

A STUDY ON APPLICATION OF CONSTRUCTION MANAGEMENT(CM) TO HOUSING RECONSTRUCTION/RENEWAL PROJECT IN KOREA

- Focused on Application of Construction Management (CM) in Professional Management of Renewal Business(PMRB)

Changgyo Kim ¹ and Jaeyoul Chun ²

¹ Prof. of Department of Architecture, Woosong University, Daejeon 300-718, South Korea ; Doctorate of Dankook University Graduate, formerly received an Certification of CCM, CVS, and License of PE in Korea

Tel : +82-42-630-9142 ; Fax : +82-42-630-9720, E-mail : citipmc@hanmail.net

² Prof. of Department of Architectural Engineering, Dankook University, Seoul 140-714, South Korea ;

Ph.D., Tel : +82-2-709-2890 ; Fax : +82-2-709-2890, E-mail : jaeyoul@dankook.ac.kr

ABSTRACT : A new law, the Urban and Living Environment Improvement Act, was established, promulgated, and entered into by the Ministry of Construction and Transportation as of 1st July 2003. This system under this law, which improves currently executed consulting process and upgrade its level, is to execute the legal process and procedures that are necessarily required for housing reconstruction/renewal project.. This system requires to be supplemented with addition of reasonable, logical, and systemized tools of system. Through concurrent application of professional management of renewal business(PMRB), more benefit will be provided to housing renewal associations that are constituted with residences concerned for execution of CM project.

Key words : Construction Management, Professional Management of Renewal Business(PMRB),

1. RESEARCH SCOPE

1.1 Background and Purpose of Study

As there have been many cases of disorders and trial errors produced among interested parties including housing associations (and/or their constituents) because the strategies and statues on housing reconstruction/renewal project have frequently been changed, without positive adaptation to living environment, between private interests such as performance of private property of associations and public interests such as improvement and development of urban living environment, the Government provided with a legal background to systemically support the execution of housing reconstruction/renewal project and to execute systemic, efficient, and integrated living environment project through promulgation of Urban and Living Environment Improvement Act as of 1st July 2003. Especially, PMRB system was established for professionalization or project execution in consideration of the characteristic that housing reconstruction/renewal projects performed through participation of various interested parties and many complicated steps and problems with construction management (CM) application including participation of CM professionals have successively been raised by CM professionals.

1.2 Research Scope and Method of Study

This study is a part of the study on construction of the process model for application of CM of housing reconstruction/renewal project, and the scope of study is defined to suggest the improvement measure in relation to adaptation the process of CM through condensed analysis of basic problems in relation to the application of CM of PMRB that

is provided in the related Act, the law on housing reconstruction/renewal project. Also, the method of this study is: i) to induce and analyze the problems related to execution of project through detailed analysis of the PMRB area; and ii) to suggest appropriate improvement measure of housing reconstruction/renewal project for protection of available benefit of ordering parties (constituents of associations) through necessity for CM application and through supplementation, differentiation, and application of housing reconstruction/renewal project that is related to the application of CM.

2. THEORETICAL DISCUSSION AND PROBLEMS WITH HOUSING RECONSTRUCTION/RENEWAL PROJECT

2.1 Concept of housing reconstruction/renewal project

Reconstruction business is defined as the one to be executed for improvement of living environment in the territory with close aged/wrong buildings although basic renewal facilities are satisfactory, among the project to improve or construct buildings such as houses in renewal territory to recover urban functions. Redevelopment project is defined as the project to be executed for improvement of living environment in the territory with poor basic renewal facilities and close aged/wrong buildings, among the project to improve or construct buildings such as houses in renewal territory to recover urban functions. ¹⁾ The problems of housing reconstruction/renewal project may be classified as follows:²⁾

(1) Determination of execution of housing reconstruction/

reconstruction/redevelopment area to the environs of the

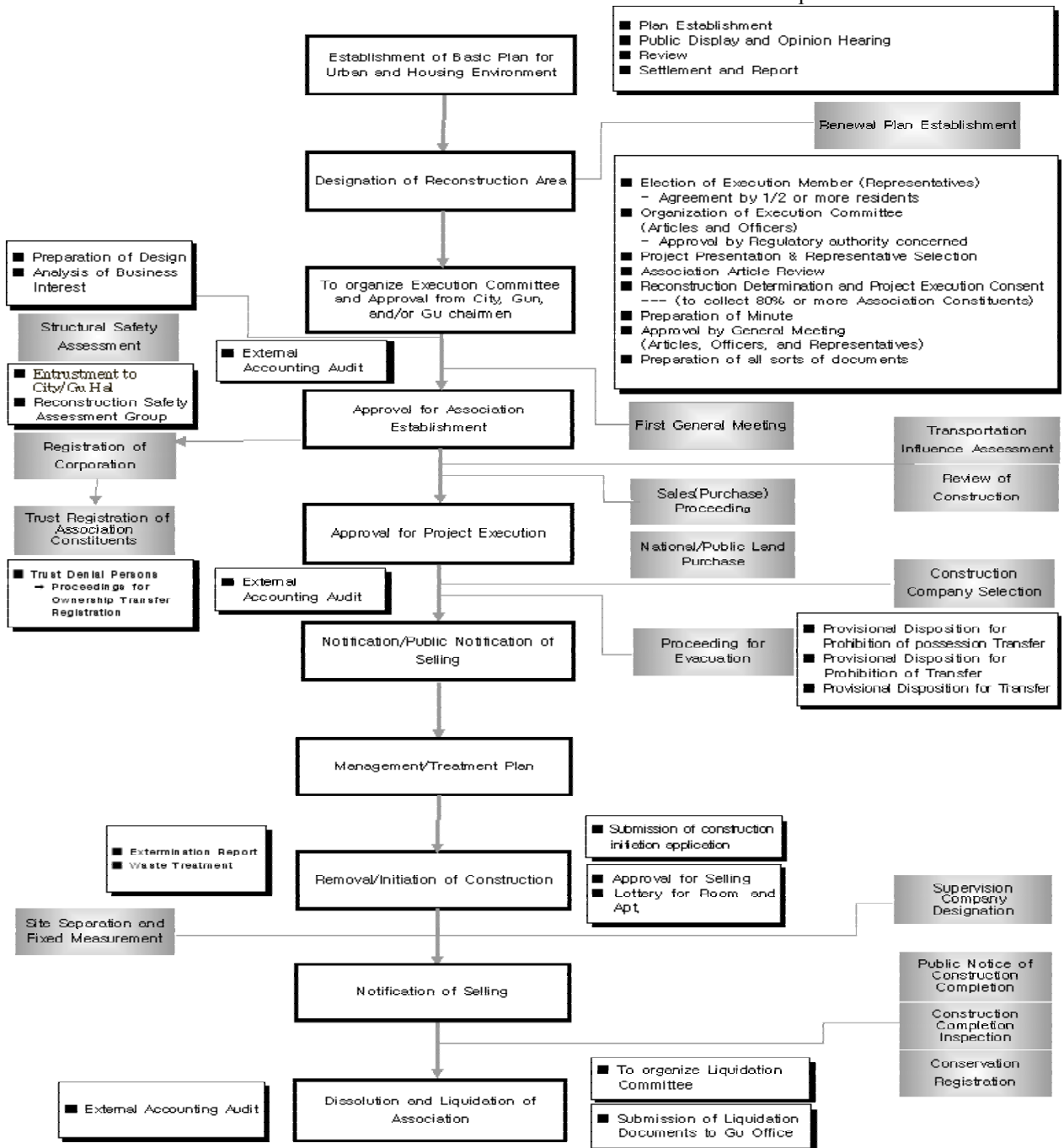


Figure1. Flowchart for execution of reconstruction/renewal for PMRB

renewal project is made in consideration of business interest rather than in necessity and execution of project towards maximization of business opportunity resulted in loss of resources.

(2) Urban view is being worsened due to formation of high-storied building complex with interception of scenic beauty caused by high-storied apartment houses on hillocks and environs or inharmonious of high-storied apartment houses in lower territory with nearby territories.

(3) Adverse reactions are produced with elevated prices of houses nearby development area including soared prices of houses and rental deposits caused by moving of residents in

area at a time.

2.2 Procedure and work analysis of execution of renewal project

In the execution process of related Act, define current housing reconstruction/renewal project, i) first-planning-later-development principle was strengthened, ii) overall process of safety measures was reorganized, iii) current project execution process was partly improved. The execution process of renewal project under the related Act is as shown in Fig.1.

2.3 Work on PMRB and imitation of work from execution

The scope of work that professional renewal project manager may assign or consult to execution committees or associations and cannot concurrently execute under Article 69 and 70 of the related Act is as shown in Table1.

Table 1. Contents of professional management of renewal business

Permitted work	Not-permitted work for concurrent execution
Agency for association establishment consent and renewal work consent	1. Removal of constructions
2. Agency work for application for association establishment approval	2. Design of renewal business
3. Review of business opportunity & planning of renewal execution	3. Execution of renewal business
4. Agency work for appointment of designers and construction companies	4. Accounting audit of renewal business
5. Agency work for application for business execution approval	5. Other work required for maintenance of fair ordering of renewal business (Enforcement Ordinance)
6. Agency work for selling and management plan establishment	
7. Review of design material and details of construction cost changed	
8. Works asked by associations, among other association works	

2.4 Background of and problems with PMRB system of housing reconstruction/renewal project. ³⁾

Because housing reconstruction/renewal project has the character that various interested parties participate in and is currently executed through complicated various steps and for a long time, the execution requires pretty high level of professionalism and, for this, associations frequently and positively utilize general consulting companies to be supported by consultation on, counseling on, and agency work of housing reconstruction/renewal project, for efficient execution of housing reconstruction/renewal project. Therefore, the Government concluded that reconstruction consulting have resulted in many adverse reactions due to insufficient professionalism or financial appropriateness, and newly established PMRB in addition to the related Act. Various problems caused by this and the reasons were analyzed as follows:

(1) Penetration barrier problem caused by monopoly and oligopoly by small number of companies Regulating consulting area of housing reconstruction/renewal project under the statue named PMRB may act as a systemized barrier against penetration and affect self-control function of market due to monopoly or oligopoly by small numbers of registered companies and/or consulting companies. In addition, settlement of business range such as consulting by

law or limitation by scale may violate scale of market or variety of demand and there is the possibility of 'being a system for a system'. However, this may be possible limited to the situation that monopoly or oligopoly by registered companies and/or consulting companies is possible.

3. CONNECTEDNESS OF HOUSING RECONST./RENEWAL PROJECT AND CM

3.1 Necessity of CM

The necessity of CM is being increased because projects are becoming larger and complicated and due to strict requirement condition such as period of construction, construction cost, and quality of project. In fact, the necessity and effectiveness of CM application is proved with quantitative increase of CM projects in the country. According to internal data of a CM company on analysis of CM performance,⁶⁾ high level of design management, project cost management, construction period management, and VE activity may save cost and shorted construction period and, in terms of construction cost, an example of cost saving more than 1,000% of CM service cost and construction period shortening is suggested.

3.2 Measures for connection of CM in PMRB

PMRB is nothing but formalization of the work, consulting. That is, it may be said as a work system with level-up of very small part in the limited work for procedural necessity to be performed to support or as agency work within designated work mainly on administrative and legal matters such as acquisition of consents, proceeding general meeting, appointment of participating company, getting various approval and authorization, claim, and disputes. Connection with CM includes the range of limited work for basic administrative agency for PMRB and there is the meaning to return benefits to associations(and/or constituents), the ordering party, through strengthening of basic matters for construction period shortening, construction cost saving, and quality maintenance. Table 2 shows Connection of housing reconstruction/renewal project with CM that arrange 5 phases from pre-design to post construction through the connection of the CM standards of practice of CMAA standard work scope(editing 2002) and Process of PMRB.⁷⁾ It shows the abbreviation for 7 functions. PM : Project Management, COM : Cost Management, TM : Time Management, QM : Quality Management, PC/A : Project Contract/Administration, SM : Safety Management, PrM : Program Management.

3.3 Application time and effect of CM

As shown in Fig 2, application of CM has as high as 80% of efficiency at initiation of construction. That is, although the maximum efficiency after initiation of construction is considered, it is as low as 20%. Accordingly, it is efficient to apply CM from designing stage and shortening of construction period and cost saving of whole project is made from designing step. For example, it was reported that H company, a CM company, achieved average 10% of cost

saving and 30% of construction period shortening when CM was executed. 8)

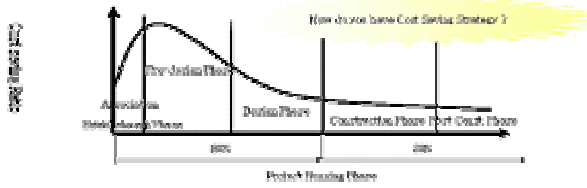


Figure 2 . Flow of influence of CM in terms of cost

4. PROBLEMS AND IMPROVEMENT MEASURES IN RELATION TO APPLICATION OF CM IN PMRB

Problems with application of CM in professional management of renewal business are as follows:

(1) Conversion of recognition of CM by ordering parties (associations and association constituents).⁹⁾ The most important reason for no activation of CM is insufficient experience in and understanding on CM, insufficient professionalism, and concern for loss of vested rights after assignment of right. This is one of the phenomenons that are particularly apparent with ordering parties of public construction. This kind of problems may be solved when private construction managers are capable to provide with appropriate technology that meet the requirements and expectations of ordering parties,¹⁰⁾ and when construction manager may be able to make ordering parties intelligent and beneficial.

(2) Problems with scheduling and coordination of CM
Scheduling and coordination is very important in housing reconstruction/renewal project because ordering parties (associations and constituents), designers, construction companies, and supervising companies should perform work in connection to project. In general, in terms of group dynamics, 5-6 persons of small group may show the highest efficiency when they perform work with acceptance of correlation.¹¹⁾ Nevertheless, the reason that we cannot have the efficiency is that there is no subject body to take the role for scheduling and coordination. Construction managers are the most appropriate subject bodies to execute project with changing hostile correlation to favorable correlation.

(3) Problems with service fee for CM
Most of ordering parties pay the service fee for PMRB with no denial which has legal basis but has no standard for service fee, however, they doubt whether they have to pay additional fee with application of CM that has more of the character of addition other than legal system. In case of U.S.A, 3-9% of CM service fee is provided depending upon scale and comprehensiveness of projects and, in case of our country,¹²⁾ the rates of service fee from preliminary design to detail design are provided for the range of 10-20 billion won of construction budget (for over 20 billion won, separate calculation equation is to be used) of public construction only.¹³⁾ Putting off the discussion that whether service it is reasonable to calculate service fee based on the rates for construction budget, calculation of service fee based on

supervision service cannot be considered to be reasonable. Anyway, CM service fee should be paid from the source of CM cost saving other than as a kind of service fee payment from ordering parties, and the approach should be made based on assumption of possible payment as shown in Fig. 3.

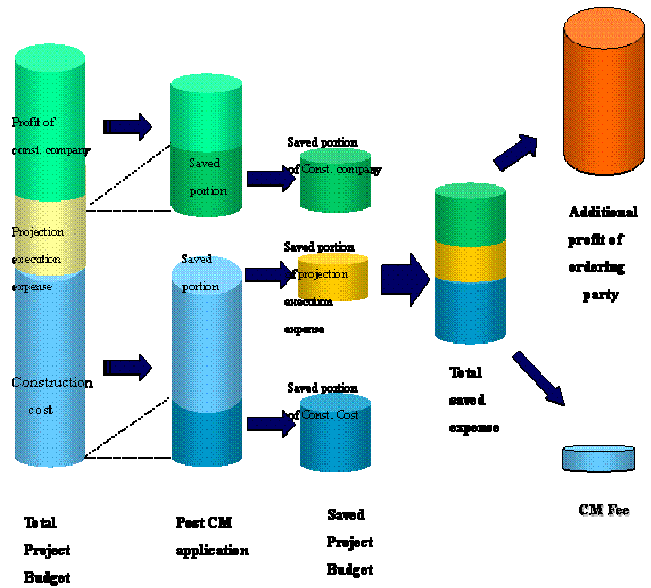


Figure3. Basic concept of cost saving CM

(4) Problems with successful appointment of construction managers

The most concerned problem with ordering parties is whether they can appoint a construction manager with appropriate knowledge, experience, technology, and experts. Selection standard of is provided based on appointment standard of supervision companies in the country, however, there is no specific standard or guideline for selection of construction managers. For this, ordering parties should select the construction managers that meet the level and qualification for execution of project, with use of below-shown checklist(as shown in table 3) and through specific and detailed review process.

(5) Problems with adoption and application of specified technology of CM

CM was developed in 1946 and, with 'CPM technique' developed in 1956, it has continued development until just before 1960's and current function was made with 'computers'. Based on this foundation, specified technology of CM was essentially supported by four kinds of specified technologies of 'Fast Track System', 'VE', 'LCC', and 'Constructibility Review'. After that, many technologies developed and applied for proceeding of CM. The pinpoint is to be able to achieve the basic objective of CM through adoption and application of these technologies.

5. CONCLUSION

Housing reconstruction/renewal project is the one that should firstly be adopted and applied in CM among the all projects. Nevertheless, there has been no example of successful adoption and execution of CM until now. The

Table 2. Connection of housing reconstruction/renewal project with CM

Process of PMRB	Phase	Funct.	Detailed CM works	
Agency for association establishment and renewal work consent. Agency work for application for association establishment approval.	Pre-Design Phase	PM	Project Organization//CM Plan Procedure/CMIS	
		COM	Preliminary Cost Investigation/Project & Construction Budgets/Cost Analysis	
		TM	Master Schedule./Milestone Schedule	
		QM	Scope of Work/Project Organization/Quality Management Plan	
		PC/A	Communication Procedures	
		PrM	Owner Commitment/Project Organization/Staffing Considerations	
Review of business opportunity & planning of renewal execution. Agency work for appointment of designers and construction companies. Agency work for application for business execution approval.	Design Phase	PM	Design Document Review/Document Distribution/Contract Agreements/General & Supplementary General Conditions/Public Relations/Project Funding/Meetings/Cost & Time Control/On-going Consulting Activities	
		COM	Estimates/Cost Verification Stages/Schematic Design, Preliminary Design & In-progress and Final Design Document Estimates/VE Studies/Cost Monitoring & Reporting	
		TM	Maintaining the Master Sch./Design Sch./Monitoring the Milestone Sch./Construction Sch./Float	
		QM	Design Procedures/Document Control/Review of Design Submittals/Design Criteria Changes/QCI/QA/Project Estimates/Owner Authorizations/Constructibility Reviews/VE/Establishment of Const.Duration /Construction Testing Requirements/QM Spec./Implementation of QC/QA Requirements during Construction/Public Relations/User Review//Project Funding/Project Review Meetings/Reports	
		PC/A	Design Phase Progress/Design Review Meetings/Sch. Maintenance Reports/Project Cost Report	
		SM	Determining the Potential Safety Hazards/Design Review of Contractors	
		PrM	Design Packaging/Design Management	
Agency work for selling and management plan establishment	Procurement Phase	PM	Bidding & Contracting Process/Meetings	
		COM	Estimates for Addenda/Bid Analysis & Negotiation	
		TM	Contractor's Construction Schedule	
		QM	Procurement Planning/Advertisement and Solicitation of Bids/Select Bidders List/Instruction to Bidders/Pre-bid Conference/Proposal Document Protocol & Bid Opening/Pre-award/Conference/ Contract Award	
		PC/A	Bidder Qualification/Development of Bidders List/Bidders Interest Campaign/Notices & Advertisements/Delivery Bid Documents/Information to Bidders/Addenda/Pre-bid Conferences/ Bid Opening & Evaluation/Post Bid Interview/Construction Contracts/Notice to Proceed/ Schedule Maintenance Report/Cash Flow Reports	
		SM	Contract Requirements& Drafting Guidelines Written Safety Program/PQ Criteria/Pre-bid Conference/Emergency Response Coordination/	
		PrM	Recommend an Overall Program Procurement Strategy/Detailed Market Analysis/ Preliminary Orientation Forums	
	Review of design material and details of construction cost changed	Construction Phase	PM	On-site Facilities/Coordination/Meetings/TM/Budget & Cost Monitoring//Payment Requests/ Change Orders/Claims Man't/QM/Owner-purchased Materials & Equipment
			COM	Schedule of Values/Change order Control/Trade-off Studies/Claims for Cost
			TM	Construction Schedule & Master Schedule/Monitoring Schedule Compliance/Extensions & Impact Analysis/Recovery Schedules/Claim Review
Review of design material and details of construction cost changed	Construction Phase	QM	Pre-construction Conference/Construction Planning & Scheduling/Inspection and Testing/Reports and Record Keeping/Changes in the Work/Document Control and Distribution/Non-conforming and Deficient Work/Progress Payments/Final Review, Documentation and Punch List Work/Beneficial Occupancy/Substantial Completion/Final Acceptance	
		PC/A	Orientation Conference/Assignment of Owner-purchased Equipment & Materials/Permits, Insurance, Labor Affidavits, and Bonds/On Site Communication Procedures/Project Site Meetings/Contract Documentation Procedures/Field Reporting/Quality Review/Nonconforming Work/Safety/Change Order Report/Cash Flow Projection Report/Progress Payments/Const. Phase Reports/Project Summary by Exceptions/Special Record Keeping/Claims Processing/Record Drawings	
		SM	Safety Submittals/Compliance Agencies/Pre-construction Conference/Contractor Safety Enforcement and Compliance/Safety Coordination Meetings/Safety Committee/Safety Audits/ Monthly Reports/CM Safety Training	
		PrM	Provision of On-site Facilities/Coordination/Program Progress Meetings/Time Man't/Budget & Cost Monitoring/Payment Requests/Change Orders/Claims Man,t/Quality Man't/Owner-purchased Materials and Equipment/Record Drawings/Record Keeping/Management Reporting	
Works asked by associations, among other association works	Post-Construction Phase	PM	Activation/Final Payment/Organization of O&M Manuals/Assembling Recordings/Contractor Follow-up/Owner move-in/Start-up/Contractor Call-back Closeout	
		COM	Final Cost Report	
		TM	Occupancy Plan	
		QM	QM Assessment with Owner/Final Report and Recommendations	
		PC/A	O&M manuals&Procedures/Spare Parts and Warranties/Final Permits/Move-in/Start-up Activities /Final Payment/Contract Closeout/Contractor Call-backs/Close-out Reports	
		PrM	Project Completion/Projects Interface/Maintenance Management/Activation/Facility Management	

Table 3. Construction manager selection checklist and Supplemental Point for PMRB

No.	Contents	Supplementary for PMRB
1.	Whether the company possesses technology superior ordering party?	Technical Force including legal consulting Capacity
2.	Whether the company receives confidence enough to 'educate' and 'guide' ordering party?	Trust Conservation and Project Process Ownership
3.	Whether the company possesses professionalism enough to take the agency role of ordering party?	Professionalism of Experts
4.	Whether the company possesses the confidence in capability to make ordering parties beneficial and in expectation effect through evidential examples?	Consulting Capacity thru Legal Procedures and Practical Caselaw
5.	Whether the company possesses the leadership to induce participation and cooperation of core participants?	Leadership

first CM (somebody calls it PM) project was possible with H company in OO Apartment Reconstruction Project in 1988, however, it was failed; T company, a CM and consulting company, developed CM Plan/Project Procedures Manual, the core of CM, in OO Reconstruction project and executes successful professional management of renewal business (consulting) and CM work through application of Construction Management Information System, which was developed jointly with a professional company, in the field. This study intends to make accurate analysis of PMRB under Urban Renewal Act that entered into as of 1st July 2003 in comparison previous consulting, and to propose measures for application of CM. Major conclusions of the study may be summarized as follows:

- (1) PMRB may be said as a work system with level-up of very small part in the limited work for procedural necessity to be performed to support or as agency work within designated work mainly on administrative and legal matters such as acquisition of consents, proceeding general meeting, appointment of participating company, getting various approval and authorization, claim, and disputes. As it is a necessary procedural work and systemic, logic, and reasonable construction operation work is excluded, connection of work between PMRB and CM is suggested.
- (2) Connection with CM includes the range of limited work for basic administrative agency for PMRB and there is the meaning to return benefits to associations (and/or association constituents), the ordering party, through strengthening of basic matters for construction period shortening, construction cost saving, and quality maintenance.
- (3) Application of CM has as high as 80% of efficiency at

initiation of construction and, although the maximum efficiency after initiation of construction is considered, it is as low as 20%, it is efficient to apply CM from designing stage and shortening of construction period and cost saving of whole project is made from designing step.

(4) Application of CM in PMRB requires following conditions:

- 1) Conversion of recognition of CM by ordering parties (associations and association constituents) is required.
- 2) Scheduling and coordination of CM is basically necessary.
- 3) Approach should be made based on assumption that CM service fee should be paid from the source of CM cost saving.
- 4) When CM, including PMRB, is adopted and applied in housing reconstruction/renewal project, the future of our possible vision of housing reconstruction/renewal project is expected to provide associations (and/or association constituents) with wonderful housing through construction of apartment houses by the most appropriate and efficient housing reconstruction/renewal project with application of PMRB and specified technology of CM.¹⁴⁾

REFERENCE

- [1] Ministry of Construction & Transportation, *Article 2, Clause 2 of the Urban and Living Environment Improvement Act*, 2003
- [2] Hyeon-Ju, Kim, *Efficient Execution of Measure of housing reconstruction/renewal project*, Samsung Economic Research Institute, 2003
- [3] Seong-Gyu Doo, *Establishment of the Urban and Living environment Renewal Law and Major Problems with Reconstruction Project*, Construction & Economy Research Institute of Korea (CERIK), 2002
- [4] CMAA, *Capstone: the History of Construction Management and Procedures*, 2003 Edition
- [5] CMAA, *Standard CM Services & Practice*, 1995. & *CM Standards of Practice*, 2003
- [6] Jong-Hoon Kim, *Measures for Activation of Construction Management*, 2003.
- [7] Kwan-Hoe Kim, *Study on Application Method of Construction Management of Apartment House Reconstruction Project*, Master's Thesis of University of Seoul, 2002.
- [8] David Moore, *10% cost saving with application of CM*, *Chosun Economics*, 20th August 2003.
- [9] Seong-Kwon Woo, *Current situation of Construction Management (CM) and Development Opportunity*, 2001.
- [10] Han-Soo Kim, *Conditions for Success in Construction Management (CM)*, Sejong University, 2002.
- [11] Tae-won Sohn, *Human Resource and Organization Management*, Hanyang University, 2002
- [12] CMAA, *Capstone Course*, Unit 2, 2f 60p, 1995
- [13] Ministry of Construction & Transportation, *CM service fee calculation standard, Notification of the Ministry of Construction & Transportation # 2001-220*, 25th August 2001.
- [14] POSEC, *Management Consulting Group, Process Engineering Consulting Report*, June 2001.