International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

The Assessment of the Conversion of the Indomaret Building on Bondowoso Street, Malang City with Building Reliability

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Abstract*—Building conversion involves repurposing old buildings to align with current environmental needs and development standards. Given the complete transformation from the original building typology, a resolution of the building reliability. Building reliability denotes the ability of a building to fulfil its functions effectively and sustainably. However, many buildings are found in unreliable conditions. Thus, the objective of this research is to evaluate the performance of achieving reliable building conversion. The methodology involves field inspection and data collection using qualitative methods and visual observation to assess the physical condition of the building. Several aspects are considered in this assessment, including architectural, structural, utility, accessibility, building planning, and environmental aspects. These aspects serve as parameters to determine the suitability of the building. In the assessment section, the building is categorised as reliable if it scores over 95%, indicating its suitability for operation in compliance with regulations and plans.*

***Keywords*—** *Building conversion, building reliability, architectural aspect, structural aspect, utility aspect, accessibility aspect, building planning aspect, environmental aspect*.

I. INTRODUCTION

Malang City, the second-largest in East Java, witnesses a surge in population alongside urban transformations. This growth necessitates more land for various purposes, notably commercial buildings, to cater to the burgeoning populace [1]. However, land scarcity fuels population density, urban sprawl, and environmental degradation [2]. Conversely, the rapid urban development and evolving lifestyles have left several buildings outdated and neglected, posing a significant challenge to the city's aesthetics and habitability [3].

Addressing this challenge involves revitalising through adaptive reuse, a process known as building conversion. This strategy breathes new life into old structures by repurposing them to meet current city demands, fostering sustainability. Conversion offers a more economically feasible solution compared to demolition and new construction [4]. Successful conversion, such as transforming residences into commercial buildings, is facilitated by clear regulations at the national level, which are further detailed in regional technical requirements [4]. In accordance with Government Regulation (PP) Number 16 of 2021, which pertains to the Implementing Regulations of Law Number 28 of 2002 concerning Buildings, Article 11 paragraph 2 stipulates that if there is a change in the function or classification of a building, the owner is required to obtain permission for alterations to the Building Construction Permit (PBG) [5].

In practice, adhering to the regulations outlined in the law, successful building conversion requires thorough studies to assess the functional viability of the building and obtain the requisite permits. Effective managerial oversight is essential for ensuring that the building is managed in a manner that fosters reliability and sustainability. Consequently, the objective of this research is to evaluate the condition of a converted building in Malang City, specifically the Indomaret building on JL. Bondowoso, through a reliability assessment. The findings of this assessment will offer recommendations to property owners on developing businesses using converted buildings, employing reliable and sustainable building models.

II. LITERATURE REVIEW

Building Conversion

Building conversion refers to the process of repurposing an old building by changing and transferring its function [3]. This approach yields numerous benefits, including prolonging the lifespan of buildings, revitalising urban areas, conserving energy and materials, rejuvenating the surrounding environment, curbing land use and urban sprawl, safeguarding the environment, and identifying economically viable uses for old and abandoned buildings that remain intact [5]. Several considerations must be taken into account when implementing building conversion [3][5]:

1. The characteristics of a building encompass various aspects, such as its physical structure, aesthetic appeal, technological features, and functional utility.
2. Opportunities for building conversion can arise in potential locations with suitable attributes and conditions.
3. The legal aspect involves policies set by local governments that can either encourage or discourage adherence to regulations in building conversion efforts. This research

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focuses on aspects of building reliability regulations, which are governed by law.

Building Reliability

The reliability assessment of a building must adhere to both administrative and technical prerequisites in building operations. Technical requirements encompass aspects like building layout specifications and building design standards. Evaluating whether a building satisfies these requirements necessitates a resolution assessment. Building reliability refers to a building's capability to fulfil its intended functions as per its design. However, real-world scenarios sometimes present buildings in unreliable conditions. Hence, a building resolution assessment becomes imperative to determine the building's resolution value, thereby establishing its functionality status. Several technical guidelines govern building inspection procedures, including Undang – Undang Nomor 28 Tahun 2002 tentang Gedung [6], Departemen PU 1998 [7], Peraturan Menteri PU No.29/PRT/M/2006 [8], Peraturan Menteri PU No.45/PRT/M/2007 [9], Peraturan Menteri PU No.26/PRT/M/2008 [10], Permen PU No. 30/PRT/M/2006 [11] dan Peraturan Menteri Pekerjaan Umum No.24/PRT/M/2008 [12]. Research has been conducted on building assessment, encompassing five key aspects: architectural, structural, utility, accessibility, and building and environmental layout. The assessment will assign weights to these aspects based on their respective importance. Typically, visual observation serves as the primary method for assessment, with supplementary document studies for the utility aspect. Each aspect will be evaluated against existing classification criteria. As for the aspect (Priyo & Wijatmiko, 2011):

1. Architecture aspects

The examination of architectural aspects is focused on the finishing of buildings, both internally and externally. The architectural aspect of inspection focuses on evaluating the building's finishes, both internally and externally. This assessment encompasses examining the functionality of the building concerning the adequacy of its layout and interior design, including the finishes of floors, walls, doors, windows, and ceilings. The exterior assessment entails evaluating the finishes of walls, floors, and fences.

2. Structural aspects

The requirements for the structural reliability of buildings are governed by Ministerial Regulation No. 29/PRT/M/2006 [8] concerning technical requirements for building structures. Determination regarding construction details, types, intensity, and load-bearing methods must be made for every building structure to be strong and stable in carrying loads or combinations of loads and to meet service requirements as per existing regulations throughout the planned service life. Additionally, considerations must be given to the building's function, location, durability, and the feasibility of its construction implementation.

3. Utility Aspects

Another aspect considered in assessing the reliability of buildings is the utility aspect. Building utilities are crucial to complement a building, especially multi-story ones. The completeness of utilities in a building ensures safety and comfort for its occupants or users. Building utilities consist of various components, including fire prevention systems, vertical transportation systems, plumbing systems, electrical installation systems, air conditioning systems, lightning protection systems, and communication installation systems [14].

4.Accessibility Aspects

The evaluation is conducted on the accessibility element system present in building structures, following the regulations outlined in Ministerial Regulation No. 30/PRT/M/2006 [11] regarding the Technical Guidelines for Facilities and Accessibility in Building Structures and Environments. The assessment includes room dimensions, pedestrian pathways, parking areas, ramps, staircases, etc.

5. Building Planning and Environmental Aspects

The value of the building layout and environmental conditions is a specific value based on the conditions of each part of the building layout and the building environment. There are three items assessed in the aspect of building layout and the building environment in the examination of building reliability, namely the building base coefficient (KDB), the floor building coefficient (KLB), and the green base coefficient (KDH) [16].

III. METHODS

The inspection and data collection in the field are conducted qualitatively through visual observation of the building's physical condition. The reliability assessment process begins by establishing an assessment classification, followed by gathering project data such as the building's maintenance and repair history, conducting visual inspections in the field, and then assessing using the established classification. The assessment results indicate the reliability level category of the building being evaluated. The reliability level categories are divided into three: reliable, less reliable, and not reliable [15]. The research case study was conducted at the Indomaret building situated on Jl. Bondowoso, Malang City. Originally, this building served as a residence before undergoing conversion into a commercial establishment.

IV. DISCUSSIONS

Building performance assessment is conducted by assigning scores to a table with predetermined function weights, as outlined by Priyo, M., and Wijatmiko, I.H. (2011) [13]. The table typically includes various aspects of building performance, each assigned a specific weight according to its importance. The following is the assessment table for the Indomaret building:

1. Administration Aspect

TABLE I. Reliability Assessment of Administration Aspects.

No.	Component	Score
1	IMB	Yes
2	PBB	Yes
3	PBG	Yes
4	Ownership letter	Yes

(Source: author, 2024)

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2. Architectural Aspect

TABLE II. Reliability Assessment of Architectural Aspects.

No.	Component	Score
1	Suitable use of interior functions	15
2	Floor	12
3	Wall	15
4	Door and Window	10
5	Exterior Ceiling	10
6	Roof covering	4.5
7	Floor	12
8	Wall	10
9	Interior Ceiling	10
Total architectural reliability value		98.5

(Source: author, 2024)

3. Structure Aspect

TABLE III. Reliability Assessment of Structure Aspects.

No.	Component	Score
1	Structures	96%

(Source: author, 2024)

4. Utility Aspect

TABLE IV. Reliability Assessment of Utility Aspects.

No.	Component	Score
1	Fire prevention installation	70
2	Vertical transport installations	100
3	Plumbing installation	100
4	Electrical installation	100
5	Air conditioning installation	100
6	Lightning protection installation	50
7	Sound installation	100
Total utility reliability value		88.57%

(Source: author, 2024)

5. Accessibility Aspect

TABLE V. Reliability Assessment of Accessibility Aspects.

No.	Component	Score
1	Basic dimensions of space	15
2	Pedestrian paths and ramps	10
3	Parking area	15
4	Supplies and equipment	20
5	Toilet	20
6	Doors	20
Total accessibility reliability value		100

(Source: author, 2024)

6. Building and Environmental Planning Aspect

TABLE VI. Reliability Assessment of Building and Environmental Planning Aspects.

No.	Component	Score
1	Conformity with basic building coefficient (KDB)	100
2	Conformity with building floor coefficient (KLB)	100
3	Conformity with green basic coefficient (KDH)	50
Total Building and Environmental Planning reliability value		83.33%

(Source: author, 2024)

7. Accessibility Aspect

TABLE VII. Reliability Assessment of Accessibility Aspects.

No.	Rated aspect	Weighting of Assessment 100%	Reliability Level Value	Reliability Level value Total
1	Architecture	10	98.5	9.85
2	Structure	30	96	28.8
3	Utility	50	88.57	44.29
4	Accessibility	5	100	5
5	Building and Environmental Planning	5	83.33	4.16
Building Reliability Value				92.1

(Source: author, 2024)

8. Building Reliability Classification

TABLE VIII. Building Reliability Classification

	Reliability	Less Reliability	Not Reliability
Architecture	≥95%-100%	≥75%−95%	<75%
Structure	≥95%-100%	≥85%−95%	<85%
Utility	≥99%-100%	≥95%−99%	<95%
Accessibility	≥95%-100%	≥75%−95%	<75%
Building and Environmental Planning	≥95%-100%	≥75%−95%	<75%
Total	≥95%-100%	≥75%−95%	<75%

(Source: author, 2024)

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the building reliability assessment conducted on the Indomaret building situated on Jl. Bondowoso, Malang City, the following conclusions can be drawn:

1.The reliability assessment commences with establishing the assessment classification, followed by gathering building data and conducting visual inspections on-site. Subsequently, the collected data and inspection findings are utilised to generate an assessment dataset tailored to the building's reliability level.

2.Visual assessment entails observing the building's history of alterations and repairs, which can sometimes pose challenges due to incomplete data availability.

3.Based on the data and field inspections conducted for the Indomaret building situated on Jl. Bondowoso, Malang City, falls within the reliable building category (>95%) and is deemed suitable for operation.

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