

Survey and Design of Individual Housing Projects: Situation and Solutions for Ha Tinh Province, Vietnam

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Received: 10 July 2022 | Revised: 21 September 2022 and 3 October 2022 | Accepted: 14 October 2022

Abstract-Survey and design processes are considered essential stages and directly affect the quality and cost of construction works. This study aimed to investigate the existing limitations in the survey and design stages of individual housing projects in Ha Tinh province, Vietnam, and to propose specific solutions to improve them. These solutions can contribute to eliminating unexpected problems or errors during the construction process of individual housing projects in Vietnam.

Keywords-survey; design; individual housing; Ha Tinh province

I. INTRODUCTION

The quality management of the construction of individual houses has not attracted serious attention in Vietnam, as the regulations focus on key works and public investment projects [1-8]. For individual houses, although the state has issued regulations, the responsibility for the survey, design, supervision, and construction is on the investor [1, 4, 7]. As investors often hire a consultant or even skip the survey and design stage to save costs, without meeting the requirements, this leads to many problems and affects the safety of people and surrounding structures. Several studies investigated existing problems in construction management in various regions around the world and proposed methods or strategies to improve the management process [9-12]. Very few studies conducted in Vietnam investigated the effects of the limitations of the survey and design stages on individual housing projects. The theoretical basis of the survey and design of public investment projects was presented in [13]. Experience and lessons on housing management from some countries were

investigated in [14], proposing an application for Tien Giang province in Vietnam. Several studies related to housing theory, research, and policies have been conducted around the world [15, 16]. A survey on user satisfaction with the mass housing projects was presented in [17], led by a district municipality in Konya-Karatay, Turkey. In [18], an overview of the effects of housing conditions on human health was presented. A systematic study on the limitations of the survey and design process of individual housing projects in Vietnam has not yet been carried out.

Ha Tinh is a province located in the central region of Vietnam. With a population of more than 1.3 million people, the demand for housing construction is increasing, especially when the economy is growing. The construction of individual houses is very crucial to satisfy the needs of each individual and household. Therefore, it is necessary to study the current situation of the survey and design stages of individual housing projects in Ha Tinh to propose solutions to improve them.

II. CHALLENGES OF SURVEY AND DESIGN IN HA TINH

In recent years, the construction of individual houses in Ha Tinh has seen many changes, as the growing economy has increased the number of households that want to build individual houses. Individual housing projects appear more and more, not only in urban areas, but also in many rural areas throughout the province. Several investors pay attention to the survey and design stages before construction to create a project that meets the requirements of function, aesthetics, stability, and reasonable cost. The increasing importance of the design and survey stages in Ha Tinh province has increased the number of individual housing projects that hire survey and design units. These works satisfy the needs of people's lives

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and beautify urban spaces. However, the construction of individual housing projects still has many problems, especially in the survey and design stages.

A. Data and Limitations

A survey was conducted on 100 individual housing projects in the districts of Ha Tinh province, through data from the construction department of Ha Tinh province [19], to explore limitations in the survey and design stages. The survey results showed that the survey, design, and construction stages of individual housing projects in Ha Tinh province still have some shortcomings and limitations, as follows:

1) Geological and Topographic Survey

Figure 1 shows the proportion of individual housing projects with and without geological and topographic surveys. A small percentage (approximately 12%) carried out such a survey before design. Most individual housing projects did not perform survey work before design and construction. Failing to conduct geological surveys or improper technical surveys can lead to no or inaccurate data and can reduce the quality of the projects, increase their cost, and cause unpredictable technical problems. In addition, many works used cadastral maps, which do not ensure precise elevation and do not comply with the regulations on the transmission and protection of landmarks. Also, not using the coordinate system can lead to location deviations.

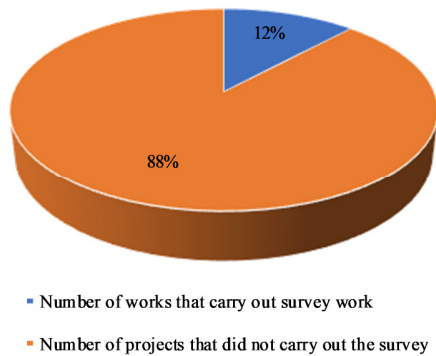


Fig. 1. Survey results: Individual housing projects that carried out geological and topographic surveys.

2) Design Stage

Many problems arise during the design process, such as over-estimated structural capacity, no or incorrect structural calculations, and improper application of regulations and standards. Figure 2 shows that most individual housing projects have typical problems. The number of projects having an authorized design registration following standards accounts for only 15%. Meanwhile, another 15% of projects are wasteful by design. The number of projects designed with unsafe and unsatisfactory structural requirements represents 25%, while 45% of the projects did not hire a design unit. This is a major problem that needs to be seriously considered and resolved.

3) Cost Estimation

Figure 3 shows the status of individual housing projects in Ha Tinh, according to cost estimation before construction.

Most individual housing design documents do not include a cost estimation or include a useless document. Only 10% of the projects had a proper cost estimation. Without an estimation of project cost, financial risks can occur.

4) Incidents

Figure 4 shows the results of the incident survey of individual housing projects in Ha Tinh. As can be observed, only 25% of projects meet structural safety and serviceability requirements. Most projects are unstable structures or affect the surrounding projects. More specifically, the number of projects with cracked walls, floor cracks, and uneven settlement accounts for 45%.

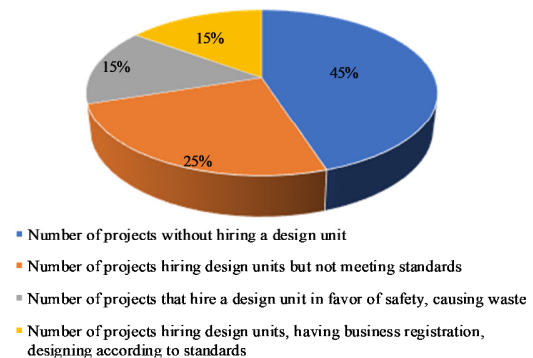


Fig. 2. Survey results: Individual housing projects having design issues.

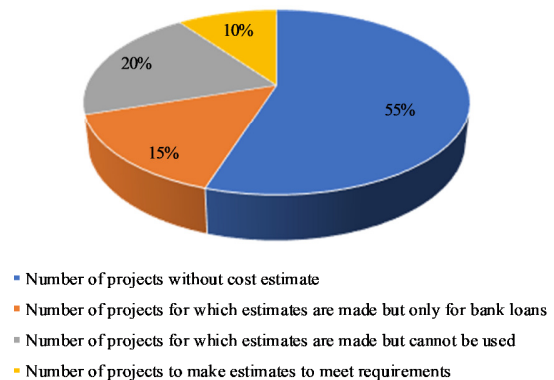


Fig. 3. Survey results on individual housing projects relating to cost estimation.

B. Reasons

The shortcomings and limitations in the survey and design stages of individual housing projects are mainly due to the following reasons:

1) State Management Agency

Most Ha Tinh localities do not have an official state management agency in charge of survey and design works. Currently, in the whole province, only Ha Tinh city, Ky Anh town, and Hong Linh town have a specialized agency named Urban Management Department (UMD). Individual housing is managed in part-time form. The local wards and communes have only 2 cadastral officers to manage both land and basic

construction fields. The inspection, appraisal, and permits for the construction of individual houses also face many difficulties. According to the regulations for individual housing projects, the authorities are only interested in works with a floor area greater than 250m² and buildings with more than 3 floors or a height of more than 12m [1, 4, 7]. As a result, the construction process is not inspected and supervised, seriously affecting the planning and causing unsafety for people and properties. Moreover, there are many separate housing projects managed by state agencies, but violations are not handled promptly, causing difficulties and economic damage to investors in handling the consequences. In addition, the mechanisms and policies to manage the quality of construction are currently unclear, and there are no additional plans to attract human resources [2, 5, 6].

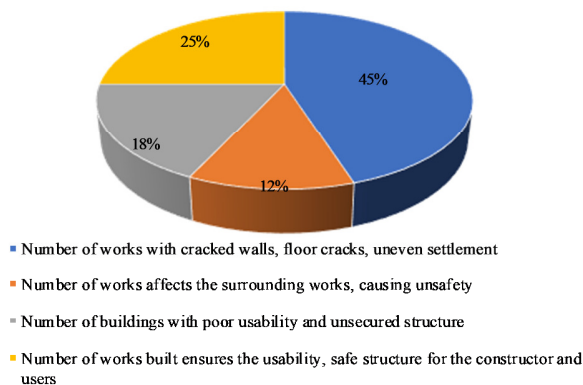


Fig. 4. Incident survey results of individual housing projects in Ha Tinh.

2) Investors

As investors in individual housing projects often lack experience and professional knowledge, there are shortcomings and limitations in the survey and design stages due to the following reasons:

- Investors often do not hire a survey and design quality management unit.
- There is no plan to choose a survey or design contractor or choosing a contractor that is unreputable, inexperienced, or has low capacity.
- Investors do not understand or have little understanding of construction. Usually, they do not employ a professional to supervise or check the process, and there are many cases where the consulting unit and the construction contractor collide. As a result, the cost increases and the quality of the project can decrease.
- Investors who build individual houses often do not make contracts when hiring a survey and design unit or, if any, the contract is made by the latter. Thus, the terms in the contract, if it exists, are often not beneficial to the investor.
- Many investors skip the survey and design stage to save costs, as it is an expensive procedure.

- Survey and design companies are not always sufficient. This can lead to over-designed (i.e. high redundancy in design) or under-designed conditions (i.e. unsafety).

Figure 5 shows the survey results regarding the reasons investors do not hire survey companies. The number of projects that do not hire a surveying agency because they do not trust them is 17%, while 20.5% do not hire a survey agency for fear of delaying the schedule, and 22.73% do not hire a survey unit because of cost. Moreover, the number of projects that do not hire a survey because the investor lacks understanding and follows the opinions of others accounts for approximately 40%.

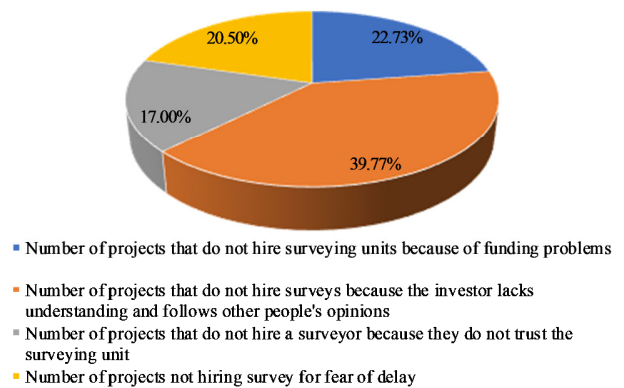


Fig. 5. Results on reasons why investors do not hire a survey unit.

3) Geological and Topographic Survey Unit

Figure 7 summarizes the capacity of the survey units. It was found that only 25% of the projects hire qualified survey companies, while the remaining 75% do not meet the requirements of the survey process, as they lack the equipment or geological engineers. These are the main reasons for the unsatisfactory geological survey results.

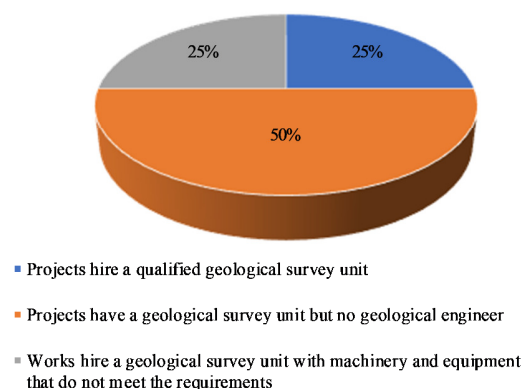
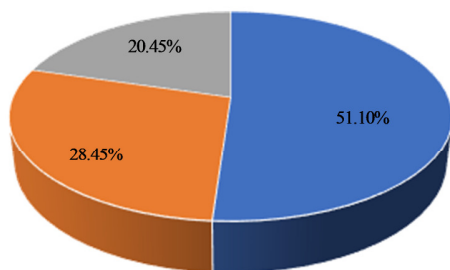


Fig. 6. Results on the capacity of survey units.

4) Design Unit

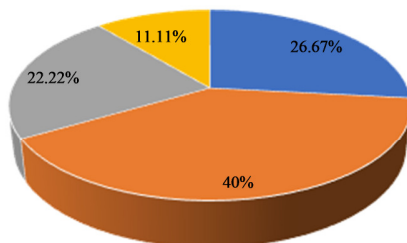
The number of small design offices is increasing in Ha Tinh. Small design offices are located where few people can notice, even in their own homes. Their main form of business is

through social networks; thus, it is difficult for the authorities to check. Figure 7 shows that only 115 design companies (51.11%) have full capacity and are registered as a business. Design units that do not register as businesses but are created by qualified individuals account for 28.45%, while the proportion of design units without business registration made up of non-professional individuals accounts for 20.45%. Figure 8 shows the results of the reasons investors do not hire design companies. The main reason is the lack of understanding of the importance of the design process (40%) followed by design costs (27%), trust in the design company (22%), and concerns about effects on design time (11%).



- Number of design units with full capacity, registered business
- Number of design units that are not registered as businesses but are created by qualified individuals
- Number of design units that do not register as a business, created by individuals who are not professional

Fig. 7. Individual housing design offices in Ha Tinh.



- Number of projects that do not hire a design unit because of funding problems
- Number of projects that do not hire designers because the investor lacks understanding
- The project does not hire a designer because it does not trust the design unit
- Number of projects that do not hire designers for fear of delay

Fig. 8. Reasons why investors do not hire a design unit.

III. PROPOSED SOLUTIONS TO IMPROVE SURVEY AND DESIGN QUALITY

Based on these results, this study attempted to propose solutions to improve the quality of the survey and design stages of individual housing projects in Ha Tinh, as follows:

A. For State Authorities

- Improve organizational structure: At the district level, it is necessary to add an urban management unit with the same function as a city or town. Communes must have a full-time

official to supplement the role of individual housing management for the cadastral staff.

- Strengthen inspection and supervision: District, town, or commune urban management divisions are required to regularly inspect individual housing works before granting construction permits, and even during construction.
- The urban management department should strengthen the inspection of the capacity of design units and contractors to improve the quality of the survey stage. For example, they can check staff, machinery and equipment, office address, and contractor capacity in documents and reality. The above solutions could reduce problems and errors in the survey, design, and construction stages of individual houses. Moreover, it is necessary to strengthen the inspection and appraisal of individual housing projects according to regulations. This task must be performed seriously and promptly to assess the safety of the survey and design stages and to inspect the surrounding works or the safety conditions during construction.
- Train and foster urban management staff: In addition to the above solutions, it is necessary to organize professional training for civil servants and public employees.
- Improve mechanisms and policies: It is important to improve the role and responsibilities of the urban management department. In addition, it is necessary to have a reasonable remuneration mechanism and policy for personnel in the construction of individual houses.

B. For Investors

The survey results show that many investors do not hire a survey and design unit before construction due to lack of knowledge or funding. Therefore, many projects do not meet the requirements in terms of usability, structural safety, or architectural beauty, or have high costs. It is recommended that before construction, the investor needs to take care of the survey and design stage. The following solutions are proposed to improve the quality of the survey and design stages:

- The investor needs to hire a qualified unit for survey and design. The quality of construction works significantly depends on the survey and design stage. Therefore, the investor needs to hire professional staff, not only to supervise the investment implementation stage but also the investment preparation stage.
- Before choosing a design survey contractor, the investor should check its capacity in practice, staff, equipment, and experience based on previous contracts. Simultaneously, multiple pieces of information can be investigated to evaluate the contractor's capacity.
- The investor should regularly inspect consulting activities or hire a second individual or unit. This is essential as the owner hires a supervision consultant to check the contractors, but there is no one to check the latter. The investor or the employed person must have a thorough understanding of professional expertise, responsibilities, and the order and content of contractors' tasks.

- The administrative method is to communicate the investor's requirements through form requests or reports. The quality of a project is described by economic contracts. The quality requirements should be detailed in the contract or the contract addendum. This is a mandatory legal requirement.

C. For Survey and Design Contractors

The quality of the survey and design stages depends not only on the role of the investor and the supervision of state management agencies but also on the capacity of the contractor. To improve the contractor's capacity, it is necessary to improve the apparatus and quality management system and develop human resources.

- Improve apparatus: It is necessary to consolidate the titles according to the regulations on capacity conditions. Additionally, they should have the necessary apparatus from the office to the field. Moreover, employees must be reinspected and supervised by inspecting staff.
- Build quality assurance and management system: Another solution is to develop a quality assurance and management process, incorporating the company's goals, roadmap, and content with the quality management model. The company should have a quality policy consistent with a roadmap. At the same time, it is necessary to focus on a quality assurance plan for each project with specific measures and generate daily, weekly, and monthly reports.
- Build, train, and retrain staff: In addition to the organizational structure, it is required to enhance the team's qualifications. The contractor must have a plan for annual professional training of technicians and surveyors, especially for new employees.

IV. CONCLUSION

This study evaluated the limited situations in the survey and design stages of individual houses in Ha Tinh province, Vietnam, and proposed some solutions to improve the quality of such construction projects. These results can contribute to better management and reduced potential risks in the survey, design, and construction stages of individual houses in this region. Furthermore, the results of this study are helpful references for investors, businesses, employees, and state management agencies to ensure and enhance quality management during the construction of individual houses in Vietnam.

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