



A study on evaluation element of technical proposal tendering for apartment remodeling business

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ABSTRACT

Method of remodeling builder selection for remodeling is competitive bidding. also metropolitan city, megalopolis city, city more than 50million have to do basic plan for remodeling before establishment of a housing cooperative. Purpose of basic plan is improvement of living conditions & the Quality of Life for resident. Technical Proposal Tendering in spite of being the a reasonable bidding system, institutional part, appraisal standard and the item part, consider procedure part is performed in a similar way to the existing bidding system. so, technical proposal tendering is appropriate for future Method of builder selection of remodeling. therefore, the study purpose is a evaluation element of technical proposal tendering for apartment remodeling business The methods of study is understanding concept through review of precedent literature. Next, case investigation through Analysis of focal points. Lastly, evaluation element deduction of technical proposal tendering for apartment remodeling business through specialist conversation. As a result, Alteration of a right & move management is added to evaluation element's professional field. And detail item is alteration of a right & move management.

KEYWORD

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1. Introduction

1.1. Background and purpose of the study

The government has presented new policies and programs for remodelling of apartments as a means to address the changes in the demands for houses due to the booming in the remodelling industry, ageing of the society, and dropping of birth rates. The standard for selecting the contractors under the new system dictates that the contractors shall be selected via an open competitive tender, limited competitive tender, or a designated competitive tender. The new standard also require that a basic remodelling plan is established before establishing a remodelling cooperative in megalopolis, metropolises, and large cities with 500,000 or higher populations. This new standard also requires that such plans are prepared with a view to improve the housing environment in cities and the quality of life for the citizens living in it. For this, the plans are required to specify a clear set of goals and basic directions.

In a technical proposal tendering, the project owner issues the basic or execution drawings, along with the tender documents, which the bidders review to prepare their technical proposals containing construction plans, plans to reduce the project cost, and how they will manage the project schedule. The project owner, then,

evaluates these proposals and selects the successful bidder. In this regard, it is believed that a technical proposal tendering would be a good choice to select contractors for remodelling projects in the future, as the contractors review the basic designs of the project and come up with a better technology and options.

However, the evaluation items specified in the 'Standard for Technical Proposal Tendering' announced by the Ministry of Land and Transportation in February 2014, and the 'Manual for Evaluation and Assessment' are mainly focused on new construction projects, making it less relevant for the nature of the remodelling projects.

Therefore, the purpose of this study is to identify the evaluation items for a technical proposal tendering process for a remodeling project.

1.2. Study Method and Scope

The scope of this study is limited to remodeling projects for increasing the housing units or horizontal/vertical expansions in accordance with the revised Housing Act in July 2012. For this study, review of the assessment items was performed based on the evaluation items in 'Standard for Technical Proposal Tendering' and 'Review and Evaluation Manual' announced by the Ministry of Land and Transportation announced in February, 2014.

As the first step of this study, we identified the concept, status, and characteristics of technical proposal tendering and

remodelling. Then, we identified the key issues involved in remodeling businesses from the existing studies and reviewed the existing cases of public announcements and contracting to identify the issues of importance. Next, we analyzed the project elements of remodelling we identified in the previous steps and compared them with the evaluation items of technical proposal tenders of the past to identify items commonly exist and other issues of importance. Lastly, we interviewed 16 construction managers, 21 contractors, and 15 designing engineers who have experience with remodeling projects to review the items analyzed herein for their relevance and set the scope of their applications. With this, we identified the appropriate evaluation items for technical proposal tenders for remodelling projects.

2. Theoretical review of remodelling and technical proposal tendering

2.1. Backgrounds and concepts of remodelling

A remodelling refers to an overhaul¹⁾ to slow the aging or increase the functional capability of a building or partial expansion of it. (Item 10, Article 2 of Construction Act, Item 15, Article 2 of Housing Act)

Residential renovation of aged apartments in Korea has been done through reconstruction or redevelopment of them since the late 1990s. However, the large amount of construction wastes resulting from it, and the tendency of otherwise sound residential complexes into slums became social problems. Also, the changes of the constructions environments surrounding reconstruction and awareness on the needs for saving resources resulted in the introduction of remodelling in the early 2000s.

In 2012, the government introduced new policies which allowed increasing the number of housing units up to 10%, selling the remodelled apartments to non-cooperative member buyers, along with up to 10% of differential application of the allowed expansion ratio for exclusive areas of 85m², building separate pavilions, and leasing of the apartment if the project include introduction of ‘multi-homes.’ In 2014, the government again introduced new policies allowing vertical expansion of the apartments, adding three more stories for apartments with 15 stories or higher and two stories for apartments of 14 stories or lower. Also, the increase ratio of the existing housing unit was again alleviated to 15% from previous 10%, in an effort to invigorate the remodelling market.

2.2. Processes for a remodeling project

In this section, we will review the key steps of a remodeling

projects as well as the processes to select the contractor, which are shown in <Table 1>²⁾ below.

Table 1. Main contents of remodeling procedure

Procedure	Main contents	Note
Basic planning of remodeling	· Purpose & target · Aged apartment's condition · City scenery management plan by extend remodeling	
Promote proposal	· Promote proposal in resident committee	
Housing association establishment	· Certificate of incorporation by mayor, head of a gu	
Selection of constructor	· Selection by general bid, limit competitive tender or nominate competitive tender	
Safety test (1st)	· Extend remodeling practicality decision by structural safety appraisal · Nonpermission extend remodeling when rebuilding needed by safety test result	
Review of construction (discuss city plan)	· Extend permission scope decision (ex: Floor area ratio exemption law)	· specialized institution safety review (basic design)
Alteration of a right plans	· Increase of the number of households (alteration of a right, share of the expenses, working expenses, distribution plan etc.)	
Permit System (approval of business plan)	· Remodeling housing association enforces a law by permitting mayor, head of a gu · Separate project approval process execution when rising more than thirty households	· specialized institution safety review (enforcement design)
Move	· Share of the expenses decision & general meeting, move	
Safety test (2nd)	· Safety test enforcement for detailed identification of structure safety after move	
Begin construction	· Begin construction, checking for use	
Housing association disbandment	· Disbandment by permitting mayor, head of a gu	

The procedure of remodeling starts with establishing the basic plan. The establishment of the basic plan is required for the sake of improving the residential environment and preventing over population of the city environment. This requirement is applicable to megalopolises, metropolises, and large cities with 500,000 or more populations. The selection of the constructor is to come after the establishment of the basic plan and forming of the remodelling association.

Since these steps come before the execution designing of the

1) Even in an overhaul, it is prohibited to join two or more housing units by removing load-bearing walls, or to make alterations with columns, beams, or load-bearing walls.

2) 한국 리모델링 협회, 리모델링 총설(개정판), 2014, p.48

project, it is evident that a technical proposal tender process for a basic design is a reasonable method of contracting. Also, the project owner many use the plans and basic designs created during the basic planning phase to achieve an improved development proposal through a technical proposal tender when selecting a constructor.

2.3. Concepts and background of a technical proposal tender

A technical proposal tender³⁾ is not like the previous tendering processes where the project owner presents already-determined construction plans and scopes of design and expects the potential contractors to present their construction references. Here, the bidders review the design documents and tender documents and submit their own plans for construction, plans to reduce the project costs, and how they will manage the construction schedule, which are evaluated by the project owner to decide the successful bidder.

The main purpose of this technical proposal tendering process is to improve the current problems of the existing tendering process, with a view to achieve qualitative improvement of the buildings through technical competitions between bidders. The expected benefits of a technical proposal tender include improvement of construction efficiency, availability of VE method, and advantages in life cycle costs, constructions costs, and construction time.

The Ministry of Land and Transportation announced the Standard for Technical Proposal Tender and the Review and Evaluation Manual, with a view to ensure fairness and reliability of the evaluation criteria and rationalize the level of outputs that used be demanded excessively in previous tender documents⁴⁾.

2.4. Types of technical proposal tenders

The technical proposal tender processes are divided into the basic design technical proposal tender processes and the execution design technical proposal tender process⁵⁾ depending on the extent of available design documents from the project owner, the mode of contracting by the project owner, and the time of contracting.

In a basic design technical proposal tender process, the project owner issues a public announcement inviting design proposals to complete the basic design. Upon completion of the design bidding, the project owner then announces a technical proposal tender, in which the bidders may participate by submitting a technical proposal based on the basic design documents along with a bid price, with possible improvement of the basic design if necessary. Once a successful bidder is selected, it is now given with the

authority to proceed with the execution design and carry out the project. Therefore, this procedure can be regraded as an integrated process to select a qualified engineering firm to perform the design work and a construction company.

In an execution technical proposal tender procedure, the execution design for the project is already finished before the announcement of the tender, to which the participating bidders submit their technical proposals. The proposals are evaluated by the project owner, and the successful bidder is then authorized to perform the construction work. While it is still possible for the successful bidder to perform execution design works for some elements, such as rather shop drawings for actual construction works and the selected bidder is not given with the level of authority to make its own designs. Hence, this process can be deemed as a process of competitive bidding to select the construction company to perform the construction jobs.

3. Study of project elements in a remodelling project

3.1. Case Study

LH Corp., Korea, has published its study titled “A Study on Improvement of the Contracting System by Developing a New Contracting Model for LH Corp.” In this study, the factors that were thought to affect the contracting (were, respectively, the characteristics of the project owner which was LH Corp., IN this case,) the characteristics of remodelling projects, and the demands from the tenants, which were examined in this study. After that, an analysis was performed to find out which of an alternative tender, construction project management, tendering the design portion and the construction portion separately, and tendering the design portion and the constructions portion in a same tender was the most appropriate.

The result of the study mentioned above showed that construction project management method was the most appropriate option. However, with our sensitivity analysis with different weights given to the demands of the tenants, the characteristics of the project, and the characteristics of the project owner, the resulting values were difference. Since the paper mentioned above was published before the introduction of the technical proposal tendering method and there was not any difference in terms of the sensitivity, we decided to refer to the elements which affect the tendering only.

Table 2 below shows the elements which were shown to affect the tendering process in the study published by LH Corp. which was mentioned above.

3) 정기영, 2008, 입찰·계약·클레임 실무, 도서출판 교원, p.451

4) 최철, 기본 및 실시설계 기술제안 평가기준 개선안, 서울시립대 도시과학대학원 건축공학과 석사논문, 2014, p.2

5) 국토교통부, 국가를 당사자로하는 계약에 관한 법률 시행령 제98조, 2010.7. 개정법안

Table 2. factor affecting order

Classification	Factor affecting order
Demand of resident	Shorten period of construction
	Shorten period of Plan, Design & Order
	Construction cost reduction
	Maintain management expense reduction
	Cost cutting of Plan, Design & Order
	User friendliness
	Durability & Safety
	Social fine
Project Characteristics	Risk of increased cost of construction
	Risk of project time extension
	Risk of deterioration
	Claim Risk
	Civil Appeals Risk
	Communication of among firms
	Change of design
	New technology & construction method
Customer characteristic	lack of similar project experience
	knowledge & experience about ordering method
	Ability & scale of organization
	Fairness
	Legality
	competition overheat

In addition, Yongkyoung Cho (2011) defined the decisive factors in a remodelling project for a multi-unit housing facility in his study titled “A Study on Decisions of the Importance Level Among Remodelling Project Elements in an Aged Multi-Unit Housing Facility” as in Fig. 1 below.

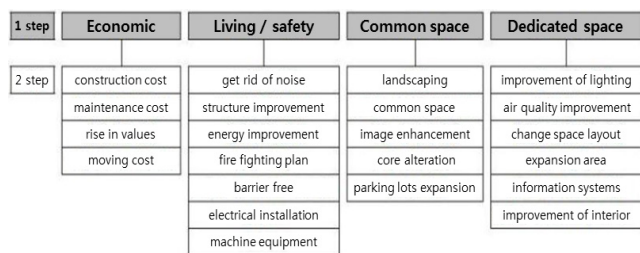


Fig 1. stratification of remodeling danger

Once the definitions were given, the importance level of each tier was analyzed through interviews with experts and the fuzzy AHP analysis method. The result of the survey showed that the importance level was the highest in the order of the economic feasibility > Improvement of the exclusive spaces > Improvement of the shared spaces > residential performances and safety.

3.2. Cases of Public Announcements

On June 18, 2014, LH Corp. announced a competition with a them of ‘Creative Space Building for Invigoration of Remodelling.’ The purpose of this competition was to promote

development of a new breed of houses with creative spatial structures and new elements technologies and obtain design ideas and technologies for convergence of the housing related industries. In this study, we analyzed the planning instructions for the competition in order to identify the necessary elements of a remodelling project.

Table 3. planning guidance

General details	<ul style="list-style-type: none"> ① low cost high efficiency remodeling plan <ul style="list-style-type: none"> - reduction idea for construction cost - rises on property value ② environmentally sustainable remodeling plan <ul style="list-style-type: none"> - minimize remove the existing structure - reduction of construction wastes
Block planning	<ul style="list-style-type: none"> ① accurate analysis of site <ul style="list-style-type: none"> - analysis of design content, physical condition, humanistic condition - remedy flow planning shortcomings (walking line, parking line etc.) ② deterioration minimize plan of apartment complex environment <ul style="list-style-type: none"> - sunshine decrease prevention plan of lower level exterior
Planning for Building Block	<ul style="list-style-type: none"> ① rational block planning <ul style="list-style-type: none"> - rational mass planning - approach / circulation planning - the top floor / lower level exterior specialized plans ② housing unit plan <ul style="list-style-type: none"> - improvement of performance & maintain effectiveness of residency - natural lighting expansion - proper configuration of function & structure - plan for user want ③ other detail <ul style="list-style-type: none"> - reinforcement idea of openness - noises prevention through floor
Structure	<ul style="list-style-type: none"> ① structural Strengthening & earthquake housing design <ul style="list-style-type: none"> - structural reinforcement due to increasing load - joint measures between old & new structure ② rational solution of structure matters <ul style="list-style-type: none"> - realizable structure plan - minimize load burden - strengthening plan of basics

The instructions/guideline shown above signifies that the planning elements for the tenants and the demands from them are proactively included, as one can see in the rational residential complex planning, the rationality in planning the unit residence layout, and the establishment of plans that reflect the preferences of the tenants.

Also, elements such as constructions plans with lower costs, high efficiency, eco-friendly planning, and other planning elements that reflected the changing trends in the housing market were included.

3.3. Contracting Cases

The purpose of this exemplary project was to facilitate formation of housing remodelling associations by preparing the project plans such as the basic design for remodelling for OO Apartment Complex No. 4 in Jeongja-dong, Bundang-gu, which was selected as the pilot complex for remodelling in accordance with the ‘Ordinance on Supporting Remodelling of Multi-unit houses in Seongnam-si.’ The detailed guidelines for the performance of the project were as follows;

Table 4. detailed achievement of a task

1. basic research
1) site location, use district, year of completion, lot area 2) physical condition : the number of households, masses & layers, floor area ratio, building to land ratio, number of parking lots 3) common service facilities condition 4) repair record, appropriation fund, rental value, site picture 5) condition research of residents
2. survey of demand
1) preferred remodeling type analysis through preference survey 2) preferred remodeling type analysis include yes or no, inconvenient item, Repair item, reason etc. 3) select the types of businesses through economic capacity of resident & economic analysis 4) economic analysis include business expenses, cost procurement method, estimated cost of housing after construction
3. The basic design
1) plan of main use, the building to land ratio, ratio of floor area to site & height 2) construction plan include the following contents (1) design Abstract : site area, total floor area, building area, ratio of floor area to site, building to land ratio, landscape area etc. (2) concept : site analysis, plan, intention, objective etc. (3) basic plan - block planning : extension plan & Housing Performance improvement for block planning - external circulation & plan : plan for pedestrian and vehicle flow, green in the apartment, convenient facilities for residents etc. - height plan : consider sky line - extension plan : minimize invasion of privacy through pith of building - parking lot plan : consider usability, accessibility & economical parking lot plan - etc consideration plan according to mayor
4. economic feasibility analysis & share of the expenses
1) task a person have to anticipate working expenses & Future house prices. and based on this conduct economic feasibility analysis. also it apply earnings from leasing of Residential House with, separated generation 2) increase the number of households type remodeling is need expected sales prices 3) allotted charge suggestion by dividing remodeling for each type 4) disinterested basis is needed by task a person

The guideline requires the contractor to perform an survey of the current status of the apartment and the demands from the current tenants. After that, the potential bidder should provide a basic design for the relevant complex, as well as the direction for the project. By utilizing the outcomes from these processes, the remodelling association may present a set of expectations so that a technical proposal tender process may result in a higher level of technical and designing capability.

3.4. Summary

In terms of the planning process, a remodelling project is dependant of the consents, which is unlike a new construction project. Therefore, the basic survey (required repair works. long-term repair works reserves, and the house prices (or the lease costs,) the site photos, and the survey with the tenants are carried out, as well as a demand survey for a remodelling (including the preferred type of remodelling and items which require urgent repair works) so that a basic design can be prepared.

Since old houses were built in accordance with the anti-earthquake designing criteria of the past, reinforcement of the anti-earthquake performance and an effective connection between the existing structure and the newly added structure should be considered.

In terms of the energy, it is required that the bidder suggests quantified energy improvement plans which are evidence-based for items which are actually to be included in the planning aspects, such as ensuring heat insulation performance of the existing walls, installation of chassis on doors, windows, and corridors, improvement of heating and air-conditioning systems, application of energy-saving technologies in the main building, addition of green areas in the main building, and addition of roof-top gardens, etc.

In the economic aspect, reduction of the project cost, construction time, lease income (for each household), divided remodelling costs, minimization of the evacuation period, and saving the maintenance cost should be considered in order to reduce the financial burdens on the tenants.

Table 5 below shows a summary of the project elements;

Table 5. Remodeling business task

basic research	physical condition : site location, use district, year of completion, lot area etc.
	building base data & field survey : repair record, appropriation fund, rental value, site picture etc.
survey of demand	preferred remodeling type analysis through preference survey yes or no, inconvenient item, Repair item, reason etc.
	select the types of businesses through economic capacity of resident & economic analysis : business expenses, cost procurement method, estimated cost of housing after construction
the basic design	construction plan include the following contents
	design Abstract : site area, total floor area, building area, ratio of floor area to site, building to land ratio, landscape area etc.
	concept : site analysis, plan, intention, objective etc.
	performance Improvement of Design in Housing : block planning, Housing unit plan, external circulation & plan, height plan, extension plan, parking lot plan, etc consideration plan
structure	Prevention of an overcrowded city
	structural reinforcement due to increasing load
	joint measures between old & new structure structural Strengthening
eco friendly plan	minimize remove the existing structure
	prevention for Public Resentment by Construction
	prevent loss of daylight at lower level exterior retrenchment of energy & improvement program
economic feasibility analysis & share of the expenses	operating expense saving, shorten period of construction, earnings from leasing, share of the expenses, shorten period of stay, reduce maintenance expenses etc.

4. Identification of evaluation elements for technical proposals in a remodelling project

4.1. Comparative analysis of the project elements and the evaluation elements in a technical proposal tender

Fig. 2 below shows the project elements specified in Section 3 of this paper and the evaluation items in the standard technical tender documents;

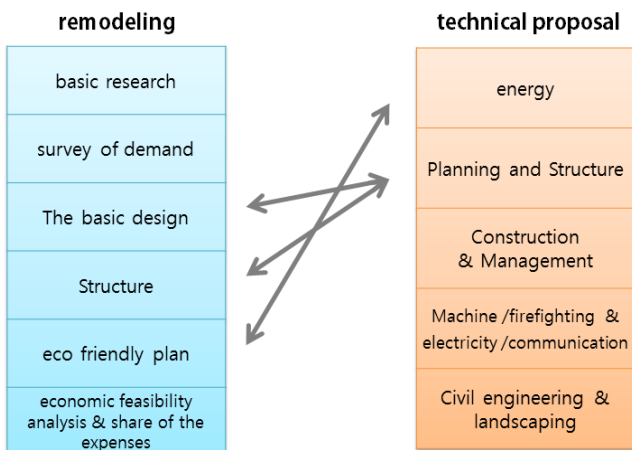


fig 2. Remodeling task & technical proposal tendering evaluation factor comparison analysis

Fig. 3 reveals that the eco-friendliness/energy, and the design/structure elements are overlapping between the two sides.

As for the elements of a remodeling project, the basic survey and the demand survey for remodelling were performed during the basic planning phase, while the tenant presentation is held when the association is established. Therefore, it is not related to the selection of the contractor. However, one might notice that, as the ‘estimation of the economic feasibility and the shared cost’ may depend on the construction technology which again depend on the selection of the contractor, it should be included as one of the evaluation items for the technical proposal tender.

As one might take a look onto the evaluation items for the technical proposal tender, the construction works, construction management, machiner/fire-fighting/electricity/communication, and the civil works and landscape items are subject to evaluation in both a new construction project and a remodelling project, therefore, these items can be regarded as common items. As a result, it is evident that, as shown in Fig. 3 below, the evaluation items for a technical proposal tender should include the ‘estimation of the economic feasibility and shared costs.’

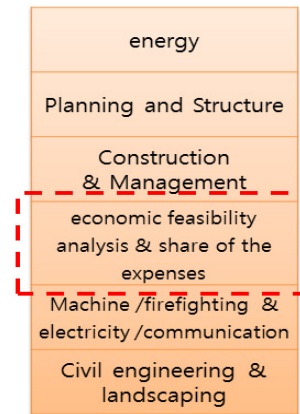


fig 3. Remodeling task + technical proposal tendering evaluation factor

4.2. Identification of evaluation items through interviews with experts

As a result of the comparison between the project elements and the evaluation elements of a technical proposal tender, the necessary elements for remodeling in the evaluation process of such a tender were identified. In order to establish relevance, hierarchy, and scope of application for these elements, an interview with experts was conducted. Also, their comments on additional items for considered were requested for.

In the interview with the experts, to collect a wide range of opinions from them, 16 construction managers, 21 constructions experts, and 15 designing engineers were selected as the panel to conduct an interview with the evaluation items for a technical proposal tender. The issues that were selected to be considered were as follows;

Firstly, the relevance of the items that were identified were reviewed.

Secondly, the identified items were reviewed for their application as an evaluation item for the standard.

Thirdly, the experts were requested to identify items subject to further considerations.

As a result of the interviews with them the studies on the evaluation items for a remodelling project that are suggested in this study resulted in conclusions that they were mostly relevant. The answers from the experts on their application were also positive.

Table 6 below shows a summary of the evaluation items for a technical proposal tender that were finally identified as a result of the interview with the experts.

Table 6. Suitable technical proposal evaluation items for Remodeling

Professional field	Evaluation items
energy	eco/retranchment of energy & improvement
	energy savings equipment
	applying renewable energy

Professional field	Evaluation items
planning and Structure	planning and Structure
	cost cutting & improvement of efficiency
	improvement plan of design errors and omissions
construction & Management	cost cutting & improvement of efficiency
	improving the life cycle cost
	shorten period plan of construction
	construction management plan
	improvement plan of design errors and omissions
alteration of a right & move management	alteration of a right
	move management
machine /fire-fighting & electricity /communication	cost cutting & improvement of efficiency
	improvement plan of design errors and omissions
civil engineering & landscaping	cost cutting & improvement of efficiency
	improvement plan of design errors and omissions

The ‘estimation of economic feasibility and shared costs’ identified as a result of the comparison between the project elements and the evaluation elements for a technical proposal tender was changed into ‘changes of the rights and plans for move-out.’ This is to include the specific items only to be found in a remodelling project, instead of simply trying to reduce the project cost.

The relevance of the plan for the changes of rights and the relevance of the plan for relocation were added to the evaluation items included in the ‘changes of the rights and plans for move-out.’ The relevance of the plans for changes of the rights is included within the process of remodelling and includes the changes of the rights for the buildings, shared costs, project costs, sales plan, and other ordinance issues. The relevance of the plans for relocation, which was not originally included in the preceding studies, pursue the convenience of the tenants by means of the timing of relocation, management of the construction sectors, the time of bringing in the materials, and management of the laborers and the remaining tenants.

Other issues identified from the project elements, which are the planning based on the opinions of the tenants, the reinforcement of the structures, and the eco-friendly elements were overlapping with many of the existing evaluation items. Therefore, they were not included as a part of the specialty fields or the evaluation elements. Instead, there were redeployed as the key consideration items for evaluation items. Also, additional key consideration items were added to the relevance of the changes of the rights and the relevance of the relocation plans, which were evaluation items that were added as a result of the interviews.

The detailed contents of each item were as shown in Table 7 below.

Table 7. Suitable evaluation guide & Principal reviewed for Remodeling

Eco/retrenchment of energy & improvement
- minimize remove the existing structure - construction waste recycling
Planning and Structure
- plan & space application through basic research - secure infrastructure - specialized design : expansion of story height & noises through floor - prevent loss of daylight at lower level exterior - joint measures between old & new structure - structural Strengthening & repair plan
Alteration of a right
- alteration of a right of land and buildings - rental revenue yield - calculated share of the expenses - calculated business expenses - distribution plan
Move management
- calculated period of move - construction Partition management - circulation management for worker & users that remains

The evaluation guideline for ‘eco-friendliness/ energy saving, and performance plan relevance’ and the key review items saw addition of ‘relevance of the plans to minimize the amount of construction wastes by minimizing the demolition of the existing structure, etc.’ which was identified during the research of the existing cases and ‘the plan for recycling of construction waste,’ which was identified during the interview with the experts.

As for the evaluation guideline and key review items for ‘construction plan and structural relevance), the basic survey, which was identified during the case study, the layout of the complex through the demand survey, the relevance of the use of spaces, the relevance of the plans to secure the infrastructure (parking lots, parks, etc.) expansion of the floor height, inter-floor noises or other design specialization plans, the relevance of the sunlight environment for the lower floor areas, the relevance of the plans for effective connections between the existing and new structures, reinforcement of the structure and the relevance of repair works were deployed. The interview with the experts resulted in inclusion of inter-floor noises related issues which are becoming a social issue these days.

As for the evaluation guideline and the key review items for ‘the relevance of the plans for changes of the rights regarding the land and the buildings,’ the relevance of the plans for changing rights related to the land and the building, which were identified during the case studies, the relevance of the calculation of the lease incomes when the number of units is increased, the relevance of the calculation of the shared costs, the relevance of the calculation of the project cost, and the relevance of the plans for sales of the properties were deployed as the key items for consideration.

The ‘relevance of the management of relocation’ was identified as a result of the interview with the experts. Key consideration

items for this included the relevance of the calculation of the relocated period, the relevance of the management of the partitions, and the management of the laborers and the remaining tenants.

5. Conclusion

It is anticipated that the remodeling industry will keep its current pace of growth due to the government's drive to boost the remodeling businesses, the increase in the number of house units in 2012, and the introduction of the new initiative to allow vertical expansion.

In accordance with the changed Housing Act, as a result, it is recommended to use the technical proposal tender method in order to overcome the existing problems of the tendering process, where the selection criteria was mainly focused on the price and the opinions of the designing engineers were not applied, while the selection method for the contractor in remodelling projects is recommended to be based on the technical proposal tendering method (where the designing and construction scopes are separately contracted.)

However, as one looks into the 'Standard for Tender Documents for a Technical Proposal Tender' and the 'Evaluation and Review Manual' issued by the Ministry of Land and Transportation, the evaluation items were mainly focused on new construction projects, which makes the standard not suitable for remodeling projects. Also, the current status is that the criteria for selecting a successful bidder for selection of the contractor are not established.

In this study, the evaluation elements for technical proposal tenders and the evaluation items for remodeling of multi-unit houses were identified based on the standard and the manual mentioned above, which were published in February 2014, in accordance with the Housing Act which was revised in July 2012. The scope of this study was limited to remodeling projects with the increase of the number of units, the remodeling for vertical or horizontal expansions.

With the evaluation elements and items for technical proposal tenders for multi-unit houses in this study, it is believed that systematic and objective selection of the successful bidder for a remodeling project would become a reality. Especially, it is believed that it is now possible to facilitate selection of high-quality bidders for remodelling projects, which have lacked evaluation methods until now. Also, it is anticipated that the possible scope of application for technical proposal tenders can now be extended.

As for future study subjects in terms of the remodeling projects, it is certain that all buildings will age. A remodelling project may be created not only for multi-unit houses but also for office

buildings, commercial facilities, or compound facilities, as well as many other fields. Therefore, it is necessary to conduct studies to develop appropriate assessment methods and improvement methods.

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