below:

- Intensify testing.
- Carryout spot-checks on applications.
- Enforce punishment of those contravening standards.
- Be consulted at design stage.

It is encouraging that SAZ has published International Standard ISO/DIS 9004 which stakeholders can use. The document provides guidelines for quality improvement.

8. Other recommendations

"Experience outside Zimbabwe has shown that an effective means to influence the industry is to form an independent, respected building research institute. The institute should be established to provide scientific support through information, advice and

research on the entire construction process. The institute could be established along the lines of BOUTEK in the Republic of South Africa, one of the "institutes" of the Council for Scientific and Industrial Research (CSIR). It should play a leading role in advising both the government and the private sector on matters relating to the science, technology, management and economics of the construction industry. The recent legislation in South Africa of the Construction Industry Development Board (CIDB), similar to Singapore, could also be of considerable value in a Zimbabwean version" (Goronga, 2001, p.91)

9. SUMMARY

The foregoing broad-based identification, diagnosis and prescribed measures to prevent building failures in the CBDH can be summarized as follows:

- The principal problem of building failures is often compounded by the lack of appreciation on the part of the building team, that problems can be solved by new approaches.
- Research conducted in the CBDH suggests that the major causes of building failures are design faults, errors in construction and faulty materials.
- The creation of a construction industry that delivers quality, defect free buildings in Zimbabwe like in other developing countries worldwide, rests with the stakeholders themselves.
- The basic phenomena of building failures in Harare are becoming increasingly understood.
- The application of new approaches to a traditional industry raises problems. Therefore, one of the first tasks is to make clear the scientific basis underlying the methods and study them within the context of the local industry.

In conclusion, the following remarks appear particularly apt:

- "The article has revealed the enemies and it is the stakeholders themselves"
- "One step is better than none, it is better to be hopeful and start implementing the prescribed preventive measures, as it is better to be hopeful and arrive"
- "Stakeholders must alleviate the bad and exploit the good and thus save millions of dollars being ploughed into avoidable maintenance".

REFERENCES

1. Beckett, R.S. 1980. *Research needs of the building industry in Zimbabwe*. Harare. University of Zimbabwe.
2. Bennett, J. and Jayes, S. 1995. *Trusting the team*. Centre for Strategic Studies in Construction, The University of Reading, UK.
3. Crocker, A. 1990. *Building Failures: Recovering the cost*. Oxford, London, Edinburgh, Boston, Melbourne. BSP Professional Books.
4. Dean, Y. 1996. *Mitchell's Building Series Materials Technology*. Edinburgh, Singapore. Longman.
5. Feld, J. 1968. *Construction failure*. New York, London, Sydney, Toronto. John Wiley and Sons.
6. Goronga, T. 2001. *Building failures on highrise buildings in the Central Business District of Harare*. Pretoria. University of Pretoria.
7. Hauptfleisch, A.C. 2000. *Project Partnering, Alliancing and Joint Ventures*. Unpublished. Module. Pretoria. University of Pretoria.

8. PMI Standards Committee, 1996. *A Guide to the Project Management Body of Knowledge*. Project Management Institute, 130 South State Road, Upper Darby, PA 19082, USA.
9. Seeley, I.H. 1987. *Building Maintenance*. Second edition. Hong Kong. Macmillan.
10. Zimbabwe: Standards Association of Zimbabwe. 2000. International ISO/DIS 9004. Harare.

*Tawanda Goronga and Prof Dries Hauptfleisch, Department of Construction Economics
University of Pretoria

Tel: (012) 420-2576 Fax: (012) 420-3598

Postal Address: Department of Construction Economics
University of Pretoria
Hillcrest
Pretoria
0002

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