ABSTRACTS

of Major Research Reports: 1995~2000

2001. 9

CERIK

Construction & Economy Research Institute of Korea

CONTENTS

Part Ⅱ. Construction Market & Firms

Part Ⅲ. Construction Management(CM) & Engineering

Foreword

This publication contains abstracts of research reports published by Construction & Economy Research Institute of Korea (CERIK). The CERIK was established in 1995 as a private research institution focusing on the construction industry. Our research staff carried out over 250 research projects during the last 6 years. This volume compiles abstracts of 61 research reports originally written in Korea.

Our research reports can be classified into 4 categories; policy analyses, forecasts for the construction market, analyses of construction firms and their strategies, and researches on construction management (CM). Reports on policy issues cover various topics including procurement systems for public works and the deregulation of the construction industry. In the area of market forecasts, we published reliable estimates for the construction industry periodically. Our studies on construction firms focused on management strategies of domestic and foreign contractors. In the area of CM studies, our research projects focused on how to introduce this new contract method into the existing procurement system.

Since the financial crisis of 1997, the Korean construction industry has undergone severe structural changes. We have put much effort on research projects that can put forward policy prescriptions and management strategies respectively for the government and general contractors in trouble.

We are proud that some of our research projects triggered public discussions of new institutional frameworks. These include studies on the real estate investment trust system (REITs), the construction management (CM), and the Remodeling of old buildings.

We hope that this volume will be helpful as a basic reference book to those who want in-depth understanding of the Korean construction industry.

Gun Young Lee, Ph.D.
President of Construction & Economy Research Institute of Korea

Part Ⅰ. Construction Policy

I -1 | January, 2000

Proposal for Improvements of the Evaluation and Public Announcing System of the Contractor's Construction Capacity

Min Hyung, Kim[1)]

After receiving the bailout fund from the IMF, there have been active discussions on the improvement of bidding system for government construction works due to the rapid shrinkage of the private construction market highly. The main focus related to the bidding system is on how to choose the proper construction company. It is however not only difficult but also very sensitive to evaluate the contractor's construction capacity by using objective and empirical resources because its effect on both owners and bidders is great.

Regardless, many construction companies are interested in the evaluation of the contractor's construction capacity, a pre-evaluation systems to bidding. The system has been improved without researching more deeply into foreign examples. Therefore, the evaluation and public announcing system of contractor's construction capacity does not carry out its function as the pre-qualification system of construction capacity. It only emphasizes on the function of sharing construction works.

This report therefore reviews the pre-qualification system of contractor's construction capacity and similar cases in the developed foreign countries. It examines the phase and the function of the evaluation and public announcing system of the constructor's capacity with respect to the relationship between the PQ(pre-qualification) and the final evaluation to choose the best contractor.

It also provides a basic principle for improving the evaluation system, makes proposals for improving the current issues in a short term, and suggests directions for improving the

1) Research Fellow, Ph.D. in Business Administration

evaluation and public announcing system of contractor's construction capacity in long term. In other words, there is a plan to replace the current system by the surety bond inspection (the first step), and another plan to connect each of three inspection; the evaluation of contractor's construction capacity, PQ, and the final evaluation to choose the best contractor, in order to carry out its own function (the second step). But since the surety bond is not matured in the construction market in Korea, it is better to proceed by stages.

I -2	March, 2000

The Impacts and Business Strategies of Constructor and Material Supplier under the Product Liability Law

Min Soo, Choi[1] ·*Woon San, Kang*[2]

Product liability is to regulate a compensation of manufacturer for the damages of consumer caused by defects of product. Product liability is different from defects liability. Defects liability in building requires the contractor to take responsibility in all repairs before the date of final handing-over, but product liability generally related to personal damages of consumers or a third party. Also another prominent feature of the product liability is to regulate a strict liability of manufacturer whether or not the manufacturer or provider was at fault if product has defects.

Korea's product liability law was enacted in December 1999 and will come into effect in July 2002. The law requires those engaged in the design, production or manufacture of products to ensure that their products and services are free of any defects of safety and sanitary concerns.

Under the product liability law, manufacturing industry such as automobiles and household electric appliances has provided against various PL risks. Nevertheless construction industry and building material suppliers have not come up with any countermeasures until now.

Although real estates, including apartments, are exempted from the application of the product liability law, constructors or housing developers are not perfectly free from the product liability law. For example, importer of product or service is also considered manufacturer of product. Consequently, constructor imported or processed building components is liable for the damages caused by defective product.

In this study, various countermeasures to reduce a PL risks are proposed. Firstly, constructor should clarify responsibilities or duties of all the parties involved in a

1) Research Fellow, Ph.D. in Architectural Engineering
2) Senior Researcher, Ph.D. in Law

construction project and consolidate a quality assurance system complying with the ISO procedure. To prepare for a possible PL litigation, constructor should reflect the liability of building material suppliers in the contract document. Furthermore, in housing industry, a housing PL center should be established.

On the other hand, building material suppliers, raw material providers or parts manufactures are strictly liable for physical injury or damage to another's property caused by a defective product. The rise of product liability means that manufacturers and retailers must pay even more attention to quality, product safety and product liability than in the past. Especially, manufacturers producing elevator, water-proofing material and construction machinery must pay more attention to safety of their products.

Under the product liability law, manufacturers, component part suppliers, importers and anyone using a trade name or trade mark should comply with the national and industrial standards. Also building material suppliers should take a serious view of end-user, besides constructor or buyer, as a countermeasure to a guarantee. Further, to enhance the safety level of a product in life cycle, manufacturers should enclose standard specifications or instructive manuals as well as attach a visible warning label.

Ⅰ-3 | January, 1999

The Policy Objectives for the Improvement of Safety Management System in Construction Works

Min Soo, Choi[1)]

The level of safety management in construction sector has constantly lagged behind that of manufacturing and national average. The reasons for this include a low investment for safety management, a transient pool of labor, and traditional labor-intensive construction systems.

To reduce accidents in construction works, the government has intensified outside walk-around inspection and penal responsibility against contractor-caused fatal injuries at construction sites. Furthermore administrative restrictions for construction safety have been tightened up recently. Despite the consecutive counter moves, the fatal injuries at construction sites are not expected to decrease significantly because of serious shortage of skilled labor and increase of high-rise or large-sized buildings.

The main purpose of this study is to present political measures to consolidate safety management at construction sites as well as to integrate the multiple overlapping restrictions.

First of all, an outrageous low bidding price should be disapproved to ensure safety and security in construction works. Especially the safety management cost for anti-accident operation should be put in the budget and paid by a fixed rate in proportion to firstly prearranged price. However, to steer the industry toward higher safety management, it is necessary to increase labor's skill levels through practical training and encourage more responsibilities on the part of the project owners.

Furthermore the liability for fatal injuries at construction sites should be distributed among all participants including the project owner and the inspection engineer. Especially, to improve a safety management operation on job sites, the inspection engineers should have an

1) Research Fellow, Ph.D. in Architectural Engineering

important role in monitoring and controlling the contractor's safety management.

However, one of the most serious obstacles facing the construction safety management is multiple duplicated restrictions between Construction Technology Administration Law and Industrial Safety and Health Law. Therefore needless or ineffective restrictions should be abolished or lightened to increase the efficiency of safety management on job sites.

On the contrary, indispensable key restrictions will help improve the construction safety. Therefore the restrictions should be more strictly strengthened. For example, more essential safety appliance on job sites should be more installed to prevent fatal injuries such as falling and electric shock. Furthermore multiple overlapping restrictions concerning the construction safety should be unified as an integrated and comprehensive law.

Ⅰ-4 | January, 1999

A Study on the Institutionalization of Real Estate Investment Company in Korea

Sang Young, Lee[1] ·Hoo Seok, Seo[2] ·Jin Woo, Kim[3] ·Wong Sic, Sin[4]

The purpose of this study is to survey the conditions and contents of the Real Estate Investment Company in Korea(K-REITs). The introduction of the Real Estate Investment Company, REITs completes the institutionalization of the secularization of real estate, which was introduced in 1998. It is already possible to securitize real estates through SPC (Special Purpose Company), and MBS (Mortgage Backed Securities) are expected to be issued in the spring. However, this institutionalization is incomplete, for it does not focus on the investment of real estate, but rather on the disposition of real estate or the obligation of insolvent. Still more a country like Korea has many problems (the domination of land, non-performing or sub-performing real estates, heavy real estate taxes, and advance payment when selling in lots), therefore revitalization of the real estate market will not be easy even with secularization.

Therefore, it is necessary for Korea to introduce new vehicles of real estate investment which can solve the above problems. Such vehicles will allow investments in new real estate securities as well as the real estate itself. Concurrently, the securities, which are issued through these vehicles, should play the role of small-divided assets. REITs, in the U.S., are generalized to meet these conditions. Furthermore, since the 1960's REITs have been involved in a variety of business allowing them to become the centers for the investment of real estate, especially developing and managing commercial real estate. And although there are

1) Former, Associate Research Fellow in CERIK,
President of Real Estate 114 corp, Ph.D. in Economics
2) Former, Associate Research Fellow in CERIK
President of R2Korea Corp., Ph.D in Business Administration
3) Professor, Univ. of New South Wales, Ph.D. in Town Planning
4) President, Sin&Sin Law Office, Lawyer

other types of vehicles, such as the LPT in Australia, which is in the form of trust, and SPC in Japan, which is in the form of special corporation, this study shows that REITs is the fittest for Korea as vehicles of real estate investment.

Although the Real Estate Trusts (RETs), in the form of trusts type are permitted in Korea, they are limited in many aspects. First, RETs have not operated according to the principle of capitalist market economy, for they are regulated by the public administrations. Second, they are not specialized in the process of developing real estate. In this light, REITs are considered more suitable in Korea's situation. Through REITs, which use outside management companies and invest in high risk real estate, the potential for high returns will be very flexible and dynamic.

This study suggests that important issues to be covered by K-REITs Law are issuance of securities, protection of the investors, and tax benefits. Especially in the case of taxes, it is necessary not only to remove double taxation, but also to cut tax liabilities in real estate transactions. The form of K-REITs should be the stock company which is based on special law and is different from that of the excision SPC and mutual fund. K-REITs are also different from RETs. However, it does not mean that it is unnecessary to introduce REITs as a type of trust. Rather, a law to include a type of trust is needed. There are the RETs, which are based on trust law and run real estate development business. The revision of the trust law accomplishes that purpose.

The purpose of introducing K-REITs is to revitalize the investment in real estate, and this institutionalization of real estate investment is to allow a great number of people to join in real estate investment. Also, the introduction of K-REITs will set the momentum to change the concept of real estate investment which is currently very vague. Namely, this institution will change the concept of the real estate investment from mere speculation of capital gains to the advanced management of net operation incomes.

I -5 | December, 1999

A Time Series Analysis of Construction Orders and Policy Recommendations Based on Short-term Forecasts

Se Jong, Wang[1] ·*Byung Wuk, Kim*[2]

Due to the stagnancy of business activities in every industry since the advent of the IMF's bailout, the need for forecasting future trend of industrial production has increased. In particular, as the Korean economy showed a sign of recovery since the first quarter of 1999 as the private consumption and domestic demand such as investment on machinery and equipment has increased, forecasting of economic trend by type of industry has attracted more attention than before. Compared to the tremendous heed for forecasting, however, forecasting is not an easy task in the era of the IMF's bailout.

The difficulty of forecasting future economic activities solely comes from the structural change of the Korean economy since the activation of the IMF's program. The structural change implies a subsequent change of data generating processes for major macroeconomic variables. Thus, it is difficult or even impossible in some cases to apply a system of structural econometrics forecasting models, which were entirely developed based on the statistical relationship such as causality and/or correlation among economic variables before the financial crisis.

This problem of forecasting, which comes from the application of previous structural econometrics forecasting models, becomes more severe when the subject to be forecasted is the business activities of the construction industry. By the inherent nature of the industry, they are mainly based on construction orders received from the business activities of other industries. The demand for construction orders, as a result, is a derived demand, whose level heavily depends on the condition of the overall business cycle.

---

1) Research Fellow, Ph.D. in Economics
2) Former, Senior Research in CERIK,
Director of R2Korea Corp.

In order to partially overcome this difficulty in forecasting business activities of the construction industry, this study aims at developing a set of time series forecasting models for various construction orders, which are regarded as preceding variables of the construction business cycle. More specifically, the economic time series to be forecasted are total, public, private, civil engineering, building, residential, and non-residential construction orders. In particular, conventional time series models, proposed by Box and Jenkins (1976), are developed in this study.

A severe problem from the application of Box-Jenkins time series models is that the approach also heavily depends on the invariance assumption of the data generating process for the series to be forecasted. In order to overcome this problem, an intervention model, proposed by Box and Hsiao (1975), is applied along with the conventional Box-Jenkins ARIMA (autoregressive integrated moving average) forecasting models. Interventional models are perfectly fitted in the current situation, since they are designed not only to detect the presence of structural change of the series, but also to estimate the magnitude of the impacts on the series.

Using the series from the first quarter of 1975 to the fourth quarter of 1998, a set of ARIMA forecasting models, identified and developed for each type of construction order, are as follows: total order ARIMA(2,1,1)-intervention model, public order ARIMA(2,1,3) model, private order ARIMA(1,1,2)-intervention model, civil engineering order ARIMA(2,1,3) model, building order ARIMA(2,1,3)-intervention model, residential order ARIMA(1,1,2)-intervention model, and non-residential order ARIMA(2,1,1)-intervention model, respectively.

The ARIMA time-series models for various types of construction orders seem quite well fitted in the following four aspects. First, their goodness of fit are very high, normally higher than 95 percent measured in terms of adjusted coefficient of determination. Second, the estimates of the coefficients in each model are statistically significant with at least 5 percent level of significance. Third, the signs of the intervention terms, capturing the positive impact of the two million house construction plan in 1988 and the negative impacts of the IMF's program in 1998, are consistently obtained. Finally, the forecasting errors of the models measured in terms of mean absolute percentage error and root mean square error are fairly small, usually less than 5 percent.

Compared to the good estimation result of these ARIMA models, however, their performance in forecasting the quarterly behavior of these time series since the third quarter of 1999 to the fourth quarter of 2000 is rather disappointing. In particular, the forecasts of

individual time series do not show any consistency in terms of estimation direction. According to the forecasts from the ARIMA models, however, the orders for public, civil engineering, and non-residential construction are estimated to decrease since the third quarter of 1999. On the contrary, the orders for total, private, building, and residential construction are estimated to show a slightly increasing tendency from the third quarter of 1999 to the fourth quarter of 2000, which seems quite consistent with the current trend in business activities of the construction industry.

Overall performance of the ARIMA models, however, has been evaluated as not to have achieved the desired purpose of this empirical study, which was set at the outset. This evaluation mainly comes from the intrinsic limitation of the ARIMA forecasting models when applied to the situation of significantly severe structural change such as caused by the activation of the IMF's program.

As a result, it is required for future study to develop a set of structural econometric forecasting models, which can capture the influence of the structural change, at least partially. Considering the current situation of the construction industry, however, application of forecasting models is inevitably limited in their use, whether they are time series models or structural models. Therefore, it is strongly suggested to rely on the judgemental forecasting of investigators based on the comprehensive analysis of current trend of the construction industry.

Based on the results from the short-term forecasts of various types of construction orders, the following implications for future policy directions are suggested: First, the stagnancy of the construction industry since the advent of the IMF's bailout is not only due to a sharp decrease in demand for construction activities, but also due to over-supply during the early 1990's. Second, the construction cycle since the third quarter of 1999 is estimated to be dominated by the recovery of private construction cycle, in particular residential building cycle.

More specifically, in order to activate the current construction cycle, the following two policy recommendations are given: First, in order to maximize the short-term effect, construction investment from both public and private sectors for infrastructure projects should increase. The government, in particular, should allocate its expenditure to complete the on-going projects ahead of their schedule rather than to proceed new projects. Also, the legal and regulatory environment for private investment for infrastructure projects should be changed in order to attract more private capital into the projects. In particular, the projects

under consideration should be chosen on the basis of profitability, removing the problem of low revenue and the difficulty of financing.

Secondly, along with the increase in investment for infrastructure projects, the residential construction cycle should be activated. In particular, the discrepancy between the demand for and supply of housing facilities during the era of the IMF's bailout should be taken into consideration before policy measures for housing industry are designed and implemented. As a result, the government should assist the participants in housing market financially, along with tax benefits and deregulation for the construction and purchase of housing facilities.

I -6 | January, 1998

The Ways to Improve Current Supervision and Inspection System

Kwan Bo, Kim[1)]

Since 1994, the supervision and inspection of Korean public construction projects has been executed by the private sector engineers under the Chaegim-Gamri System(CGS) in the Construction Technology Administration Law(CTAL). In the process of its implementation, however, several drawbacks have arisen, which include inefficient inspection activities due to uniform legal code and ambiguous role allocation among related parties(owner, contractor, and private engineering companies), inappropriate scope of supervision and inspection activities, and red tape administration, and so on.

The main purpose of this study is to reexamine these several drawbacks through the questionnaire survey of owners' and suggest ways to improve the current CGS in the Korean public construction projects towards the advanced countries' inspection standards.

This study is organized into seven chapters. The first chapter specifies the scope of analysis and survey method. The second chapter offers an overview of current construction inspection-related laws and introduction of the background of the current CGS. The third chapter identifies the limitations of previous studies. In the chapters that follow, the current conditions, drawbacks and their causes, foreign cases, and remedies of the CGS are discussed.

The major remedies of the current CGS are as follows : first of all, to secure technically and quantitatively qualified inspection engineers, supervision and inspection order method be diversified according to project characteristics, financial capability and capacity of supervision and inspection engineers. Also, the scope of supervision and inspection should be reduced to the PQ construction projects over 10 billions won.

---

1) Former, Associate Research Fellow in CERIK
Professor, Catholic Univ. of Korea, Ph.D. in Public Administration

Second, to improve the quality of inspection function, the criteria of engineers' qualifications and placement should be more intensified and supervision and inspection companies should be enormously restructured and specialized. Also, through the alliance (joint contract) or competition with foreign engineering companies, domestic engineering companies should have competitive power in supervision and inspection.

Third, the concept and activities of inspection should be redefined and clarified. It should focus on the action of inspection and comprehensive engineering. In particular, all kinds of inspection activities should be implemented based on the contract document committed between the owner and the inspection companies.

Fourth, the activities of inspection should be actualized under design-construction linkage. To do this, the inefficient current design inspection function should be transferred to the forthcoming 'owner's design consulting committee' or should be amalgamated in the Construction Management(CM) service system. Especially, the CGS in the CTAL and the CM in the Construction Industry Basic Law(CIBL) should be linked to implement efficiently both design and construction inspection.

Fifth, diverse supervision and inspection related laws should be unified into the CIBL or the CTAL for systematic construction project monitoring. Sixth, reasonable scope of authorities, duties, and responsibilities of the supervision and inspection should be granted to inspection companies and engineers. Also, to protect engineers against the serious defective work resulting from their faults, professional liability insurance(PLI) system should be institutionalized. Finally, inspection administration procedure should be simplified and the number of documents reported to the owner should be efficiently reduced.

I -7	May, 1998

Reform Measures for Efficient Operation of the Construction Machinery

Min Soo, Choi[1)]

Construction machines play an important role in the progress of mechanization of construction activities, as their progress directly improves the quality of products in the construction industry. Significant increase in the demand for construction machines, such as excavators, bulldozers, loaders, an graders, has led rapid progress in the 1990's with the aid of vigorous activities in the domestic segments of the public works and building construction involved in the subway development and new city construction projects.

Since the early 1998, however, the numerous construction machinery lease-holders have gone bankrupt or thrown up their businesses. This has been mainly caused by the sudden decrease of new construction activities, especially of the non-governmental sector, as well as rapid increase of interest rate and exchange rate affected by the IMF's bailout package. Also, the total operation ratio of construction machinery in the first quarter of 1998 was around 30%, which is 20 percent point lower than the previous year.

Recently, slightly old construction machines are exported to keep the pace with the change in the domestic demand. The export of construction machinery, on the average by month, reached from 287 in 1997 to 508 in 1998. Most of them were sold to the Philippines. However, it has been pointed out as a serious problem that the exported items are mainly composed of large-scale, imported, and extremely high-cost machines and core-parts. To minimize the sacrifice sale of the second-hand construction machines, first of all, it is required to magnify the governmental construction investment at an early stage, such as highway, farmland, and anti-flood forestation.

---

1) Research Fellow, Ph.D. in Architectural Engineering

On the other hand, mid-term and long-term prospects for the construction machinery industry, including lease-holders, seem positive since the procurement of construction machinery tends to be geared toward rent or lease. Accordingly, on a long-run basis, large-sized firms are expected to appear in the construction machinery market through mergers or acquisitions.

Also in order to assure continuous growth, many problems are yet to be addressed-relatively low safety levels compared to those of automobiles, illegal remodeling of slightly old construction machines such as drilling equipment, and absence of the time limit for retirement from the service.

Along with these problems, several sectors within the industry, however, need to be improved. First, the transportation and delivery organizations need to be rationalized. Second, the communal marshalling of construction machines need to be introduced to curtail the expenses for transportation. Thirdly, concrete mixer trucks need to be allowed to revolve in exclusive bus-line, considering the fact that the delivery time of ready-mixed concrete is restricted to 90 minutes from semi-manufactures.

I -8	July, 1998

Legal Frameworks of Construction Sector of North Korea

Hyun, Lee[1]·Woon San, Kang[2]

This research attempts to survey construction related laws and institutions and facts in the construction industry of North Korea. Since North Korea has a centralized planning system, the construction sector functions as a part of national economy in the process of national economic growth. Thus, the legal framework for construction sector in North Korea is established to support the national economy by utilizing construction sector rather than supporting and developing construction sector per se. However, the construction industry of North Korea does not reveal any significant differences from that of capitalist societies from the construction industry perspectives, providing infrastructures for economic growth, public facilities, and housing, etc..

The legal framework of North Korea consists of three major laws, that is, land law, construction law, and urban management law. Land law defines planning principles and contents of "National Land Construction Master Plan" and basic directives of land development. Construction law, which basically deals with total process of construction, defines planning principles and process of "Construction Master Plan" and basic directives of design, construction, and inspection, etc. Urban management law, which deals with operation and maintenance of constructed facilities in urban and rural areas, defines a maintenance agent of individual building such as public facilities, industrial facilities, and housing, operation of water and sewer system, and maintenance of roads, rivers, and urban greens. In addition to them, there are several ordinances defining the details of each process of construction including "Ordinance of Construction Contract for Basic Construction," Urban Facility

1) Former, Associate Research Fellow in CERIK
Vice President of Real Estate 114 Corp., Ph.D in Planning
2) Senior Researcher, Ph.D. in Law

Management Ordinance," and "Water and Sewer System Management Ordinance". etc..

The results of this research can be summarized as follows: first, the legal system of North Korea is established to facilitate construction activities in order to promote national economic growth: second, construction in North Korea functions as a part of national economy but ultimate goals of construction is to build the national economy: and third, the legal system of North Korea has not been well developed and has provided the fundamental directives and guidelines for the construction sector.

I -9	July, 1998

Proposal for Training and Management System for the Construction Craftsmen

Myung Su, Park[1] ·Tae Hwang Kim[2]

Since the beginning of 1990s, the short supply of construction craftsmen including carpenters, plumbers, welders, etc, has been a constant threat to the effective operation of the construction activity. The inadequate number of construction workers coupled with the low quality of skills has been a stumbling block to the sound development of construction industry. The causes of this phenomena are diagnosed as follows: 1) the higher schooling effects and the increasing proportion of older ages and female population reduce the size of population that has based the construction laborers, 2) the decreasing incentives of the construction trades due to the low quality of working conditions let the current workers leave the construction industry

To encourage more inflow of workers into and longer stay in the construction industry, a revolutionary reform should take place in the labor market for construction craftsmen. The traditional pattern of labor market is that the craftsmen are employed as daily and/or temporary workers, and that their work is assigned by the independent superintendent. Because of these circumstances of the labor market, though the daily wage is high, the number of workdays is highly variable from month to month, and so is the income. To revise the mechanism of flow of workers in the market, this study examines the establishment of the training and management system of the construction craftsmen.

The paper first analyzes the characteristics of the construction craftsmen and suggests the solutions for the increase of labor supply. The findings suggest that what the construction craftsmen need most are stable jobs and the coverage of social insurance which has been

1) Former, Research Fellow, Ph.D. in Economics
2) Research Fellow, Ph.D. in Economics

limited only to permanent workers.

The paper also examines the current vocational training system, both public and private. The poor performance of the current vocational training system shows that it should train workers so that they can immediately apply the learning on site, and that training system cannot be efficient if they are not related with the job placement and labor management of craftsmen.

Based on these findings, the study suggests that function of training and the function of management should be closely related, and that a 'Management Center for the Construction Craftsmen' (MCCC) should be established. The center systematically organizes the craftsmen and provides a stable work, by providing the vocational training program, placement services and employment information services.

A concrete example of the MCCC can be found in the performance of the Pohang Area Construction Workers Union (PACWU). The PACWU is composed of plumbers, pipe fitters and welders. It plays as a representative for these three kinds of trades and does the collective bargaining with the construction firms. The union operates a training school for the union members to upgrade skill level and teach new techniques. It also provide job placement services.

Based on the fundamentals in the proposal for the Management Center which are adjusted by the facts and limitations found in the case of PACWU, the paper describes a working program for the establishment and operation of the MCCC. The Center is to be organized under the auspices of the association of construction. Sources of the fund are from the vocational training levy that is paid by a vast majority of construction enterprises in lieu of carrying out in-plant training program. It operates through the assistance of construction workers union in training craftsmen and in job placement. It is organized at a regional level, and covers most of the trades of construction craftsmen. The Center is expected to play a role in the efficient supply and demand of workers, to give confidence and reliability in construction job to the workers and, through management of workers, to give a legitimate route for the government to execute public policies.

I -10 | September, 1998

A Study on the Rationalization of Defects Liability in Construction Works

Min Soo, Choi[1] · Young Min[2]

In the 1990s, several buildings or structures such as Sungsoo-bridge, Sampung department store collapsed in Korea. The government concluded that the collapse resulted from unreliable construction and prolonged the maximal period of defects liability from five years to ten years. Furthermore, there has been increasing trend of providing consumer protection against defective construction products in our country.

In general, defect liability is that contractor shall guarantee the executed works and shall carry out all the necessary repairs until the date of the final handing-over. The defect liability is generally defined as a strict liability rule. Under the strict liability rule, however, the contractor has a unilateral liability. The contractor has to execute all such work of amendment, reconstruction, remedying defects, or other faults during the period of defect liability.

The purpose of this study is to propose a reasonable period for defect liability by analyzing the fact-finding results for the defects and by closely examining foreign cases. In general, the period of defect liability is one complete year from the date of the preliminary handing-over in other developed countries. From the recent survey, in case of an apartment house, approximately eighty percent of architectural defects, for example, crack, water leakage, or other faults, are generated within two years from the date of the preliminary handing-over in Korea.

Compared with the foreign cases and fact-finding results, the period of defect liability in Korea tends to be far more prolonged than that of other countries and emphasize the convenience of employer or consumer. This is mainly caused by the fact that the warranty

1) Research Fellow, Ph.D. in Architectural Engineering
2) Former, Director of Administration Division in CERIK

period constitutes a part of the defect liability period in Korea. For example, in Japan or Saudi Arabia, the period of defect liability is regulated as only one year or two years with strict liability, but the contractor shall be guarantee for latent defects. That is, the contractor shall be solely responsible, for a period of ten years, for any collapses whether total or partial that may occur as a result of defective execution in the buildings or structures.

In this study, a survey of the CM or construction technology experts was conducted to inspect the validity of the present regulation for defect. The experts, including employers, generally approved the reduction of the present period for defect liability. Accordingly, the period of defect liability should be shortened to less than two years. The rest period will be regulated as a warranty period. That is, the contractors should have a strict liability within one year or two years.

On the other hand, in the negligence liability period, the contractor should take the responsibility for the defects or other faults caused by his willfulness or negligence. If the responsibility is due to any other cause, the contractor has no responsibility, that is, any amounts not insured or not recovered from the contractor shall be borne by the employer, architect, engineer or suppliers of materials depending on the degree of their responsibilities.

Finally, especially in the housing products, the warranty contract for quality should be introduced to compensate for the damage or loss in the long-term period. Also, a design-build or turn-key contract is desirable to clear the liabilities of various participants in construction works.

I -11 November, 1998

Study of Construction Bidding Collusion : the Realities, the Causes and the Remedies

Young Sun, Yoon[1] ·Sang Ho, Lee[2] ·Tae Hwang, Kim[3] ·Sun Hee, Lee[4]

The purpose of this study is to analyze the characteristics of the construction bidding behavior in terms of successful bid rate distribution and to suggest an institutional improvement. Recently, the Korean government has pointed out the pressing necessity of an institutional proposal in order to prevent contractors from forming a collusion during the process of bidding for construction contracts.

After examining the successful bid rate distribution of the construction contracts over 10 billion wons that were procured in the public sector from January 1997 to July 1998, it was found that the total average rate was 86.9%. More specifically, the proportions of the rate over 90% and under 80% were 62.9% and 27.3%, respectively, and on the other hand the proportion between 80% and 90% was at most 9.8%. These polarized phenomena have revealed a possibility of colluding bidding and dumping bidding. These bidding behaviors can be characterized according to the project owner, the type of works, the amount of construction contracts and the bidding period.

The construction firms could participate in a collusion to maintain and maximize their profits in confrontation with dumping bidding. In a way, the bidding collusion can be considered as a countermeasure of the firms in response to the monopsony structure of the construction market ; in other way, it gives rise to an increase in the social cost on the account of deadweight welfare loss, X-inefficiency or rent-seeking behavior cost.

1) Senior Research Fellow, Ph.D in Public Administration
2) Research Fellow, Ph.D. in Public Administration
3) Research Fellow, Ph.D. in Economics
4) Senior Researcher

According to the current bidding system, there are some structural problems by which the construction firms may be led to forming a collusion. The bidding system, mainly focused on the bid price, tends to incite the bidders to a lowest price and then to a simple adjustment of the bidding price between them, so that they could share the profits of a higher price. In addition, as this system puts in practice the unit price type based on quantities, the contractors have no incentive to economize the unit price or the quantities, and they would be involved in a quantitative competition in terms of a bidding price. In the process of this uniform price competition, the bidders can keep homogeneity so as to facilitate the bidding price adjustment among them.

As a conclusion, the bidding collusion is caused, in one sense, by the moral hazard of the construction firms, and in the other sense, by the institutional conditions of the current bidding system. In order to improve the institutional problems, the bidding system focused on the single-lined price criteria must be replaced by the composite bidding-contract method according to which one can evaluate original(heterogeneous) characteristics of each firm in an integrated viewpoint : not only the level of bidding price, but also the level of technology, project management capability, contribution to the social welfare, etc.

I -12 | November, 1998

The Remedies for Improving Subcontract Payment Systems in the Korean Construction Projects

Kwan Bo, Kim[1)]

The maintenance and operation of a fair and sound subcontract payment system in construction is a very crucial issue for the equal and cooperative relationship between prime contractors and subcontractors as well as for the prevention of defective subcontract work. Until recently, however, the current subcontract payment system has not been on the right track toward these goals. Why has the current system not performed well? How are the foreign subcontract payment systems operated? What kinds of remedies can be suggested to improve the current system? To respond to these queries, this study tries to identify the problems and their remedies of the current subcontract payment system in the Korean construction projects.

This study is organized into six chapters. The first chapter specifies the scope of analysis in the overall flow of subcontract payment with three phases: 1) prime contractor - subcontractor, 2) orderer(owner) - prime contractor, 3) subcontractor - (informal)second - tier subcontractor. Each phase includes three types of subcontract payment system : advance payment, progress payment, and final payment. Two additional safety measures against the delay and rejection of subcontract payment are the subcontract payment bond and orderer(owner)'s direct payment schemes. The second chapter offers an overview of the above mentioned five types of subcontract payment-related systems, which are formulated in the Construction Industry Basic Law, the Act of Fair Subcontract Transaction, the Act Relating to Contracts to which the State is a Party, and the Budget Account Law. In the chapters that follow, the current conditions, problems, and remedies of five systems are discussed. In

1) Former, Associate Research Fellow in CERIK
Professor, Catholic Univ. of Korea, Ph.D. in Public Administration

particular, the field survey results are amalgamated in the current conditions. The primary suggestions of each system are as follows.

First of all, the remedies in the advance payment system are preferential treatment in the tender to the prime contractors whose advance payment performance is outstanding, the operation of advance payment coupon system, the abolition of conditional rules in the guidelines of advance payment, and the revision of advance payment related rules in the Local Financial Law. Secondly, the alternatives in the progress and final payment system are the unification of progress (final) work inspection and payment application, the reasonability of the adjustment of the contract amount due to price fluctuation and modification of design, the award of challenge rights to prime contractors against the default of owner, the pursuit of fair treatment of financial institutions(banks) to construction sector, the reasonability of interest rate on arrearage, and the transformation of fair trade policy toward the cooperation of owner - prime contractor - subcontractor. Thirdly, the subcontractor payment bond system should be implemented with the following measures: the choice of autonomous mutual payment bond principle of prime contractor between owners and prime contractors, the owner's liability for the premium cost of subcontract payment bond, the decision of reasonable work standards and amount of subcontract payment bond, and the improvement of payment system in the informal second-tier subcontract phase. Finally, the main suggestions in the owner's direct payment system are the progressive implementation after the pursuit of subcontractor management system and the provision of the reasonable conditions of direct payment based on the contract between owners and prime contractors.

The final chapter stresses the reform of attitude and consciousness by the participants(owner, prime contractors, subcontractors) involved in the subcontract payment phases, which should be paralleled with the institutional reform itself.

I -13 January, 1997

A Study on the Transformation of Public Works Ordering System

Sang Ho, Lee[1)]

Since 1961, the public works ordering system of Korea has been overly centralized. In the 1960s, the centralized public works ordering system was efficient in dealing with severe corruption and for transparent of construction contracting process. Furthermore, expert public servants to take charge of public works ordering process were very few. However, recently, the trends of globalization. localization, decentralization, and privatization have been predominant, and individual central and local government units have acquired more expert public servants than OSROK(Office of Supply, Republic of Korea). Therefore, the institutional reform of the current public works ordering system is needed to cope with construction market opening and joining of Government Procurement Agreement.

The purposes of this study are to examine the current public works ordering system in the perspective of system theory, and to suggest its transformation into the decentralized system, which would cope with the era of globalization and localization.

In the perspective of system theory, the current public works ordering system is examined. The results are as follows : First of all, current system is focused on transparency rather than efficiency. Secondly, with respect to ordering timing, procedure, quality, diversity and convenience, centralized system is inferior to decentralized system. Finally, according to the market opening and Government Procurement Agreement, Korea lacks of institutional instrument that would to protect small and medium size construction firms.

The following specific strategies are proposed to institutionalize a decentralized public works ordering system. First of all, the regulation of delegating ordering to the OSROK

1) Research Fellow, Ph.D. in Public Administration

should be abolished. Secondly, individual ordering agencies have to possess their own ordering rules. Thirdly, to enhance expertise of public servants, systematic education and training program of public works ordering should be executed. Finally, the reform of public personnel system and organization is needed.

I -14 June, 1997

Survey Report on the Demand and Supply of the Construction Technical Manpower

Myung Su, Park[1)]

The opening of construction market challenges the Korean construction industry. Facing the changes in domestic and overseas market, the construction industry has been trying hard to adopt an advanced production system. It requires more inputs from engineers and technicians. This study examines the demand and supply of the construction technical manpower, especially the engineers. The engineer group is composed of hierarchical order of professional, class 1 and class 2 engineer.

The number of graduates of universities and colleges is about 14,000 in the area of civil engineering and architectural engineering. Total number of certified engineers in the area of construction technology is about 300,000 ; 68,000 in civil engineering and 92,000 in architectural engineering. From the aspect of the hierarchical order, the professional engineers take 3% of the whole certified construction engineers, and class 1 and 2 engineers take 49% and 48%, respectively.

The manpower demand by the construction related organizations as required by the law amounts to about 100,000 engineers; about 25,000 by general and specific contractors. Also it is estimated that about 24,000 engineers at minimum were legally required for the construction work in 1995 due to the construction site placement rule.

The total number of construction engineers is 115,731 of which 37,869 are in civil engineering and 56,039 in architectural engineering. From the aspect of the hierarchical order, the professional engineers are 7,363 and compose 6.4% of the construction engineers population. Class 1 and 2 engineers are 66,517 and 41,851 respectively. To be qualified for

1) Former, Research Fellow in CERIK, Ph.D. in Economics

engineers, one must pass through the national technical qualification tests. The national technical qualification system establishes the testing standards and certification, thereby upgrading the quality and social standing of technical manpower. Since 1992, workers without national technical certificate, but equipped with enough education and career, have been recognized as engineers. The number of this type of engineers is 77,430. There are four hierarchical ranks; special, high, middle and elementary level.

Based on the survey on the employment of the general contractors, the deficiency rate of construction engineers is found to be 5.2%; 5.4% in civil engineering and 4.6% in architectural engineering. Safety area shows 8.8% which is the highest deficiency rate. The deficiency rate of professional engineers, class 1 and 2 engineers are 4.8%, 5.0%. 6.7%, respectively. As for the education and career engineers, the deficiency rate of special, high, middle and elementary level is 4.1%, 5.5%, 6.2% and 1.6%, respectively. It shows that the engineers who can perform the linkage role between high level technologists and craftsmen are most wanted. As for the size of the construction company, smaller company shows higher deficiency rate. The reasons why company needs more engineers are; first, more amount of work is required due to the tighter inspection and diversified consumer demand, and, second, there are larger amount of construction orders.

As for the solution of deficiency problem of construction engineers, construction manpower policies are suggested. They are as follows; ① reflect the work site career for the evaluation of national certificate tests, ② expand the area of construction technology for the national technical certificate system, ③ expand the area of construction technology curriculum, which is used as a basis for qualification criteria of the education and career engineers, ④ recognize the workers who have not received construction technology education, but have construction work career, as engineers, ⑤ raise the efficiency of the education and training, ⑥ update the construction site placement rule, ⑦ activate the private technical certificate system, and ⑧ develop an efficient operation mechanism for the career management system.

I -15 | December, 1997

Implementation of a New Cost Estimation Method Using Bill of Quantities

Kyung Re Kim[1)]

The existing cost estimation method in Korea is based upon the production rate called "Poom Saem". A major problem of the existing cost estimation method is that it does not properly consider the characteristics of each projects, such as site location and standards of the project. Also, there is no standard format to produce a unit price. As a result, there have been a lot of improper change orders during the construction.

Therefore, the government is trying to adopt a new cost estimation method using Bill of Quantities in the construction industry. The main purpose of this adoption is to resolve the problems of the existing method and to simplify owner's cost estimating procedures. Main difference between the new and existing one is in applying the historical database of similar projects and altering the unit price based on time, size and location of the projects.

However, the adoption of the new cost estimation method is not a just reformation of the existing cost estimation method, but is a reformation of the whole tendering and contracting systems. Therefore, this research suggests a collaborative approach of the owner, contractor, and Construction Association of Korea to implement the new cost estimation method effectively.

1) Former, Associate Research Fellow in CERIK
Professor, Univ. of HanYang, Ph.D. in Civil Engineering

I -16 December, 1997

Measures to Improve the Budgeteering of Environmental Conservation Cost in Construction Projects

Min Soo, Choi[1)]

The purpose of this study is to analyze the environmental issues at job sites, and to propose alternative measures to ameliorate environmental conservation in construction field with priority given to necessary cost. In general, appropriation for anti-pollution facilities in the budget is essential for the prevention of air or water pollution, noise, and vibration by reason of driving of pile, excavation, blasting, or demolition at job sites.

In 1985, the expense for environmental conservation has been introduced in the working rule for estimating of construction cost under the direction of the government in response to increasing concerns about the prevention of pollutions in construction projects. Nevertheless, in numerous construction projects, the expense for environmental conservation hasn't been properly appropriated in the budget.

The results of this survey shows that the expenditure for anti-pollution facilities to prevent air pollution from construction is relatively higher than other expenditures for environmental protection on job sites. There is still much to be desired, however, in the expenditure for anti-pollution facilities against noise and vibration from job sites.

By contrasting owner-paid appropriation with actual expenditure for environmental conservation at job site, the average ratio is 33.7% for antipollution facilities, 37.2% for waste disposal, 31.7% for waster recycling, and 19.8% for site-cleaning. Judging by these results, it is concluded that the owner put in only 30% of actual expenditure to protect pollution by a construction project in a contract phase.

On the other hand, the ratio of cost for environmental conservation in lump-sum of

1) Research Fellow, Ph.D. in Architectural Engineering

construction cost in a contract phase reached 0.713% on average.

In general, the costs for environmental conservation are widely distributed by reason of construction scale, location of job site, and adapted machines and process. Judging from the results of simple regression analysis of environmental conservation costs and corresponding construction costs, it is concluded that the environmental conservation cost has no correlations with lump-sum cost of construction. Therefore, the cost for environmental conservation cannot be obliged as a fixed standard rate against lump-sum of construction cost.

It will be possible to comply with the demand for environmental conservation on job sites by setting up many sided and sufficient anti-pollution facilities. It is expected that both the introducing of standardized tools to estimate the quantity of anti-pollution facilities and the revision of regulations and obligations related to environmental policies will readily be able to extend the appropriation for environmental conservation in case of placing an order of construction project. Among numerous anti-pollution facilities and equipments, judging from the results of the survey, soundproofing panel, wheel-washing facility, waste chute, incinerator, sprinkling equipment, watering cart, muffler, recycling apparatus, sewage disposal facility are pointed out as indispensable equipments on job sites.

Ⅰ-17 January, 1997

Policies for Project-Partnering

Sok Mook, Lee[1)]

The main purpose of this study is to investigate the problems in project-partnering, to explore their causes, and to present policies inducing vigorous project-partnering in government construction projects.

In regard to the research methodology, the study first identified the policy incentives and their characteristics for project-partnering in the Korean government procurement system. To find the problems, the study analyzed the survey that was done by CERIK for a diagnosis on the management of small and medium construction firms. Second, in relation to the general problems in project-partnering, the study did a survey and some interviews with those people engaged in project-partnering to collect data in detail and explore the causes of the problems. Finally, based on the problems and causes, the study presents some policy suggestions.

Following Chapter Ⅰ, introduction, Chapter Ⅱ, identifies that project-partnering differs from partnership, consortium, and joint venture. It introduces the objectives and types of project-partnering and reviews the policy direction of other countries in their incentives of project-partnering. It concludes that they are aiming to assist the small firms.

Chapter Ⅲ introduces the Korean policy incentives for project-partnering and presents the contract results and pattern by firm size(large, medium and small). It shows that most of project-partnerings have been made between large firms in Seoul and small ones in local areas. The study found that consequently the government incentives have been given to large firms in Seoul responding to have project-partnering with small firms in local areas. It is different from those of developed countries' incentives given to small firms.

In Chapter Ⅳ and Ⅴ, the results of the study are presented. The problems in

1) Research Fellow, Ph.D. in Town Planning

project-partnering are presented in Chapter Ⅳ and causes of them in Chapter Ⅴ. The problems are such as paper-contracts aiming for government incentives; large number of partner members ; unrefined contract contents between partners ; problems in the implementation process(e.g., negotiation delay between partners ; problem of keeping separate accounts between partners ; problem of personnel administration).

Consequently, the individual problems are related with two categories of issues, paper-contract and operational issue.

First, the causes of paper-contracts are ;

·Lack of estimation for project-partnering during bidding process;

·Lack of fundamental complementary relation between partners;

·The fact that some firms are allowed to be partners for the merit of future bidding ;

·Severe operational disputes between partners.

Second, the causes of operational problems are ;

·Insufficient contract contents for project-partnering ;

·Not allowing for the association of project-partnering to register as an independent organization for tax purpose ;

·Lack of management skills in project-partnering.

According to the problems and causes found, the study suggests the following policies in Chapter Ⅵ. They are ;

·As an essential factor, project-partnering with different functions, such as project management, building and financing among partners, are to be stimulated. Also the policy inducing individual firms to have specialty areas in building is suggested in such a way that government procurement should favor for those firms who have specialty areas. Also the objective of construction business license system should be changed from the aspect of prohibiting unqualified firms' market entering into the other aspect of endorsing those firms with specialized job areas ;

·For the legitimacy of receiving government incentives by project-partnering, the applied partnering associations should be estimated in such a way whether they are eligible of receiving policy incentives ;

·Introducing a new license is suggested for those partnered associations consisting of small firms. And some incentives (e.g., premium points in bidding estimation) can be given

to the associations ;

·Statutory law can be considered allowing the associations to be eligible in registering at tax office as an independent business organization ;

·The present standardized contract form for project-partnering should be enriched with more detailed contents for the elimination of operational disputes. In essence, they are the one that provides the guidelines for the rights and responsibility between partners.

I -18 | September, 1997

A Study on the Guarantee System of Public Construction Contract and the Construction-related Financial Cooperative : Current Problems and Proposals for their Solutions in Korea

Eui Seop, Lee[1)]

The Korean guarantee system of public construction contract has economic irrationality. The negative effects of such irrationality on construction industry did not materialize because the number of construction firms was limited and there was no major contractor's default. However, as the number of construction firms increases, the negative effects has been felt recently : the number of bankrupt firms has increased and construction-related financial cooperatives, which are bonding institutes, have become financially weak and even insolvent.

This study investigates the problems and suggests their solutions in guarantee system of public construction contract. Also, the study investigates the current state and operating problems of construction financial cooperatives and suggests improvement methods for the government.

The solutions to the problems with the guarantee system of the public contract are suggested using three criteria. First, the guarantee system should ensure the equal footing between project owner(i.e., government) and the contractor. Second, the contractor or the bonding institute should reimburse the owner only for the loss suffered from the contractor's default, not the total bond amount. Third, the cost of guarantee system should be ultimately borne by the project owner because the project owner benefits from the guarantee system.

With respect to criteria stated above, the solutions to the current problems with the guarantee system are as follows.

First, the bonding institute should reimburse the owner only for the losses from the contractor's default for each guarantee scheme, because the goal of guarantee system is

1) Research Fellow, Ph.D. in Economics

compensatory in nature upon the contractor's default.

Second, the government should return the cash deposit, a Difference Guarantee, to the contractor if the project is more than half in progress as well as Difference Guarantee bond is submitted by the contractor.

Third, the contract bond amount of long-term contract, which is composed of several one-year contracts, should be based upon total contract price. However, when each one-year contract is completed, the owner should reduce the bond amount by the proportion of the price of one-year contract completed to total contract price.

Fourth, the bond premium should be included in the cost estimated by the owner and the owner reimburse the contractor the premium when the owner makes the first progress payment.

The supervising authority of the financial cooperatives should devise a measure to help them become financially strong. Also, the construction-related financial cooperatives should be listed as organizations which can include indemnity allowance and/or reserve accounts as costs for tax purpose.

I -19 September, 1997

Implementation of Grading Scheme in the Pre-Qualification Process of Construction Tendering

Jeong Ho, Moon[1)]

The purpose of this study is to suggest positive and prescriptive guidelines of implementation of "Grading Scheme" as one of the efficient ways of pre-qualification of contractors in the process of government construction project contracts. In the amendment of The Law of Public Contract in 1996, a Qualified Contractors Listing System has been formally introduced, which may be enlarged to the more general "Grading Scheme" of contractors. With such a new scheme of pre-qualification of bidders, the government ordering agencies are to arrange and operate their unique grading system; yet, the agencies such as The Office of Government Procurement has not been installed the system. In this regard, this study was conducted to show how the grading scheme can be modified as a refined PQ system for the various ordering agencies

The current PQ system in the government contract was formally implemented in 1993. The Law of Public Contract rules that the client (government agency) may carry the PQ examination for the contracts of 22 types of work including highway, bridge, tunnel, railroad, subway, airport, seaport, dam, stadium, water and sewage system, etc. of which estimated contract amount exceeds 10 billion Won. The Ministry of Finance and Economy (MOFE) rules the evaluation factors and weight of those factors in PQ examination

In such an institutional scheme, various imperfections and problems are imposed. First of all, the Korean contractors, especially mid and small size companies complain that there are unnecessarily too many PQ cases. Also, since the evaluation method in PQ adopts more rigidly quantified indicators than qualified ones, the reliability and discrimination power of PQ examination are often in dispute. And in the process of actual process of carrying out the PQ

1) Research Fellow, Ph.D. in Planning

examination, there observed some procedural problems such as inconveniences in documents attachment, imperfections in certifying mechanism of contractors statements, and so on.

Grading scheme can be efficiently used to supplement the inflexible PQ system. Contractor grading system or similar one is adopted in many countries like Great Britain, Japan, China, the Philippines, etc. The core of this system is to list up qualified contractors through a periodical evaluation process and to keep a classification of contractors according to their level of qualification results. Applying such a system, government agencies as clients could save time and cost for pre-qualification to a significant level. Parallel with the contractors grading system, the project base PQ should be sustained for the large size and high technology type of work.

Also, the current institutional scheme of PQ system should allow more autonomy of government contract agencies working in the line of actual practice. Many experts and practitioners in those agencies need to modify the given scheme according to the characteristics of the agency and to the peculiarities of the contract in order to perform more qualified PQ examination. With a proper implementation of grading scheme, each ordering agency is able to make up more suitable PQ system.

This study suggests three different scenarios of implementing grading scheme according to the different situation of ordering agencies. First, in case of government agencies with small amount of construction contracts such as small municipal governments, this study suggests the simplest way of sustaining a list of qualified contractors by applying the result of "Contractors Evaluation Bulletin" updated every year by the Ministry of Construction and Transportation. Those agencies may add some other evaluation factors such as contractor's contract history with the ordering agency in the grading scheme.

Second, in case of agencies that are specialized in a specific construction field such as Korea National Housing Corporation, Korea Electricity Corporation, etc., this study suggest for them to keep more specific listing and grading of contractors according to the type of works. Since those agencies have kept a long and well-refined history of contracts, they would have set up unique criteria of evaluating contractors. Third, in case of a comprehensive ordering agencies such as The Office of Government Procurement, this study suggest to arrange various methods of grading with various type and scale of works. In particular, grading scheme in such a case can be applied to the modification of Contractors Evaluation Bulletin system.

I -20 December, 1997

The Strategies of Improving Korean Overseas Construction Industry

Min Hyung, Kim[1] · Sang Ho, Lee[2]

Korean overseas construction industry is rapidly growing up recently. But the environment of overseas construction market is very different from the 'middle east miracle' in 1970s. Though the size of market is growing, project financing capacity, soft engineering technology and the building of information system are emerged more important factors in overseas construction markets. But Korean overseas construction firms are relatively disadvantaged compared to U.S. or Japan because they lack these factors.

The purpose of this study is to establish strategies of improving Korean overseas construction industry in the long term perspective.

In chapter Ⅱ, recent trends and outlook of world construction markets are described briefly. Chapter Ⅲ is about current state of Korean overseas construction industry and its defects. In chapter Ⅳ, long term goal of Korean overseas construction industry is established, and chapter Ⅴ suggests specific strategies for improvements.

The suggested strategies are the enhancement of market diversification and the level of localization, building of overseas construction industry information system, the improvement of project financing capacity through Global Project Investment Fund(GPIF), increase the role of Economic Development Cooperation Fund(EDCF) in overseas of entering the overseas construction markets, improve soft technology in order to meet clients' needs, to deregulate unnecessary domestic construction regulations, and enlarge education programs for overseas construction professionals, and so on.

Now Korean overseas construction industry has important role of mitigating the currency crisis, like in the 1970s. In this era, the entrepreneurial spirit is highly necessary.

---

1) Research Fellow, Ph.D. in Business Administration
2) Research Fellow, Ph.D. in Public Administration

I -21 | December, 1997

IMF Bailout and the Korean Construction Industry: Impacts and Countermeasures

CERIK IMF Task Force Team

The purposes of this study are twofold : the first is to forecast and analyze the impacts of the IMF's bailout on the Korean economy with a special focus on the construction industry. The second is to propose a set of countermeasures and strategic policy guidelines for the Korean government and construction firms who are destined to overcome such an economic turmoil

Entering 1997, the economic news became worse in Korea. A series of high-profile bankruptcies, beginning in January with Hanbo Steel and continuing in July with Kia Motors, led foreign creditors to begin shying away from rolling over loans to Korea's ailing banks. Wildly imprudent lending policies have led to mountains of bad debt and economic instability. And, the government's countermeasures against such problems have generally failed. As financial and exchange rate crisis is just ahead, Korea has come to sign up for the International Monetary Fund (IMF) bailout.

In return for a $55-billion bailout, the Korean government agreed on the conditions to slash the current account deficit to 1% of gross domestic product, inflation to 5% and economic growth rate to less than 3%. The prescriptions from the IMF include restriction on government spending, boosting domestic savings, raising interest rates, scaling back large-scaled infrastructure projects and paring growth targets. Also, the IMF expects the government to disclose all data relating to foreign exchange reserves, bank capitalization and Chaebol ownership.

These conditions would result in rising prices, reduced social welfare services, more unemployment and more bankruptcies. The forecasted results of this study imply that the Korean economy in 1998 would go through a typical stagflation of low economic growth and high inflation. The current study estimates the major macroeconomic indices of Korea in the year 1998: economic growth rate as 2.0 ~ 2.5%, consumption growth rate as 2.5% ~ 2.8%,

investment growth rate as -8.9%, consumer prices index' increase as 5.0 ~ 5.5%, corporate bond interest rate as 17.0 ~ 20.0% in the first half of the year and 14.5 ~ 16.5% in the second half, unemployment rate as 4.5 ~ 5.0%, deficit in the balance of payments in the range of 40 to 60 million dollars, and the exchange rate (₩/$) up to 1,300 won.

The Korean construction industry would be one of the most severely suffering sectors under the change of an economic situation. Most of all, a decrease in capital investment of the private sector and restricted government spending would seriously decrease construction orders. High interest rate and tightened financial market would worsen current liquidity crunch for individual contractors and related businesses. This study estimates the 1998 construction orders up to 70.6 trillion won with the sharing rate between the public and the private sectors as 42.8% and 57.2%. Compared to 1997, the construction orders are estimated to decrease by 9.9%: the decrease in the public and private orders by 7.0% and 12.0%. The biggest reduction is forecasted in the construction orders of private civil engineering section by 22.0%, mainly due to the difficulty in proceeding large-scaled private capital induced infrastructure projects.

Financial condition for construction firms is also estimated to be worse in 1998. As ordinary financial sources such as loans from banks, corporate bonds and stock would be restricted, most of the construction firms would be faced with serious danger of bankruptcy. As inflation rate goes up, construction cost will also increase, and operation cost will be a heavier burden. Under such a condition, even a series of bankruptcy of the construction firms could happen. And, it seems to be inevitable for the Korean construction industry to survive a severe recession for a longer period of time than the other sectors of the economy such as manufacturing industry.

In spite of these gloomy forecasts, this study paradoxically insists that the IMF's prescriptions would inject necessary discipline into the Korean economy and the construction industry. The current financial and foreign exchange crisis actually came from the deep-rooted structural problems of the Korean economy. Facing the era of opening overall markets, Korea was not successful in establishing market mechanism and in transforming the old-fashioned economic behaviors and corruptive relationships among Chaebol, banks, and the government to a more competitive and transparent economic system. As a result, the current study recognizes the recent IMF's prescriptions rather positively, and suggests accepting this economic crisis as an opportunity for the next giant step.

This study takes three ways in proposing countermeasures and strategic policy guidelines for the Korean government and the construction firms: to positively accept the IMF prescriptions, to minimize undesirable side effects in the next short term, and to aggressively formulate and implement a restructuring program for the construction industry. On the basis of these three principles, the major suggestions of this study are as follows.

In the short term, up to the first quarter of 1998, the government is required to stop the domino bankruptcies of sound construction firms, although it is natural and inevitable that financially weak and careless construction firms would closed. Financially sound and well-managed ones need to be protected for the industry. In order to selectively protect sound construction firms, the government needs to raise a certain level of funds and administrative measures as well as to prepare a series of decent criteria to determine the credit level of individual construction firms. On the contrary, private firms need to reevaluate their managerial and accounting system, and ongoing projects. Also, they are required to do their best in searching for financial resources and in cutting expenses.

If the current situation is to be mediated in the middle of 1998, the government needs to propose a set of programs for restructuring the construction industry. These programs would include wide range of institutional and legislative reforms such as construction license system, public bidding and contracting laws, deregulation of sub-contract regulations, introduction of various production systems such as engineering procurement and contracting (EPC) along with a financing mechanism, franchise, and other measures and programs in order to enhance soundness of construction firms and to facilitate firm's specialization. Along with such policy programs, the government is also required to propose proper support for survived construction firms.

Those programs, when successfully designed and implemented, will help in restoring confidence from the foreign investors as well as domestic investors. In order to obtain the maximum results, such efforts need to be accompanied by tighter regulation as well as more competitive and transparent management.

I -22 April, 1996

A Study on Unfair Trade Practices and Their Remedies in Public Construction Contract : With Reference to the Korean General Conditions of Construction Contract

Kwan Bo, Kim[1)]

Recently, in relation to performing the public construction contract, many general contractors demanded the establishment and upholding of strict principles of contract. The "Act Relating to Contracts to which the State is a Party" and the "General Conditions of Construction Contract" declare that the contract shall be concluded with the agreement of contracting parties in equal standing and both parties shall carry out the terms of the contract according to the principles of faithfulness and honesty.

Contrary to this principle of contract, however, there have been many unfair trade practices in the public construction contract have been made by the predominant behavior of the owner(government). Such misconduct in the performance of public construction contract will surely become a crucial issue of claims and disputes in accordance with the forthcoming construction market opening as well as the Government Procurement Agreement.

The purposes of this study are to investigate the current unfair trade practices(cases) of the owner by employing the methods of questionnaire survey and data collection from the Fair Trade Commission and to suggest a proposal for their remedies with reference to the General Conditions of Construction Contract of the Republic of Korea and that of FIDIC.

The survey results of unfair trade practices can be categorized into three stages of a contract : 1) execution(conclusion) of contract, 2) performance of contract, 3) termination of contract. Seven types of unfair trade cases are identified in those three stages of contract as follows. First of all, improper special conditions are specified in the execution(conclusion)

1) Former, Associate Research Fellow in CERIK
Professor in Catholic Univ. of Korea, Ph.D. in Public Administration

stage of a contract, giving the owner the advantage. Unreasonable joint guarantor condition can be included in this stage. In the performance stage of a contract, four kinds of unfair trade cases are revealed : delay of adjustment of the contract amount due to price fluctuation, delay of adjustment of the contract amount due to the modification of the design, delay of construction period due to the faults of the owner, and delay of payment upon completion of construction and suspension of interest payments. Finally, in the termination(completion) stage of a contract, mal-practices on the deposit and period for defects liability have been conducted by the owner.

The causes of these unfair trade practices can be reviewed in two dimensions. One is that the Korean General Conditions of Construction Contract themselves have not been stipulated based on the principle of equal standing between two parties, namely the owner(the State or the Government) and the general contractor. The other is that the owner has traditionally exploited the contract conditions for his own advantage in the predominant position.

The basic directions for the remedies of these unfair trade cases are to institutionalize consciousness reform and contract mechanism to create more advanced construction environments through the establishment of a fair trade order in the performance of public construction contract and to improve the current contract conditions with standardization, and internationalization, all of which can reduce contract claims that are bound to rise with the opening of the construction market.

The proposed solutions to the unfair trade practices are as follows. First of all, concerning the design modification and price fluctuation, the owner and the contractor must bear the equal footing in terms of authority and responsibility. In particular, under the current Responsible Engineering System(chaekim gamri), the authority to adjust the contract amount should be rationally delegated to the engineer under the supervision of public officials(supervisor) in charge of the construction contracts. Also, adjustment requirements should be improved in accordance with the international standards. Secondly, liability conditions due to the accusation of the owner should be concretely specified in the General Conditions and other contract documents. Thirdly, construction payment terms should be curtailed from ninety days to thirty days. Also, the interest rate on arrearage should be properly realized. Fourthly, the contents and period for defects liability should be improved according to the international standards. Also, like the payment of retention money in the

FIDIC conditions, current deposit for defects liability system should be revised. Fifthly, joint guarantor system should be abolished. Sixthly, the investigation condition for checking whether the subcontracting award price is below the certain criteria(88%) should be abolished because it lacks both the effectiveness and the sense of reality. In particular, as the market opens and the Government Procurement Agreement become effective, there will be serious claims and dispute issues that are not in line with the general international practices. Seventhly, a construction dispute resolution organization(Construction Dispute Resolution Board) should be established and its functions should be invigorated with reference to the international construction resolution system(Alternative Dispute Resolution: ADR). Finally, the compensation schemes against the accusation of the owner should be clearly specified in the General Conditions like the procedure for claim in the FIDIC clauses.

In addition, more importantly, the consciousness reform for the fair contract performance of the owner should be accompanied with the institutional reform of the General Conditions..

I -23	June, 1996

A Study on Construction Bonding and Loan System : Current Problems and Proposals for their Solution

Eui Seop, Lee[1] · Se Yol, Jeong[2]

The construction environment has been and will be changing drastically in Korea. These changes are in fact reflected in the business environment for the KCFC(Korea Construction Financial Cooperative). As well, the KCFC experienced a peculiar liquidity problem in 1995 because the amount of indemnity payments to obligees sharply increased due to the unprecedented bankruptcy rate of construction firms. If such an increase in indemnity payments continues and thus the financial status of the KCFC becomes more insolvent, the KCFC cannot function properly as a bonding institution, which in turn incurs unnecessary losses to most members of the KCFC.

To enable the KCFC to handle the impending challenges and problems more effectively, this report first investigates the effects of changes in business environment on the KCFC and suggests strategies for its operations.

We examine the nature of members' capital sharing and the related functions of KCFC. On the basis of this examination, we suggest future strategies for efficient asset management. Especially we propose that the KCFC introduce the allowance accounts for indemnity payments and reserve accounts.

Also, this report evaluates the adequacy of the current bond rate and borrowing rate, and concludes that they are too low to be sustained. We then examine problems in the credit evaluation system and loan guarantee business and set forth the directions for their improvements. Finally, the current status of the mass bankruptcy of construction firms is investigated with some recommendations are made for the improvement of the bonding business of the KCFC.

---

1) Research Fellow, Ph.D. in Economics
2) Former, Associate Research Fellow in CERIK
Editorial writer in Meill Eoconomics Newspaper, Ph.D. in Economics

I -24 August, 1996

A Study on Calculation and Effective Management of Quality Control Cost in Construction

Kyung Re, Kim[1)]

Quality control in construction projects became a hot issue after a series of big disasters such as the collapse of the Sung Soo Bridge. These example of man-made disasters surely rang a bell for Korean owners, designers and contractors who neglected quality control in many of the construction projects.

According to the existing Construction Technology Management Law, quality control is merely defined as a quality tests even though it is generally defined by the total expenses for quality test including inspection and prevention throughout the project life cycle in order to meet owner's requirements. Naturally, expenses for other types quality activities, such as quality assurance, ISO systems, and quality inspection at the job site are not adequately compensated. The Korean contractors have been paid for the narrowly defined quality tests while all other quality control expenses were borne by the contractors themselves.

82 construction sites of buildings, civil and plants were investigated to identify the actual size of the quality assurance costs through a survey. The survey results show 2.14% (Buildings: 1.79%, Civil: 2.14%, Plant: 3.44%) of the contract amount have been actually spent on the job sites as the quality assurance cost, but only 0.28% of the contract amount were compensated through the contract. Moreover, the actual expenses should be higher if the development and operation costs of quality system are considered. The survey results also show that the contractors are to some degree suffering from a heavy financial burden incurred by improper compensation for quality assurance. Therefore, to maintain and guarantee a desired level of quality in public projects, the government must include sufficient

1) Former, Associate Research Fellow in CERIK
Professor in Univ. of HanYang, Ph.D. in Civil Engineering

amount of quality assurance costs in the contract amount.

According to Construction Industry Institute (CII) in U.S.A, the portion of the quality cost is 8.1% of the total contract amount and includes the cost of quality assurance and quality control. According to Project Management Institute (PMI), the portion of the quality control cost is 3 to 5% of the total contract amount minus the cost of quality systems. Japanese contractors believe that a sufficient quality assurance cost has been included in the total contract amount. According to the Korean Power Corporation, they pay 5% of direct labor cost to the contractors in the nuclear power plant projects as quality control costs.

As the results of this survey convey, more than 2% of the contract amount should be additionally included in the contract amount as quality assurance cost to achieve the desired quality construction works in Korean. If the government hesitates to include this quality cost in the contract amount additionally, the contractors will suffer severely from heavy financial burdens and the quality control will deteriorate even further. In addition, additional quality cost should be allowed apart from the bid so that the contractors can get full compensation for the quality assurance cost after they win the bid.

I -25 November, 1996

Directions for Improvement of the Guarantee System of Public Construction Contract

Eui Seop, Lee[1)]

The State Contract Law requires a contractor to post a Contract Bond, amount of which is 10% of the cost of construction project estimated by the project owner and also have another contractor co-sign for the contract as a Bonds-Contractor. In case the project owner requires the contractor to post the Contract Bond, amount of which is 20% of the cost estimated by the owner, the project owner waives the contractor's responsibility of having Bonds-Contractor. In case the contractor defaults, the Bonds-Contractor must take over the contract with the same terms and conditions as the original contract.

This study examines the problems with the current contract guarantee system using five criteria. First, the system should certainly recover the losses suffered from the default by the contractor. Second, the system should ensure the equal footing between the project owner and contractor. Third, the cost of the guarantee system should be ultimately borne by the project owner because the project owner benefits from the guarantee system. Fourth, the system should have economic rationality. Lastly, the system should be conformable to international practice.

With respect to criteria stated above, the problems with the current contract guarantee system are as follows. The current contract guarantee system does not ensure the equal footing between the project owner and contractor because the project owner requires the contractor to post Contract Bond and to have Bonds-Contractor.

Since the bond premium is not included in the estimation cost of a project, it is not borne by the project owner. Also since the contract price is related to the cost estimated by the project owner in the current bidding system, whether or not the bond premium is

1) Research Fellow, Ph.D. in Economics

included in the estimation cost of project affects the contract price.

If the Bonds-Contractor takes over the contract unexpectedly upon default by the original contractor, it is impossible for the Bonds-Contractor to run the project as originally planned. If the Bonds-Contractor takes over the contractor at very low price, the Bonds-Contractor severely suffers from big losses. It is unreasonably that the Bonds-Contractor can be awarded the contract at a price lower than what would have been his own bidding price. The Bonds-Contractor scheme is not conformable to international practice since it is a guarantee system by other contractor who could be a potential competitor in other projects.

The solutions to the problems mentioned above are as follows. The bond premium should be included in the cost estimated by the project owner, since the project owner should bear the cost of the bond. The Bonds-Contractor scheme should be abolished and performance bond should be introduced for some contracts. The contracts for which the performance bond should be required include the contracts for which timeliness of the completion of construction is very important. The law should not stipulate a specific guarantee scheme, but let the project owner determine whether performance bond should be required for each project at his own will.

At the initial stage of introduction of performance bond, the performance bond should be required only for the contract eligible for international bidding. However, the project owner may use both the Contract Bond and Bonds-Contractor for the contract ineligible for international bidding tentatively. Also, the law should not stipulate the bond amount, but the law should let the project owner determine the bond amount for each project at his own will.

I -26 November, 1996

The Policy Measures to Support the Recycling and Upright Disposal of Construction Wastes

Min Soo, Choi[1)]

For environmental and other reasons the number of readily accessible disposal sites for waste products around major cities in this country have decreased in recent years. On the other hand, both the disposal volume and maximum size of wastes have been increasing every year. Moreover, distances between demolition sites and disposal areas become longer, rendering transportation costs to rise. In the long run, the difficulty and expense to dispose building wastes and demolition rubbles will increase for demolition contractors.

In the mean time, many urban areas experience critical shortage of natural aggregates of good quality, and distances between deposits of natural materials and new construction sites have increased, again increasing the transportation costs accordingly.

It is estimated that approximately 30million tons of construction wastes are currently generated each year in Korea. It is also estimated that the demolished construction wastes in year 2000 will increase by two times. Nevertheless only a very small portion of the demolished wastes are currently reused as a non-stabilized base or sub-base in highway construction. The rest are dumped or disposed as a filler.

For these reasons it is necessary that demolition contractors consider reusing the demolished concrete as unscreened gravels, base and sub-base materials, and aggregates for production of concrete or for other useful purposes in the future.

Accordingly, large-scale recycling of construction wastes will be required not only for the solution of a growing waste disposal problem. It will also help conserve natural aggregates for the purpose of building and other construction within large urban areas.

The purpose of this study is to examine the current state-of-the-art and controversial

---

1) Research Fellow, Ph.D. in Architectural Engineering

issues related to construction wastes and to suggest policy measures which is needed in order to promote the appropriate disposal and economical recycling of such wastes.

The principal conclusions in this study are summarized as follows :

1) From the results of the questionnaire survey, it is found that only a very small portion of the demolished wastes are recycled. The rest are dumped or disposed of as fillers.

2) Recycling of construction wastes are difficult because of shortage of reclaimed lands and disposal sites, insufficient intermediate treatment, and incomplete disposal expense within construction cost. Also the quantity of construction wastes have seasonal variation in its quantity, variety of its kinds, and discharge of its mixed state.

3) To promote economical recycling and appropriate disposal of construction wastes, all the parties involved must be fully aware of the situation and consequences. The shortage of companies that specialized in recycling of construction wastes is another serious problem. Therefore, to promote recycling, it is necessary that non-governmental funds be raised for the foundation of large recycling facilities and that the government provide sufficient financial and legal support.

4) For the promotion of recycling, information on quantities and qualities of construction wastes must be obtained. Furthermore, a recycling system should be organized and guideline and specification should be established by the government for the upright reusing of waste concrete.

5) In addition, to promote successful recycling, regulations and industrial standards related to the recycling of construction wastes should be established or revised as well as intermediary processing facilities should be enlarged.

I -27 November, 1996

Problems of and Solutions to Current Pre-Qualification Scheme

Jeong Ho, Moon[1)]

The purpose of this study is to suggest positive and prescriptive policy directions and guidelines for the institutional scheme of Pre-Qualification (PQ, hereafter) in the process of government construction project contracts in Korea. PQ is a pre-screening of contractors for final selection as a bidder for a construction contract. When a construction contract is offered, a bunch of contractors may intend to enter the bidding process. When there are too many contractors who wish to enter the bid, it might be more efficient for the client to restrain the number of bidders. In such a line, clients may have prospective contractors take PQ examination for selection of qualified bidders.

In Korea, PQ system in government contracts was formally implemented in 1993. The series of accident in the early 1990s such as collapse of bridges, explosion of gas pipeline, etc. made the quality construction a steady social issue. Accordingly, in the government construction contract, it became more and more important to ensure quality work, and this quality consciousness led to the implementation of a PQ system. 22 types of work including highway, bridge, tunnel, railroad, subway, airport, seaport, dam, stadium, water and sewage system, etc. of which estimated contract amount exceeds 10 billion Won are included in the scope of PQ. The Ministry of Finance and Economy (MOFE) sets forth the evaluation factors and weight of those factors in PQ examination. The major factors include construction experience (up to 30 pts.), technical ability (up to 40 pts), financial status (up to 30 pts). and the state of contractor's credit & recognition (up to 20 pts).

Each factor is composed of 3 to 6 sub-factors that are used to evaluate prospective

1) Research Fellow, Ph.D. in Planning

bidders. And the government agencies as client of construction contract are allowed to modify the weight of evaluation factors up to 20% and to arrange specified details of evaluation in each factor and sub-factor. In such an institutional scheme, PQ examination has been applied by various government agencies and it has grown in terms of number of cases carried out since its first implementation in 1993. The Office of Government Procurement, the representative government contract agency alone has carried out 195 PQ cases from July 1993 to August 1996, of which total amount is nearly 13 trillion Won.

In the real process of implementation of PQ various imperfections and problems are found. First of all, the Korean contractors, especially mid and small size companies complain that there are unnecessary PQ cases that are carried out. Although the rule enforcing the PQ examination for designated types of work is not an obligation, almost all government agencies follow the rule in a strict mechanical way. Since the evaluation factors in PQ focus heavily on the quantitative variables such as experiences and number of employed experts and technicians, etc. rather than the qualitative variables, the PQ has functioned more likely to narrow the bidding chances for mid and small contractors. Also, since the evaluation method in PQ adopts more rigidly quantified indicators than qualified ones, the reliability and discrimination power of PQ examination are often in dispute. Many of evaluation factors are also in doubt as to the effectiveness of a qualifier. And in the actual process of the PQ examination, some procedural problems such as inconveniences in documents attachment, imperfections in certifying mechanism of contractors statements, and etc. are observed.

In figuring out those problems and in consideration of the market opening in 1997 as the Government Procurement Agreement takes effect, the institutional scheme of PQ examination should be modified. This study suggests some policy directions and guidelines in two layers. One is the mid to long term policy directions including the inducement of contractor grading system and multi-stage PQ. Contractor grading system or some thing to that effect is adopted in many countries like Great Britain, Japan, China, the Philippines, etc. The core of this system is to list up qualified contractors through a periodical evaluation process and to keep a classification of contractors according to their level of qualification results. Applying such a system, government agencies as clients could save time and reduce the cost for prequalification to a significant level. Parallel with the contractors grading system, the project base PQ should be sustained for the large size and high technology type of work.

By multi-stage PQ, this study implies that many evaluation factors could transform to pass or fail kind of qualifier. For example, if a certain construction project requires a special method of construction, no contractor lacking such a method may be able to enter the PQ examination. Especially sub-factors like technical ability and the state of credit & recognition such as method of construction, available technicians and equipments, the record of past performance, the state of legal suspension etc. could consist the first stage of PQ examination.

In the short run, the institutional scheme of PQ system should allow more autonomy of government contract agencies. Many experts and practitioners in these agencies need to modify the given scheme according to the characteristics of the agency and to the specificity of the contract in order to perform better qualified PQ examination. Therefore, the Law of Government Contract and the rules of MOFE should deregulate the current options and ensure more flexibility in operation of PQ system for practitioners. Also, the types and amount of work given as the range of carrying out PQ should be relieved to reflect the condition and situation of clients.

Finally, this study suggests some possible sub-factors of evaluation to be add to or replace the inadequate ones in the current system. They include references of past clients, current work load, project control procedures, staff available instead of number of staff currently employed, experience in geographic location of project, project management capabilities, bonding capacity, and etc.

I -28 November, 1996

The Problems and Directions for the Improvement of Design-Build Contract for the Public Projects in Korea

Sin Young, You[1)]

While Korean construction industry today experiences a rapid change in construction market due to globalization and market opening, the domestic construction market is increasing its demands for projects of large scale, diverse characters, and complicated nature.

The conventional ordering pattern, sequential Design-Bid-Build is no more considered as an effective method to cope with the various needs of advanced high technology, composite system, and huge project scale and to accommodate the soft and service technology oriented trends of the international market. More effective methods such as Design-Build or Turn-Key orders are considered as necessary, one which is capable of management of the project throughout its life-cycle with contractor's full responsibility.

Korean government has pursued the design-build approach for public sector project by the initiation of the government regulation since 1975. However, the design-build approach has not been applied successfully to the projects. One of the main reasons is that there may be a conflict between the nature of the design-build approach which allows flexibility in contractor's control and the project delivery system for the public project which must be demonstrably fair under the control of the owner.

The purpose of this research is to analyze the problems of design-build contract for public projects in Korea and to suggest directions for the improvement. The research consists of seven chapters. After the introductory chapter, chapter two analyzes the characteristics of a design-build approach. The evolution, types, the ways to select design-build entity, payment methods are discussed together with the advantages and disadvantages of the approach.

---

1) Former, Associate Research Fellow in CERIK, Ph.D. in Architectural Engineering

Chapter three examines the current status of design-build projects performed in the advanced foreign countries. The cases of the U.S.A., Japan and England are introduced in order to derive implications for the domestic institutional reform.

Chapter four examines the current status of design-build project in Korea. Also the policies and regulations for design-build approach are generally introduced. Chapter five analyzes the problems of design-build contract policies and regulations, such as the selection of the design-build project, the owner group, the method of bidding and contracting, and the selection of the design-build entity. Chapter six suggests the directions for the improvements for design-build contract policies and regulations. Both short term and long term improvement directions are suggested. The conclusion of this research is presented in Chapter seven, which summarizes the discussions of previous chapters.

I -29 | November, 1996

Reformation of General Conditions in Construction Projects

Kyung Re, Kim[1)]

Rights and duties between the owner and contractor are not clearly defined in the existing general conditions of the construction projects. Also, throughout the history of construction, the owners have taken some advantages over the contractors. However, the existing general conditions might generate more claims after the domestic construction markets are opened to foreign contractors in accordance with the WTO. Therefore, the existing general conditions should be reorganized to meet the standard of the advanced contract documents.

This research shows the problems of the existing general conditions of the construction projects and how these problems are improved in the revised general conditions. Also, recommendations for the revised general conditions are made in comparison with C.O.E. (US Army Corps of Engineers), FIDIC (Federation Internationale Des Ingenious-Conseils) and Japanese General Conditions.

1) Former, Associate Research Fellow in CERIK
Professor in Univ. of HanYang, Ph.D. in Civil Engineering

I -30 November, 1995

A Proposal of Solutions to the Problem of Vocational Training System for the Construction Industry

Myung Su, Park[1)]

Construction industry is a large and diversified sector of the economy. Since the early 1970s, its share of GDP has grown from 5 to 13 percent and the share of employment from 3 to 9 percent. One of the driving forces that have led the development of the construction industry is the skilled workers' labor. Despite technological innovation and mechanization of the production process, the production technology of the construction activity has been and will continue to be labor intensive. Although the role of construction workers may not be overly emphasized, especially that of on-site workers composed of craftsmen and operatives, it is also true that the due attention has not been paid toward the betterment of their working conditions let alone the improvement of their skills. Now, the recent accidents involving buildings and structures have led us to demand for more secure and proper operations by better-skilled craftsmen and operatives.

This study examines the vocational training system for the construction industry, especially concerning the in-plant training system for craftsmen. The basic goal of the vocational training is to train youths with no skill to acquire new skills to enhance their vocational abilities. The training system thus ensures the stable supply of skilled manpower and enhances the level of skills of craftsmen. Specifically, the purpose of the in-plant training is for firms to train the prospective workers for its own need. Through the in-plant training, a firm teaches firm-specific skills to its employees. If the nature of the skill to be taught is not firm-specific but industry wise-general, then it is in fact a public training system, not an in-plant training system. The Training Law obliges a private enterprise to

---

1) Former, Research Fellow in CERIK, Ph.D. in Economics

invest a certain portion of its wage bill for training workers. If not, a firm is required to pay the vocational training levy, so that the government can carry out the public training.

In the case of the construction industry, performances of the in-plant training program as well as the public vocational trainings have been very poor. The result is that craftsmen from the vocational training system comprise less than 10% of the current on-site workers. There are two basic reasons for the poor performance of the vocational training system. First, the characteristics of the construction craftsmen are such that it is not proper to train them through the in-plant vocational training system. The employment duration of the craftsmen is temporary and/or daily, not permanent. And their employer is most likely a subcontractor rather than a general contractor. However, it is the general contractor who is legally obliged to operate in-plant training. Second, construction works are considered tiring, dangerous, heavy and socially undesirable. There are fewer new entrants into the construction industry, and this explains the poor results of the public training program. The results are that a vast majority of construction enterprises ended up paying vocational training levy instead of providing in-plant training program, and the public training program failed to draw enough trainees demanded by the industry.

The characteristics of the craftsmen are analyzed and presented in this study. Typical craftsmen are male, old-aged, under-educated and indigent. Their daily wage is high, but the number of workdays fluctuates widely and so does their income. What construction craftsmen need most are stable jobs and social insurance coverage which has been limited to permanent workers only. The overall employment system should be restructured in manners that satisfy all these needs. As long as their wants and needs are not met, vocational training, employment system for quality control and management of workers cannot achieve what it intends to get, and the labor shortage will persist.

There is an ever-growing need to secure the skilled craftsmen with aptitudes specific to the industry to ensure better performance of the construction activities. The vocational training is a necessary condition for this purpose, and the training program should provide a basis for stable employment. From this perspective, this study recommends three policy measures.

(1) Construction firms must be exempted from the current in-plant vocational training requirements.

(2) A "Management Center for Construction Craftsmen" should be established to

organize and manage workers and provide the vocational training program, placement services and employment information services to improve the labor market efficiency. The basic object of the Center is to systematically organize the craftsmen and provide a stable workplace for each of them. Funding should come from the vocational training levy.

(3) Various kinds of public welfare scheme should cover the daily and/or temporarily-employed craftsmen. The systematic organization of the workers through the Center will enable the social insurance system to extend its coverage to construction craftsmen.

I -31 | November, 1995

A Survey on Institutional Framework for Construction Activities in Selected Countries

Jeong Ho, Moon[1)]

The purpose of this study is to survey construction licensing and other institutional framework for construction business currently observed in major foreign countries. Recently, the demand for information on construction industries and institutional schemes of foreign countries has been growing since it becomes more and more important for Korean contractors to prepare for the forthcoming opening of the market. In order to comply with the General Agreements for trade in construction services and products and to enhance the industry's competitiveness, the institutional framework for construction industry in Korea needs to be modified in accordance with the grand trend of globalization. In this regard, this survey is conducted as one of the first attempts to collect and examine various construction licensing systems and legislative frameworks for construction industry in foreign countries

The main focus of this survey is placed on various construction licensing systems and grading of contractors as basic qualification. Through this survey, general information on the following countries are collected ; Japan, China, Philippines, Vietnam, Iran, Saudi Arabia, United States of America, and Australia. To sum up, Japan, Philippines and some U.S. states such as California, Alaska, etc. have a construction licensing system similar to that of Korea. Yet, generally speaking, the criteria for obtaining a construction license in Korea are more strict than in those countries. Since the license requirements for contractors work as a barrier to market entry, it should be maintained at the minimum level in general.

Instead of licensing, many countries such as China, Philippines, Vietnam, Iran and Saudi Arabia have a grading system for contractors. Considering their construction capability in terms

1) Research Fellow, Ph.D. in Planning

of experiences, assets of contractors, reputation, the number of technicians, etc., contractors in those countries are categorized according to the grading guidelines. With such a grading system, in general, customers and ordering agencies could qualify contractors before the bidding process starts. However, in some countries like Iran and Saudi Arabia, the grading system seems to operate rather rigidly because mainly of strict and intractable criteria.

In addition to the licensing and grading system, this survey briefly collected and examined the bidding process and contracts of construction in several advanced countries such as the United Sates of America, Great Britain, Germany, and France where strict licensing and grading systems are rarely observed. Those countries generally have a well-defined bidding system and contract scheme, most likely to ensure the quality of construction rather than to regulate contractors. Prequalification system and other similar systems are observed in most countries, and the bidding process is usually conducted based on the principle of free-market competition. Also, as a condition for contracts, ordering agencies in those countries require contractors to submit surety or performance bond which can be purchased by private financial institutions such as banks and insurance companies.

Compared with the institutional frameworks for construction in foreign countries, the Korean system is fairly complicated and rigid especially in construction licensing scheme. This kind of system puts a burden on the contractors and constrains contractors' function of engineering construction and construction management. In order to minimize restrictions and to enhance the industry's competitiveness, a more sophisticated licensing system should be mediated, and other qualification measures should be intensified.

I -32 November, 1995

Recommendation to the Promotion Policy System for Construction Technology Development

Sok Mook, Lee[1)]

The main purpose of this study is to investigate the implementation problems of the government policies encouraging the development of new construction technology. This paper also aims at finding the ways to improve the policy effectiveness.

In regard to the research methodology, the study, first, identified the system of the government incentive policies and collected data, implementation result of the policies. Next, based on the data, the study intended to measure the effectiveness of the policies. Additional information were gathered through literature review and interviews with those involved in technology development in construction firms. Intending to find the practical causes of the general problems, this study conducted a survey of firms that had new construction technology endorsements by the government. Finally the study made some recommendations for policy revision.

The suggested policy revisions are as follows. First, the policy that requires private firms to invest in technology development should be abolished. Instead, a new regulation should be considered to deal with the development of new construction technology. Second, the government should give incentives to developers of new technology rather than the technology itself. Third, for the active operation of policy incentives which are given to value engineering, professional license system on VE and designing is prerequisite

1) Research Fellow, Ph.D. in Town Planning

I -33 | December, 1995

A Proposal for Improvements of Contractor Evaluation : With Main Reference to Foreign Cases

Se Yol, Jeong[1)]

The report examines the underlying principles and characteristics of foreign cases and makes suggestions for improving the Korean evaluation system of construction firms in the tendering process. It mainly focuses on the official formula to determine the maximum contracting limit for each construction firm and the PQ(pre-qualification) evaluation of Korea.

As a notable reference to determine the maximum contracting limit, this report introduces the mechanism used by the US surety to measure the bonding capacity and the maximum amount for new bonds for a given contractor and examines its underlying principles. The surety determines the limit based on the current financial status of a contractor and uncompleted works on hand as well as many other factors to evaluate past experiences both in terms of quantity and quality. This evaluation mechanism plays a major role in keeping a contractor from being involved in construction works beyond capacity, both financially and physically. It is also conducive to promoting the sound condition for competition and profitability in the construction industry. The Korean evaluation system is mainly dependent upon the mere size of a construction firm and its works and the general financial indicators in the past.

It is also observed that in many other foreign cases of the PQ evaluation, especially those of many states in the US, that they also adopt the mechanism similar to, though much simpler than the one used by the US surety. In addition, it is notable that the Japanese formula to evaluate contractors for public works, which is in many ways similar to the Korean one, plays a very limited role in determining the maximum contracting limit.

---

1) Former, Associate Research Fellow in CERIK
Editorial writer in Meill Economics Newspaper, Ph.D. in Economics

This report proposes that Korean construction industry adopt the kind of evaluation mechanism used by the US surety in the long run. Meanwhile, it can start with a relatively simpler mechanism used abroad. It is also proposed that the application of this newly adopted mechanism be extended to construction works smaller than those applicable under the current Korean PQ evaluation. It is expected that proposed measures will not only enhance the effectiveness of the evaluation mechanism but also keep contractors from competing with others for just winning bids while ignoring their capability and profitability.

I -34 December, 1995

A Study on the Regulatory Reform and Deregulation of Subcontracting in the Construction Production

Kwan Bo, Kim[1)]

In the construction of most projects, a significant role is played by the cooperative and credible relationship between general(prime) contractors and subcontractors. Looking back upon the past 30 years of the Korean construction production, the contractors-subcontractors' relationship has been rather uncooperative with tit-for-tat strategies to meet their self-interests. In particular, the government policy of subcontracting has focused on the protection of subcontractors with the rigid regulatory rules or institutions. A reform on such regulatory frameworks of subcontracting is attempted to cope with the forthcoming opening of the construction market as well as the joining of the Government Procurement Agreement.

The purposes of this study are to investigate the current conditions and issues of subcontracting rules(institutions) and to suggest the regulatory reform and deregulation measures. Regulatory reform and deregulation of subcontracting should be pursued using the new "quasi self-regulation" tool, not the current "government regulation". It should induce construction industries themselves to make and follow the rules of subcontracting with the government supervising and penalizing.

The basic directions of subcontracting deregulation under the new framework are to construct the cooperative partnership by systemization of subcontracting for a common profit, to rearrange the subcontracting network in response to the construction market opening, to ensure accountable construction and quality control through the fair distribution of construction works, and to transform the informal sector of subcontracting into formal one.

The major suggestions of the regulatory reform and deregulation of subcontracting are as follows. First of all, the current mandatory subcontracting rule should be abolished. The size

1) Former, Associate Research Fellow in CERIK
Professor in Catholic Univ. of Korea, Ph.D. in Public Administration

of subcontracting should be autonomously decided by the mutual trust of general contractors and subcontractors themselves. Secondly, the prohibition of re-subcontracting in the subcontracting process should be flexibly mitigated according to the characteristics of construction works. Thirdly, the rule against the blanket(lump) subcontracting of most of construction works should be mitigated in such cases as alternative bidding or turnkey type tendering. Also, the ambiguous clause banning the blanket subcontracting in the Construction Business Act, that is, "most of the major parts," should be clarified to avoid the arbitrary translation by the orderers or government officials. Fourthly, the investigation provision of whether the subcontracting award price is below the certain criteria(88%) should be abolished because it has neither the effectiveness nor reflect the reality. Also, the notice liability of subcontracting award should be appropriately improved through simple mailing notice, and the period should be extended from 15 days to 30 days. Fifth, the subcontractor-joint-bid scheme (subcontractor's bid packages) should be improved to systemize subcontracting among the orderers, prime contractors, and subcontractors. Sixth, to discourage the use of non-licensed labor team working at the construction site, the current scheme of both licensing criteria and rigid subcontracting constraints should be deregulated, which will be conducive to institutionalizing an illegal or unfair subcontracting transaction structure into a legal and fair one. Finally, the subcontractor's payment bond system should be autonomously implemented by the free contracting principle of the private parties, not by the mandates of the Construction Business Act.

For the successful regulatory reform and deregulation of subcontracting in construction production, a "Subcontracting Regulatory Reform Committee" needs to be established, which will be composed of government officials, construction association staffs, contractors, and subcontractors. The organization should aim to successfully implement the seven suggestions mentioned above by establishing an "Examination Organization of Subcontracting Process" and the introduction of "Pre-Investigation System for the Regulation of Construction Works.

It is the responsibility of all constructors and government officials to establish the new "quasi self-regulation" tool of subcontracting and to actualize the regulatory reform and deregulation of subcontracting. More importantly, the reform of the mind and consciousness in the subcontracting process should be ahead of the institutional reform.

I -35 December, 1995

The Current Status of and Improvement Directions for Construction-Related Institutional Frameworks

Kwan Bo, Kim[1] *·Eui Seop, Lee*[2]

Over the past 30 years, the construction-related institutional frameworks have focused on the protection of the industry, neglecting the safety and quality control side of the construction activities. The reform of such institutional frameworks is thus needed, since we have to cope with forthcoming opening of the construction market as well as the joining of the Government Procurement Agreement. The purposes of this report are to examine the current state and to suggest the direction of construction work related institutional arrangements such as licensing, bidding-contract, subcontract, project supervising, and construction facilities maintenance system.

First of all, the criteria of construction licensing should be set at the minimum level of qualifications, while the pre-qualification and/or bonding system are used to exclude under-qualified contractor for each construction project. The Construction Business Act and other individual laws on licensing criteria should be integrated into a single law. The licensing of 'special contractor' should be gradually abolished. The entry barriers between general contractors and specialty contractors should be also abolished and the specialty construction works should be appropriately classified.

Secondly, in order to cope with construction market opening, the current bidding-contract system should be improved for procuring construction products with good quality. Pre-qualification, construction-capability limit, the unit-price bid design-construct(turn key) bid, 'long-term continual contract', and the construction guarantee schemes are such on the list.

---

1) Former, Associate Research Fellow in CERIK
Present, Professor in Catholic Univ. of Korea, Ph.D. in Public Administration
2) Research Fellow, Ph.D. in Economics

Thirdly, concerning subcontract system, the major suggestions are as follows : 1) the abolition of a mandatory subcontract, 2) the mitigation of ban on re-subcontracting in the subcontracting process, 3) the mitigation of ban on subcontracting the whole works by the prime contractor, 4) the abolition of review process for low price subcontracting and contractor's notice liability for award of subcontract, 5) the improvement of the bidding package with subcontractors, 6) licensing of craftsmen working at the construction site, and 7) the arrangement of subcontractor's payment bond.

Fourthly, project supervising related laws should be unified, and the right and liability of the supervisor should be clarified. Also, the scope of the project requiring 'responsible supervising' should be appropriately revised. The penalty for mal-supervising should be strengthened. The requirement that architect-supervising companies have the architect-representatives should be abolished.

Lastly, the scope of facilities for required maintenance should be enlarged. The government should adopt construct-maintenance contract system. In the long run, the safety insurance should be required.

Part Ⅱ. Construction Market & Firms

Ⅱ-1 | August, 1999

The Analysis of Financial Statement and Business Performance of the Listed Construction Corporations for 1998

Min Hyung, Kim[1] ·*Hyun Aa, Kim*[2]

The business performances of construction companies are becoming worse abruptly as construction investment suddenly dropped and social and economic conditions changed since Korea was rescued by the IMF bail-out fund. These changes will continue into the Post-IMF period. Thorough analysis of management performances of 1998, the first year of financial support from IMF, will thus offer useful strategy in preparing for the 21st century.

This study analyzes the overall business performances and the sales and financial characteristics of companies by type and also analyzes profit and loss statements and balance sheets for 1998 of 46 listed construction companies. The results of the analyses are as follows. First, the profitability of the listed construction companies have become worse. Second, the effect of financial structure improvement is very weak because the degree of reduction in the current liabilities and interest-bering debts are small even though the effort of restructuring in 1998. Third, the main causes of worsing profitability are the soaring of interest expenses, the selling loss of large real estate, such as loss on disposition of tangible assets and extraordinary losses, and the loss on foreign currency exchange. Fourth, as the net cash amount is decreased, so did the cash flow.

While the most construction companies performed badly, there are a few listed companies whose performances seemed improved. The characteristics of these listed construction companies 1998 are as follows. First, they maintained good profitability and thus protected from the financial shock. Second, they have relatively higher rate of public construction works in total selling. Third, the proportions of interest expenses, loss on disposition of tangible

1) Research Fellow, Ph.D. in Business Administration
2) Senior Researcher, Ph.D. in Urban Planning

assets and extraordinary losses among non-operating expenses are small. Fourth, they do not have financing problems because they depend on direct financing rather than indirect one. Fifth, the proportion of public works is relatively high among the backlogs.

The basic strategies of financing and management for the listed construction companies according to the results of analysis are as follows. First, they have to put an emphasis on profit, cash-flow and value of enterprise. Second, they must raise the fund through direct, rather than indirect financing. Third, the companies, which have improved their financial structure for 1998, control themselves to sell real estate unconditionally and find the effective ways to use their property. Fourth, they have to balance the construction rate between public and private construction works in order to reduce the fatal risk from the changes of economic conditions. Moreover, each construction company has to devise its own practical strategies that are company specific.

Ⅱ-2 | September, 1999

A Study on the Development of Apartment Investment Indicators

Hoo Seok, Seo[1] · Je Hyun, Byun[2]

Since the 1997 currency crisis, the paradigm of the Korean real estate market has shifted from the capital-gain approach to the income-producing approach. The shift has been caused by the unprecedented real estate deflation, the real estate market opening and the introduction of a mortgage finance system.

The impacts of institutional reforms are consequently expected to lead change in the investors' behavior and decision making processes. However, an informational infrastructure including investment indicators may be required in order for the shift to fully develop their potential advantages.

This report aims to suggest a way to produce investment indicators required from the view point of investors in the Korean real estate markets. It will also attempt to apply the way tentatively to the Korean apartment housing markets. The indicators will be composed of many of raw indices and data such as simple movements of the sales and Chonsei (Korean traditional housing lease) prices, type and location variables, regional differences in the increasing rate of real asset prices, and regional investment return rates.

In order to consider the investors' perspective, this study provides with newly defined conceptions.

First of all, it does not focus on the simple mean variables using the family unit data as appeared often in the existing literature, but rather on the weighted mean values using the Pyong unit (a Korean traditional measuring unit).

---

1) Former, Associate Research Fellow in CERIK
President of R2Korea Corp., Ph.D in Business Administration
2) Former, Senior Researcher in CERIK
Director in Real Estate 114 Corp.

Secondly, the methods for producing KOSPI (Korea Stock Price Index) is applied to our apartment sales & Chonsei indices.

Thirdly, new indices for apartment investment returns are developed in this report, which are more sensitive to the actual price volatility than ones officially provided by the Korea Housing & Commercial Banks.

The additional findings in this reports are as follows : 1) During 1992-1998, the average investment return rate in Kyunggi province (9.1%) was higher than in Incheon (7.8%) & Seoul metropolitan area (5.8%). 2) During 1989-1998, the average return rate of below 5 story apartment buildings (17.8%) was higher than that of above 6 story apartment buildings (16.1%). 3) The total asset value of apartment houses in Seoul is for the first time estimated at 108, 822 billion Korean Won as of the end of 1998.

Ⅱ-3 | January, 1997

A Survey on the Small and Medium-Sized Construction Firms in Korea

Min Hyung, Kim[1)]

The opening of the Korean construction market due to the advent of the World Trade Organization will result in great change in the environment for the small and mid-sized (S&M, hereafter) construction firms in Korea. They are expected to lose their share in the construction market, and they are no longer protected by the laws which have existed for the last 40 years as shields for them.

Under a new competitive structure which is totally different from the current one, the S&M construction firms need to build management strategies for the coming change in their environment. Thus, the current research study first analyzes their problems inherent in the management side through a field-survey. Then, based on the results from the survey, corporative and sectoral management strategies are presented to enhance their competitiveness.

Currently, the management state of the S&M construction firms is as follows. First, there is a rapid increase in the number of small business firms and local S&M construction firms after the license opening. Second, the gap between the large and the S&M construction firms gets wider in terms of sales. Third, the share of the S&M construction firms in public works tends to decrease, especially their share in the public works ordered by local self-governing bodies. On the whole, therefore, the relative size of the S&M construction firms becomes paltrier. Also, their overall management state gets worse, since their growth, stability and profitability are on the declining curve due to a decrease in sales, an increase in debt ratio, and excessive competition and dumping orders which result from the increase in the number of firms in the construction market.

---

1) Research Fellow, Ph.D. in Business Administration

The results from the survey on the management state of the S&M construction firms are as follows. First of all, due to their deficiency of management resources and the limitation of their organizations at the outset, their operating systems fall behind, their organization structure and human management system are very weak, and they do not possess competitive advantages. In order to overcome these shortcomings, appropriate management strategies and leadership is strongly required. However, they do not have management strategies to overcome the shortage of management resources, and leadership is so weak, and the vicious circle of their difficulty in management continues.

Some results from a comparative study about the S&M construction firms of which relative rankings in the market continue to go higher with the other firms are as follows. First, the growing S&M construction firms are found to possess relatively stable organization structure and competitive advantages in terms of operating capacity and information management. Second, they are revealed to exercise a strong leadership to overcome their limitations resulting from the insufficiency of management resources and their initial organization structure.

Based on the results from the survey, the following management strategies are suggested to gain their competitive advantages. Assuming that they will develop management strategies, the entrepreneurship of the top managers must be shown. Most of all, the role of the top manager is the most important factor since most of the top managers for the S&M construction firms usually coincide with the owners of the firms.

The first corporative strategy for the S&M construction firms is to establish the specialization or niche strategy on the basis of specialized skills and skilled workers. Second, this strategy should be based on the selective escalation of functions in order to maintain an appropriate level of construction work. Third, they should concentrate their business centering around their own region and local markets by taking advantage of the firms' characteristics as local firms which are familiar with their region.

The management strategies in each part are as follows. As strategies for technology development, they should take a proper step by establishing a joint venture with the domestic large firms and/or the advanced foreign firms or the so-called technology institute for the S&M construction firms. For human resource development strategies, their workers should be trained to be multi-functioned on the assumption that they could stay at the firm until they wish to retire. For their sales of marketing strategies, they should actively create construction

demands by doing business together with land owners, involve in the third sector business, establish a good relationship with the other S&M construction firms through consortiums, and manage their customers by completely repairing defects of their works. For financial strategies, they should increase their reserves through selective orders in order to maintain the stability of the financial state, and enhance their financing capacity by establishing a good relationship with local financial institutes. As the last strategies for materials management, they should continuously keep the record of the material costs, maintain an appropriate level of materials for an emergency, and develop an effective system for purchasing materials.

In order to strengthen the self-generating capacity of the S&M construction firms along with these management strategies, the government should lead insolvent firms to some other industry, and make proper institutional adjustments which back-up the deregulation on the pre-qualifications (PQ), the local limitation system, and the regulation for subcontracting among general construction firms.

Ⅱ-4 | January, 1997

A Study on Construction Firms' Bankruptcy

Se Jong, Wang[1)]

The number of the general construction firms in Korea has rapidly increased since the opening of construction licences in 1989, leading the construction industry into a very competitive one. The number of the general construction firms before the licence opening was 468, but as of the end of October 1996, there are 3,516 firms, an increase of seven and half times from the time of the license opening. Compared to the increase in the number of the firms, the size of the Korean general construction market measured in 1990 constant price has less than the doubled from 1989 and 1995.

The increase in the number of the construction firms also has led to dramatic increase in the number of the firms that went bankrupt. In 1995, 145 out of 2,651 firms went bankrupt, resulting bankruptcy rate of 5.5%. And, as of the end of October 1996, the number of the bankrupt firms is 164 out of 2,958, increasing the monthly bankruptcy rate to 6.6%, the highest in the history of the industry. Compared to the previous bankruptcy in the construction firms, the recent bankruptcy has the following three typical characteristics: first, the big-sized firms also went bankrupt; second, most of the bankrupt firms were newly established ones since the licence opening; third, most of the bankrupt firms have construction licences for general building.

One main reason for the increase in the bankrupt firms is the structural change of the construction industry which is caused by the increase in the number of the firms. Also, considering the fact that the construction industry is the one that produces on orders, bad business condition in the construction market since the end of the "two million housing plan" from 1988 to 1992 is another reason. These are empirically verified through a questionnaire

1) Research Fellow, Ph.D. in Economics

survey. However, the seriousness of the current bankruptcy trend in the construction industry lies in the forecast that the number of the bankrupt firms will continuously increase, since the current tendency for deregulation will make the industry more competitive.

The cause and the pattern of business failure in the general construction industry are not particularly different from those in other industries, but it only takes two to three years for general construction firms to be identified as a success or failure, which is relatively short compared to other industries. Most of the small and mid-sized firms followed the business failure pattern caused by the lack of initial capital, while the big-size firms failed due to the lack of special knowledge or mismanagement. Also, 34% of the bankrupt construction firms from 1994 to 1996 were found to have been related with other bankrupt firms in one way or another.

Ⅱ-5 | December, 1997

An Analysis of Influential Factors on Profitability of Construction Firms

Joon Han, Kim[1)]

In recent days, business performance of Korean construction firms was very stagnant as the ratio of ordinary income to sales in 1996 tumbled down to 0.1%. It is generally assumed, in the Korean construction industry, that the most influential factors on profitability include lobbyism, mutual consent, and trust of top management. Yet, these factors might not work any more under the rapidly changing circumstances such as more competitive market condition, effectuation of corruption round and even IMF bailout and following stagflation. In this regard, this study analyzes influential factors on profitability of the Korean construction firms. That is, this study is to verify which factors affect and how much influence those factors have on ordinary income to sales.

In this study, empirical analysis targeted 182 general construction firms with all sorts of management and financial data of 1995. The factors, extracted through multiple regression analysis, are as follows : (1) resource variables such as proportion of technical expert and R&D(technical capability), stockholders' equity to total assets(financial capability), and sales amount per employee(production capability) ; and (2) strategic variables such as extent of specialization, proportion of contracts with government, proportion of "PQ contracts" and subcontract awarded.

In general, it is shown that the factors such as proportion of equity capital, proportion of technicians, and sales amount per employee are significantly influential on profitability. Breaking down the sample firms by size, it appeared that influencing factors differ. In case of large firms, ordinary income by sales is more influenced by strategic variables rather than resource variables. This implies that large firms' profitability depends heavily on mutual consent, lobbying ability, etc.

---

1) Senior Research Fellow, Ph.D. in Economics

On the other hand, in case of small firms, the resource variables are more closely related with profitability. In common, proportion of equity capital is very significant as it has very positive relation to firms' profit. For medium and small size firms, the other significant factors include proportion of technical experts and extent of specialization. Also, it is noteworthy that proportion of contracts with government, for medium and small firms, has negative relation to profitability.

Ⅱ-6 | January, 1997

The Construction Guarantee System in U.S.A. and Japan

Eui Seop, Lee[1)]

This survey examines the guarantee system in conjunction with construction project in U.S.A. and Japan. The purpose of the survey is to help policy makers in the Government and bonding institutes to reformulate the policy as the Government Procurement Agreement became effective as of 1997. Also the survey purports to help Korean construction companies to enter the markets in U.S.A. and Japan.

The guarantee system in U.S.A. is a surety bond system. The surety bond is a promise to be liable for the debt, default or failure of another. The construction contract surety bonds are bid bond, performance bond and labor and material payment bond. The contract surety bonds are provided as the basic instrument of pre-qualification. There are also maintenance bond and advance payment bond, which are sometimes required in the context of construction.

The bid bond provides that the surety will compensate the owner if the bidder is awarded the contract but fails to accept and sign it or fails to provide the requisite performance and labor and material payment bonds. The performance bond assures that the contractor will build what has been contracted to be built in accordance with the contract plan and specifications and performs all the other obligations in the construction contract. The labor and material payment bond assures that certain suppliers of labor and materials on the project will be paid subject to restrictions and limitations imposed by statute, the contract or the bond itself.

The guarantee system in Japan has two classes. One is a construction contract guarantee scheme and the other is an advance payment guarantee scheme. The construction guarantee was generally a Bonds-Contractor scheme until 1995. The Bonds-Contractor must take over

1) Research Fellow, Ph.D. in Economics

the contract with the same terms and conditions as the original contract's if the contractor defaults. However, the scheme is being replaced by performance bond and

other monetary guarantee schemes by the choice of project owner. The owner chooses the guarantee scheme considering the characteristics of the contracts. For example, the owner requires the contractor to pose the performance bond if he thinks that the timeliness of completion of the construction project is important. The advance payment guarantee scheme is an advance payment bond. The advance payment bond is provided for the public construction contract with advance payment provisions exclusively by three construction surety companies.

Ⅱ-7 | November, 1997

A Study on Enhancing Financial Competitiveness of the Construction Industry Conforming to the Change of Financial Environment

Se Jong, Wang[1] ·*Sun Hee, Lee*[2]

Currently, the financial environment of the Korean economy is drastically changing, both domestically and internationally. Since the effectuation of the World Trade Organization's (WTO) agreements from January of 1995, the Korean economy is in the process of gradually opening its financial services markets to foreign investors. And, this process, including the opening of its capital markets, is expected to accelerate now that Korea has become the twenty-ninth member of the Organization for Economic Co-operation and Development (OECD) in October of 1996.

In order to effectively correspond to the opening of its capital and financial services markets and to the world tendency of liberalization and internationalization of finance, the Korean economy has been faced with the necessity of reforming regulations and practices in the financial sector. All of these, along with a desire to introduce market mechanism into financial system, have led President Kim to set up the Presidential Commission for Financial Reform, which is a purely non-governmental organization, as an advisory committee to the President in January of 1997.

These ongoing changes in the Korean financial environment can be best summarized as financial market opening and financial system reform, which implies that the Korean financial market and system is currently in the process of restructuring. Considering the important role of the financial sector in the whole economy, which deserves being called the life sustaining blood of the economy, a change in financial market and system eventually results in a significant change in the management behavior of all firms in the economy, regardless of the

1) Research Fellow, Ph.D. in Economics
2) Senior Researcher

industry where they operate their business. And, the construction firms are no exception so that they also need to be prepared for a change in their financial environment.

The purpose of this study is three-fold: the first is to present an outlook for the future financial environment by simultaneously examining the progress of financial market opening and financial system reform. The second is to analyze the impact of a change in financial environment on the construction firms. And, the last is to make some policy suggestions to improve the financial environment of the construction industry and to enhance the financial competitiveness of the construction firms.

For these purposes, the current study consists of four chapters. The introductory chapter reviews the opening schedule of the Korean financial services and capital markets as stated in the agreements of the WTO and the OECD to examine the progress of financial market opening from 1997 to 2000. Also, it reviews the suggestions given by the Presidential Commission for Financial Reform to examine the progress of financial system reform. These suggestions are briefly compared with those given by the Ministry of Finance and Economy, the governmental counter part of financial system reform, and those by the Bank of Korea, the central bank of Korea. Finally, an outlook of the future financial environment of the Korean economy is presented on the basis of the analysis of financial market opening and financial system reform. As the process of restructuring the Korean financial market and system continues, it is naturally predicted that the financial industry will become more competitive and recover the market mechanism in terms of pricing, supplying and operation financial resources.

Chapter two examines the current state of construction finance in Korea in terms of raising financial resources, and summarizes its characteristics on the basis of a comparison with those of manufacturing finance. Also, based on the schedule of financial market opening and financial system reform as considered in Chapter two, it analyzes the impact of a change in financial market and system on the construction industry itself, and on the construction firms by size and by market, respectively. In general, it is expected that a change in financial environment shall have positive effect on the construction industry, as financial environment since 1960's has been so poor in terms of inter-industry competitiveness when compared to that of the other industries, especially the manufacturing industry.

However, it is also predicted that the change shall have somewhat differential effect on the construction firms as they differ in size, implying that they have different capacity to raise

and operate financial resources. More specifically, the principle of financial market opening and financial system reform aims at maximizing the functioning of market mechanism, which could be obtained by minimizing the intervention of the government in financial market, especially its involvement in distributing financial resources among several sectors. Thus, as the process of restructuring financial market and system continues, the degree of the government's intervention will eventually decrease and, as a result, some of the policies that have functioned as protecting vehicles for small and medium-sized construction firms will be abolished.

In order to make some policy suggestions to enhance the financial competitiveness of the construction industry, Chapter three presents a principal direction for managing the system of construction finance. Basically, the current financial system should be reformed in a way to maintain the principle of equity in distributing financial resources among various industries. In order to maintain the principle of equity, every financial institute including commercial banks needs to revise the current credit assessment system for the construction firms by taking their operational characteristics into consideration. As construction activities involve more risks and are executed on a single project base, it is not unusual that the business indices of the construction firms are poorer compared to those of the firms in other industries. Thus, it is not fair that every firm, regardless of the industry where it operates, should be assessed by the same standard.

Along with the principle of inter-industrial equity in the distribution of financial resources, the conventional system for construction finance needs to be significantly improved in order to efficiently provide more financial resources to the construction sector. First of all, the functions of the Korea Construction Financial Cooperative (KCFC) should be enlarged to support the activities of the small and mid-sized construction firms. More specifically, the KCFC should be allowed to float corporate bonds in order to raise more fund, and to treat insurance business. Secondly, advance payment system for public construction projects should be applied to every public project, and the central government should monitor the other public organizations to check whether the system works well or not.

Chapter four summarizes and presents the conclusion of this study. Also, it discusses a direction for future researches to significantly improve the financial competitiveness of the construction firms. Especially, future researches should include a study on the behavior of the construction firms to raise and operate funds at an individual firm's level and a study on the construction taxes.

Ⅱ-8 | December, 1997

Six Successful Marketing Strategies for Housing Business

Hyung Seok, Sim[1)]

The business environment of housing industry is currently in the process of drastic changes, since the rate of housing supply is rapidly increasing. Accordingly, house buyers are more flexible in choosing their own houses. In particular, a recent tendency of diversified preferences of house buyers has significantly influenced the business environment of housing industry, and, as a result, house sellers are required to develop new housing products in order to meet buyers' preferences. Also, opening of housing market and deregulation of the housing industry themselves have put more pressure on the business environment of housing industry.

These changes in the business environment of housing market imply that the housing market itself is now in the process of changing from sellers' market to buyers' market. In order to operate profitable business in the more competitive housing market, the construction firms are required to prepare some marketing strategies such as developing new products, enhancing price competitiveness and employing promotion strategies. As a result, the ability to devise and employ marketing strategies is regarded as one of the critical factors to maintain competitive advantages in the housing business.

In order to select the most successful marketing strategies, a case study on eight successful housing projects was carried out. The six successful marketing strategies selected by the case study are as follows.

First, all of the construction firms investigated in this case study have had a system to identify customers' needs in their own firms. In particular, they have selected a group of target customers by a thorough analysis with participation of customers and systemized the

1) Former, Senior Researcher in CERIK
Director in Real Estate 114 Corp.

procedure in their marketing strategies.

Second, they have kept trying to develop new housing products in order to satisfy potential customers' needs. In the process of developing new products, diversified groups of customers were invited into the program to review the products.

Thirdly, all of them have had a competitive advantage in pricing housing products. In particular, they have determined a certain level of house prices, and have done their best to meet the level by reducing the overall construction cost.

Fourthly, they have employed a distinctive brand image strategy. Especially, they have chosen the ones among the strategies for company identification, company relationship, and distinctive brand images.

Fifthly, they have employed a series of focus marketing strategies on target customers by involving almost all of the staffs in the department. Some of the examples are cyber marketing, salesmen and housing dealers.

Sixthly and lastly, they have employed a series of total marketing strategies. In order to do so on a certain project level, they have kept all of business units closely related.

In order to carry out housing business in the more competitive environment of housing industry, the construction firms are required to employ all of these six successful marketing strategies. Moreover, they can utilize the association of these strategies in accordance with their own business characteristics.

Ⅱ-9 | December, 1997

International Strategic Alliance of Korean Construction Firms

Min Hyung, Kim[1)]

With the establishment of WTO, and the improvement of telecommunication and transportation system, the construction market is eventually going to be globalized. In addition, several changes such as client's changing desire for various services, diversity of construction products, and advanced construction techniques require construction firms to develop many other functions, not only for construction.

In the construction industry, therefore, strategic alliance among construction firms will be more significant as a project delivery system of the future, providing services for client's needs. This system is combined with competitive advantages among firms, substituting their services mutually.

Under these circumstances, this study places the focus on the suggestion of a practical strategy for successful strategic alliance in domestic and international markets through the analysis of present condition of alliances among construction firms in Korea.

Namely, for the successful strategic alliance, Korean construction firms must establish their own strategy for strategic alliance as a prerequisite. First of all, they must identify what strengths and weaknesses they have, and analyze the business opportunity and threats. And then, they must draft a network plan for strategic alliance.

The key factors for an achievement of successful alliance are as follows: (1) to choose the best partner, (2) to have clear goals and aims in forming alliances, (3) to make a long-term relationship on the basis of confidence, (4) to overcome the differences of other culture, and (5) to create a network for strategic alliance.

---

1) Research Fellow, Ph.D. in Business Administration

Ⅱ-10 February, 1996

Demand Creation and Public Project Participation of Construction Firms : A Case of Japan

Hyun, Lee[1)]

Construction firms can find the means to develop themselves by creating demand for new construction projects. When construction market becomes more and more competitive due to the changes in socioeconomic and industrial environments, efforts to create demand as a part of business diversification attempts can become the core of many firms' development strategy.

The experiences of Japanese leading construction firms well demonstrate that demand creation of construction projects has played a major role in promoting their growth. Responding to the changes in preferences and behavior of consumers, the Japanese construction firms developed and proposed innovative concepts of architectural buildings and urban developments. Preparing for the aged society of Japan, for example, the Shimizu Corporation supplied "silver housing" to meet the increasing demand for housing for the elderly, designed exclusively for the elderly and equipped with convenient facilities. The Shimizu Corporation succeeded in expanding its business area through housing construction that meets the special needs of the society.

This study surveys the cases of demand creation of the Japanese construction firms. It also reviews the cases of urban development projects, which generated new construction demand in Japan. While the private construction firms take an initiative to create construction demand based on the changing social needs, the public sector construct large scale infrastructure facilities, and as a consequence the public sector generates huge construction projects. Since the private sector can expand into the construction market through participation in those construction projects, the public construction projects play an important

1) Former, Associate Research Fellow in CERIK
Vice President of Real Estate 114 Corp., Ph.D in Planning

role in developing and nurturing the construction industry. The Japanese examples of development projects including Minato Mirai 21 of Yokohama and Rokko Island of Kobe illustrate a good example where the public and private cooperation contributed to developing the construction industry and improving the quality of life of the residents.

The impacts of both demand creation by the construction firms and large scale construction projects by the public sector on the development of construction industry can be summarized as follows : First, construction technology developments are encouraged in order to obtain the competitive advantages. Second, the quality of life of a society is improved through the provision of construction facilities to satisfy the changing preferences of consumers. It is required to enhance the planning and development function of construction firms in order to succeed in creating demand through the provision of better construction facilities as a commodity in a competitive market.

Ⅱ-11 April, 1996

Status of Foreign Engineering Construction Industry and Implementation of Constructability

Sin Young, You[1] ·*Sang Kyung, An*[2]

As the demand for projects of large-scale, high technology, and diverse characters increases within the world construction market, construction projects are changing in nature from labor-intensive to technology-intensive. The ordering pattern is also changing gradually from conventional Design-Bid-Build to the type of B.O.T. or turnkey orders, which require full responsibility of a contractor throughout the life-cycle of the construction project.

Due to this new international trend the domestic construction companies are paying close attention to engineering construction(EC), pursuing wider scope of construction operations to be more competitive in the world market. Many leading companies have already prepared for EC by reorganizing or establishing new system, and the conflicts between actors with different interests in the business are arising.

Meanwhile, foreign firms from the advanced countries such as U.S. and Japan have been EC firms for a long time and their interests today are focused on the project-level integration of design and construction rather than simple corporate-level organizational integration. They have pursued constructability improvement for EC projects so that they could improve the quality of project by integrating design and construction from the beginning of the project.

The purpose of this research is two-fold: the first is to derive the implications for the domestic engineering and construction industry by analyzing the current status of business operation by foreign Engineering Construction firms. The second is to introduce the concept

1) Former, Associate Research Fellow in CERIK, Ph.D. in Architectural Engineering
2) Former, Associate Research Fellow in CERIK
Professor of YOYO Univ. Japan

of constructability which is understood as a strategic method to integrate construction and design from the initial stage of projects, reflecting construction knowledge and experience. Furthermore, this research aims to show the way to implement constructability by carefully examining the cases of foreign firms in performing EC projects.

The research consists of six chapters. After the introductory chapter, chapter two defines the concepts of EC and constructability and discusses the advantages of constructability applied to EC projects. Chapter three examines the current situation of EC in both domestic and foreign construction industries and discusses the problems of EC in the domestic industry as implied by the foreign cases. Chapter four examines the current status of constructability implementation by the foreign construction companies and discusses the types of the constructability programs and the strategic stages of constructability.

Chapter five considers two cases of constructability improvement that the foreign construction companies have achieved. The first is the case of constructability implementation through the hiring of a professional manager during pre-construction of a high-rise commercial office building project. The second is the implementation of a constructability program on renovation of a soap manufacturing facility. The conclusion of the research is presented in Chapter six, which summarizes the discussions of previous chapters and derives the implications for the domestic construction industry.

Ⅱ-12 November, 1995

The Strategies of the Japanese Construction Firms for Entry into Foreign Markets

Min Hyung, Kim[1)]

Recently, the rapid progress of internationalization and market opening turned the world into a global market, implying the advent of an era of boundless competition over the whole industries including the construction. In the face of these changes, the Korean construction firms are inevitably required to compete in the world market and penetrate into foreign markets for survival.

The purpose of this study is two-fold. The first is to analyze how the Japanese construction firms entered the Southeast Asian construction market. The second is to present some lessons for the Korean firms in order to enhance their competitiveness.

Currently, the Japanese overseas construction business holds the top rank in the world construction market with the 20.4% market share(U.S. $18.8 billion). Construction and civil engineering are the major types of work, the share of which is 65% and 30%, respectively. The share of orders from private agencies is 65%, of which 25% are from the Japanese overseas firms. Also, construction projects supported by official development assistance(ODA) amounted to 7%(￥63 billion), and contract orders by overseas corporations increased every year, and reached 70.5% in number and 47% in the amount, out of the total contracts.

The most important reason for today's success of the Japanese construction firms in the world market is that they approached it with such firm-specific advantages as high level technology, active localization effort, excellent financing, and strategic planning under the top manager's adamant will. Also, the globalized manufacturing industry, the close link with the financial institutions and the overseas trading companies, and the Japanese government's home

---

1) Research Fellow, Ph.D. in Business Administration

country-specific advantages for international economic cooperation are well combined to play as their overall international competitiveness.

Compared to Japan, Korean overseas construction business has a short history, and the size of the construction market is relatively small. Unlike the Japanese firms, most of the Korean construction firms except some large ones do not have the firm-specific advantages yet. Also, they cannot match the Japanese firms for their home country-specific comparative advantages in other supporting industries such as financing and overseas trading business. However, the former advantages depend upon the nation's overall economic development and the market of the country they desire to enter. Thus, the Korean construction firms must do their best to obtain the firm-specific advantages.

With these purposes, they need to establish a series of strategies to expand into the overseas market based on a thorough investigation of their strengths and weaknesses and opportunities and threats within the market they desire to enter. Since they are at the moment inferior to international leading firms with sound financing and technology, Korean construction firms need to decide among a series of alternatives to become more competitive in the following order.

First of all, they need to build cooperative relations with other related and supporting firms under top-managers' solid guidance and based on the long-term perspectives for the overseas construction business. To be more specific, the first step is to establish cooperative systems with other domestic construction firms. Secondly, they need to construct a network system for information sharing with the subsidiaries of home company and domestic companies in other industries. Thirdly, they need to build cooperative systems with domestic leading firms, form strategic alliance with the local companies, or with local governments in order to cover their weakness. In the long-run, they must establish firm-specific strategies based on the specialized skills and techniques through continuous research effort and build bases of operations in local areas through the localization strategies by fostering local workers and subcontract firms.

Ⅱ-13 December, 1995

The Impacts of Localization on the Construction Industry and Business Strategies in Response to Localization

Sang Ho, Lee[1)]

The main purpose of this study is three-fold. The first is to create a desirable perspective on the localization of the construction industry. The second is to analyze the impacts and the limits of localization. The third is to develop a set of strategies in response to localization that could be readily adopted by the construction industry as well as the individual firms within the industry.

As is the case in many other industries, both localization and globalization are the two main tides evident in the construction industry, and we must pursuit 'localization under globalization' in order to avoid such negative effects of localization as regional selfishness.

Localization has somewhat different impacts on the construction industry. First of all, there will be a change in the institutional environment such as the decentralization of the central government's authority and enhanced role of local governments. Second, regional construction markets will grow due to an increase of regional large-scale projects. Third, there will be a change in the relationship among local governments, local construction firms, and people. However, the localization of the construction industry is very limited due to the poor condition of the local economy, unfavorable business environment for local firms, and incompetence of local governments in terms of finance, manpower, and organizational structure.

The strategies of the construction firms in response to localization can be grouped in two different ways; each individual firm's strategies, and a set of strategies for all firms

1) Research Fellow, Ph.D. in Public Administration

within the industry. The former is based on the interests of each individual firm, which could cause conflicts among themselves. Especially, in this era of localization, it could lead to 'the politicization of the construction industry.' Thus, beyond the interests of each individual firm, we will develop a set of strategies to realize 'localization under globalization' for the construction industry.

Three strategies are suggested. The first is enhancing the cooperation between big firms and small firms and among medium firms. The second is the establishment of the Regional Construction Information System(RCIS). And, the last is to mobilize as much construction manpower as possible in the local area.

This study then concludes as follows. First, the localization of the construction industry should be pursued within the context of globalization, and the underlying principle must be the 'pursuit of mutual interests.' Second, in order to enrigorate local construction markets, it is necessary to improve the current unfavorable business environment for local construction firms and create favorable conditions for their investment in the regions. Third, since both localization and globalization could cause extreme competition, the construction industry as well as each individual firm should enhance their competitiveness, especially in financing, information, and technology. Finally, it is very important to establish a Regional Construction Information System(RCIS).

Ⅱ-14 December, 1995

A Survey Report on the Image of the Construction Industry and Worker's Perception on Employment Environment

Eui Seop, Lee[1] ·Min Hyung, Kim[2]

The purpose of this report is to provide solutions to improve the images of the construction industry. To this purpose, two surveys are conducted focusing on the examination of the image of the construction industry and workers' perception on the employment environment of the Korean construction industry.

We examined and compared the image of the construction and manufacturing industry as perceived by the citizens of Seoul in terms of their contribution to national economy, the non-economic contribution to society, impression on the workers, future prospect, and morality. In addition, we asked the workers in the construction industry about their motivation of entering the construction industry, the current working environment, the degree of satisfaction with their current job, and the needs for improvement in their employment environment to figure out their perception on the construction industry in general.

The survey shows that the image of the construction industry is positively perceived by the general public and not significantly different from that of the manufacturing industry in terms of the contribution to national economy, the degree of non-economic contribution to society, and the degree of favorable impression of the workers. However, the morality is negatively assessed for the construction industry, and the future prospect is perceived to be worse than that of the manufacturing industry. That the image of the construction industry is a little negatively perceived might have been partly due to the halo effect of the recent series of disastrous accidents in the construction fields.

---

1) Research Fellow, Ph.D. in Economics
2) Research Fellow, Ph.D. in Business Administration

Concerning the workers' perception on the working environment, more than half of the respondents(53%) answered that the construction job is attractive. The strongest reason for believing so is that they enjoy creating built-environment, social infrastructure. They positively evaluated the future prospect of the construction industry.

However, most respondents, especially on-site workers and workers in small and medium enterprises, answered that the current wage rate, working hours, and welfare situation are not satisfactory.

Based on the analysis of these surveys, we recommend construction companies and construction-related association to adopt the following image enhancing strategies. In the short-run, they should adopt image circumvention strategies. They should advertise to the general public the good aspects of the industry - that the construction industry contributes much to national economy, the future prospect of the industry is bright, and the construction job is enjoyable because it creates tangible built-environment for the nation. In the long-run, they should adopt new strategies to change their image. They should try to change the unfavorable aspects of the industry to favorable ones. The construction companies should manage the business with faith and honesty and assume social responsibility.

Ⅱ-15 December, 1995

Construction Industry and National Economy

Se Jong, Wang[1)]

Recently, the environment of the Korean construction industry is rapidly changing, both domestically and internationally. Construction license opening in 1989 has caused a significant increase in the number of construction firms, making the construction market very competitive and leading some firms to bankruptcy. Also, the advent of the World Trade Organization and the global tendency of internationalization and market opening lead the world into the era of boundless competition throughout the entire industries, including the construction industry. In response to these changes, the Korean construction industry is currently in the process of restructuring, and the firms need to be prepared for the future.

The purpose of this study is two-fold : the first is to historically review the contribution of the construction industry to the Korean national economy since the Korean liberation from Japan in 1945, and the second is to present the vision and role of the construction industry in conformity with the Korean economy in the twenty-first century.

The study consists of seven chapters and one appendix. After the introductory chapter, chapter two defines the concept of the construction industry, and reviews construction activities according to various classifications of the industry. Also, the industry-specific characteristics are discussed, and an examination of the current state of the Korean domestic construction industry is presented in this chapter.

Chapter three reviews the history of the Korean construction industry on the basis of the chronological table of the Korean construction industry provided in the appendix. A historical classification used in this review is based on the transition of the Korean construction license law and construction activities.

---

1) Research Fellow, Ph.D. in Economics

Chapter four historically reviews the macroeconomic side of the Korean construction industry such as its contribution to national competitiveness, economic growth, and national welfare. Specifically, we examine its contribution for infrastructures, national wealth, construction investment, gross domestic products, housing, and electricity. Also, the role of the overseas construction and its contribution to the national economy are discussed with respect to the improvement in the balance of international payment.

Chapter five reviews the microeconomic side of the Korean construction industry such as the transition of its role and national economic proportion according to the change in the structure of the Korean economy. Also, the effects of construction activities on other industries and the relationships among the domestic industries are discussed.

Chapter six discusses the forthcoming changes in the domestic and international environment of the construction industry and gives an outlook for the Korean economy in the twenty-first century. Also, the vision and the role of the Korean construction industry in the future are presented, conforming to the changes and the outlook of general economy.

The conclusion and summary of the study is presented in Chapter seven. A chronological table of the Korean construction industry covering the period from 1945 up to present is provided in the appendix, which divides the period into four terms according to the change of construction license law and construction activities.

Ⅱ-16 November, 1995

A Survey on Subcontractor Management System of Selected Japanese Contractors

Jun Hun, Lee[1)]

The purpose of this survey is to provide the Korean contractors with the practical information about how the Japanese general contractors manage their subcontractors. The collected information of materials includes selection of subcontractors, evaluation of subcontractor's performance, incentives and promoting measures for subcontractors, etc.

Facing market opening of the construction industry, the concerns about managing subcontractors have been growing and it is becoming more important for the domestic general contractors to establish a solid connection with capable subcontractors.

It is generally agreed that the Japanese general contractors operate a unique subcontractor management system and that such system seems to protect domestic construction market from foreign contractor's market penetration.

It might be helpful for the Korean contractors, as they stand right before the opening of the market, to consider the positive implications of the Japanese construction contractor's experiences in establishing a new mode of subcontractor management system.

Through this survey, three cases are closely examined. Daisei construction company and Kajima construction company as a general contractor and Mukkai construction company as a subcontractor. Data are collected through literature review and interviews of key personnel of the companies in question and their related organizations.

The implications of this survey can be summarized as follows. First, selection of subcontractor was rationalized by the change of scoring method of subcontractors. Second, evaluation of a subcontractor has been done by both job site and head office based on the

1) Former, Associate Research Fellow in CERIK

constructed results on site, subcontractor corporation and general appraisal items. Third, rewarding of subcontractor has been made through the negotiated contract, exempting contract related bonds to some extent. Fourth, organization in support of subcontractor has been provided by the contractor according to the 「construction plan」 proposed by the subcontractor. Fifth, education for enhancing subcontractor capability has been provided by the prime contractor. Sixth, calculated subcontracting has been executed with a view to promote subcontractor.

The ultimate goals of subcontractor management are to strengthen subcontractor's capability and to enhance prime contractor's competitiveness. However, many difficulties should be anticipated in achieving such goals because subcontractors are different in contracted volume, construction ability, management skill, etc. In this regard, it is suggested for the prime contractor to establish three step strategy as follows. First, a clear goal of subcontractor management should be set up. Second, selected subcontractors in specified and specialized fields should be supported with intensive incentives. Third, a close partnership between prime contractor and subcontractor should be established.

Ⅱ-17 November, 1995

A Survey on the Roles and Operation of the Japanese Construction Related Associations

Sang Kyung, An[1)]

Recently, the rapid change of environment surrounding the construction industry requires a structural reorganization of the construction-related associations as well as both government policies and business strategies of firms. This report aims at suggesting policy implication with respect to reorganization of the institutions by examining the organizational characteristics and operational methods of the Japanese construction-related institutions.

Chapter Ⅱ deals with structural characteristics of the Japanese construction industry. A brief history of the Japanese construction industry is chronologically examined. Also, the characteristics of the construction market are provided on both demand and supply sides. There are now as many as 530 thousand companies operating in the construction sector. Of these firms, more than 99.0% are small in size with less than 100 million yen in capital. Other characteristics are multi-layered subcontracting system and dominance of general contractors(Gene-Con).

Chapter Ⅲ focuses on how associations have been historically evolved and structured. One of the characteristics of the Japanese institutions is that the firms can voluntarily choose the entry to the association, unlike the Korean associations which require the construction companies to enter compulsorily after obtaining a construction business license. The other is that the Japanese associations are divided by the class and the types of construction works. Also, most of the firms could enter several institutions such as local or federal associations.

Chapter Ⅳ deals with the in-depth study of the Construction Association of Japan(CAJ)

1) Former, Associate Research Fellow in CERIK
Professor of YOYO Univ. Japan

and the Japan Federation of Construction Contractors(JFCC) with special emphasis on their activities and operations. Virtually, two associations lead the Japanese construction business, although a number of other institutions exist.

The last chapter suggests some policy implications and direction for the reorganization of the Korean construction-related associations based on the findings in this research.

Part Ⅲ. Construction Management(CM) & Engineering

Ⅲ-1 | February, 1999

Analysis of Time Extensions in Construction Projects

Je Seop, Lee[1)]

In recent years, considerable attention has been directed towards ascertaining the nature of delays and disruptions in construction projects. As the cost of individual projects increase dramatically, the cost of delays seems to increase at an even greater rate. Construction claims arising from delays are a common occurrence of most construction projects and among the most complicated and difficult to analyze.

This paper describes the different types of delay analysis techniques and a new delay analysis procedure is proposed and discussed.

In practice, attempts to identify the causes of delays and determine the new project time are made. Several techniques using as-planned and as-built schedules for delay analysis have been utilized by practitioners in the domain of claim analysis to determine the impact of delay events upon the overall project completion date. Attempts to measure delay by comparing planned to actual completion of individual activities tether then to the project completion date have been rejected regularly. The following is a list of the delay analysis techniques currently being used in the construction industry.

1) Global Impact Approach(GIA)
2) Net Impact Approach(NIA)
3) As-Planned Method(APM)
4) As-Build Method(ABM)
5) Time Impact Analysis(TLA)

Which scheduling analysis method is best suited to particular situation depends upon the

1) Former, Associate Research Fellow in CERIK
Professor in Univ. of Dong Kuk, Ph.D in Architectural Engineering

data available to evaluate the delay, the type of schedule available, and the circumstances of the delay. The following five situations are set to select as-planned basis in project disputes.

Scenario 1 : No formal schedule

Scenario 2 : Bar chart approved, but never used

Scenario 3 : CPM approved, but never updated or used

Scenario 4 : CPM approved, formally updated, but never used

Scenario 5 : CPM approved, properly updated, and used

Considering the above scenarios, the basic guidelines for preparation of CPM analysis for time extensions are proposed as follows.

In scenario 1, CPM diagram as intended by the contractor or CPM with as-built logic and as-built durations should be developed. In scenario 2, an as-planned CPM based on original bar chart should be developed at the needed level of detail.

1) Application of APM

As-Planned Method is applied to scenario 3 and scenario 4. Final results of APM analysis are to be explained in bar chart.

2) Application of ABM or TIA

As-Built Method or Time Impact Analysis is applied to scenario 5. Final results of ABM/TIA analysis also are to be explained in bar chart.

It is important to the success of delay analysis that specifications outlining the scheduling requirements be carefully prepared and incorporated into the contract. In addition, it is encouraged that provisions for recognizing acceleration should be developed in public construction contracts.

Ⅲ-2 | March, 1999

Promotion of Reasonable Construction Claims in Construction Works

Sok Mook, Lee[1)]

In comparison with the function and size of construction claims in the developed countries, construction claims in Korea are very few. In general, construction claims in Korea are expected to be more than those in the developed countries. The reason is that Korean construction contract is made in very much favor of client's opinion and position.

The study, first, started with the assumption that the causes of the scarcity of claims in Korea may be resulted from the facts that claim matters are handled in the following ways:

·Successful compromise between client and contractor before claiming :

·Informal solution : and

·Contractors transfer of claim matters to subcontractors.

Given the present system of contract modification for government projects, the first one means that the problems identified during construction processes are solved by design changes. The second and third ones indicate the possibility of poor construction performance. Therefore, factors of the scarcity in construction claims in Korea can be drawn into two categories of 1) problems in design change, and 2) poor construction performance. The latter one is dealt with in many ways to be excluded here, and the study chose to deal with the former one. In addition, the study also analyzed claim procedure. In essence, the study analyzes the system of design changes and claim procedure to clarify the reasons of claim scarcity, and draw out some policies to foster claim proposals in Korean construction projects.

According to the analysis of design changes, the present system suppresses claim proposals by the following factors :

---

1) Research Fellow, Ph.D. in Town Planning

·Design change is the major way to compensate extra cost not only for those caused by the necessity of design change but also for other matters to be dealt by direct contract modification :

·The application of present system of design changes follow the pattern of contractor's change first and then official admission of design change follow. Therefore the final comprehensive approval of design change - the same type of change order/verifications - heavily depends on the decision from the client side.

From the analysis of the claim procedure, following two factors are drawn to suppress the claim-making proposal :

·Ambiguity of claim-formation procedure : and

·Institutional defects in providing procedures for claim negotiation

In short, the study concluded the followings as the basic factors prohibiting construction claim proposals in Korea :

·Negative impact of present system of design changes :

·Difficulty in predicting claim results :

·Institutional defects of the procedure in reaching the claim proposal and its negotiation methods.

Hence, to solve the construction problems by claim, above causal factors should be dealt with. The following policies are derived, comprised of detailed elements resulting from the analyses on the system of design changes and claim procedure :

·Redefining present concept for the system design change-adoption of change order/variation system :

·Institutional establishment for the procedure of claiming :

·Clearer allocation of responsibility between client and contractor by contract :

·Institutional establishment introducing multi-steps for claim negotiations :

·Diversification of arbitration methods depending on project size.

Ⅲ-3 | September, 1999

The Function and Role of Construction Management

Bok Nam, Lee[1] · Young Su, Jeong[2]

Recent construction projects of a large scale or complex nature have widely adapted non-traditional types of project delivery methods such as construction management (CM) or design-build (DB). These types of non-traditional project delivery methods usually involve different degree of owner's participation.

As these methods were introduced, there have been several efforts to effectively utilize the different types of delivery methods in the Korean construction industry. These efforts include the use of third party construction management, project management, or program management, as well as the change of mandatory supervision by statutory regulations. However, inappropriate sharing of the scope, duty, or responsibility of the construction management functions have caused confusion, superposition, and excessive management costs.

In order to identify the problems and solutions, the purpose of this study is : 1) to investigate the functions of construction management practices, 2) to examine the role of the owner, construction manager, and supervisor in terms of their scope, duty, or responsibility in the construction management, and 3) to propose suggestions for enhancing the construction management systems.

Five capital projects were surveyed and analyzed, and extensive interviews with industry experts were conducted. Findings of this study suggest an establishment of a standard CM body of knowledge in Korea, revision of relevant regulations, development of an estimating guideline for CM fees, development of an assessment method for professional qualifications, and promotion of CM education.

---

1) Senior Research Fellow
2) Former, Associate Research Fellow in CERIK
Professor in Univ. of Myung Gi, Ph.D. Civil Engineering

Ⅲ-4 | December, 1999

Construction Management Model for Public Projects in Korea

Kyung Re, Kim[1)]

In order to implement CM (Construction Management) actively for public projects in Korea as a project delivery method, first of all, the existing cases of CM are analyzed and barriers to implement CM are identified. As results of the case study, the following barriers are identified in terms of the Korea construction law, owners, and CM firms respectively:

First, proper policy guidelines to implement CM, such as definition, service, compensation, and qualification are not yet provided. Second, proper tendering procedures for CM, such as bid strategy, PQ (Pre-Qualification), obtaining tenders, opening and evaluation of tenders, are not yet provided. Third, ability of construction managers is not yet enough to receive credits from the owners.

Therefore, the following CM model is proposed to eliminate the above barriers. The model is composed of provisions of the Korean construction law especially for CM, reformation of tendering procedures for owners, and improvements in ability of construction managers.

For the provisions of the Korean construction law, first, CM should be defined including all phases of the project life cycle. Application of CM for each project should be decided by owner's needs for CM based on characteristics of the project and owner's organization. Second, CM services are defined including all phases of the project life-cycle complying with the definition of CM. Construction managers should have active roles to coordinate all project participants and control quality, schedule, and cost. Third, owner's budget for CM service is set up based on the percentage of the construction cost, and compensation for the CM service is made based on cost plus fee. Fourth, qualification of CM firms is not required additionally

1) Former, Associate Research Fellow in CERIK
Professor in Univ. of HanYang, Ph.D. in Civil Engineering

and CM firms are selected based on their technical ability rater than price.

For the reformation of tendering procedures, first bid strategies including requirements of CM, CM service, budget and schedule should be set up considering characteristics of the project owner's organization. Second, PQ should be applied for the tendering procedures of CM in order to use the technical proposals from the selected bidders. Third, clear obtaining of tender process including preparation of tender documents, issue of tender documents, visit to site by tenderers, tenderer's queries, addenda to tender documents, and submission and receipt of tenders should be set up. Minimum of 30 days from the invitation to bid to the submission of bid are required to give bidders enough bid preparation time. Fourth, clear opening and evaluation process of tenders including opening of tender, review of tenders, tenders containing deviations, adjudication of tenders, rejection of all tenders, award of contract, issuance of letter of acceptance, performance security, preparation of contract agreement, and notification of unsuccessful tenders should be set up.

To improve the ability of construction managers, first, ability to prepare technical proposals has to be improved to get an award. In preparing the technical proposal, characteristics of the project and owner should be taken into account. Second, a construction manager could propose a CM organization to perform his services, which are provided in the request for proposal. To propose the organization, the construction manager considers available manpower in hands and utilization of foreign engineers if necessary. Third, CM system is developed to improve quality of CM services. Generally, this system is composed of a manual, procedures, instruction, and a project execution plan. Also, PMIS (Project Management Information System) is developed as a tool based on the CM system. Fourth, specialists who provide CM services should be well trained. Quality of the CM service depends on those who have both technical and managerial abilities and experiences.

As mentioned in the CM model, government, owner, and CM firms should play their roles properly and then CM can be utilized positively for public projects in Korea.

Ⅲ-5 | December, 1999

Calculating Delay Damages in Construction Projects

Je Seop, Lee[1)]

Delay may cause any number of changes in a project, including late completion, loss of potential early completion or acceleration of the work. The contractor's performance may be impacted by attempts to accelerate, lost productivity, and changes to the sequencing of the work. As a result, the contractor's cost almost inevitably increase.

The delay damages incurred by a contractor will depend on how the delay has affected contractor's specific manner and costs of performance. Whether the damages are recovered depends upon the contract terms, the applicable law, and whether the contractor has provided reliable proof.

The most common cost type of delay damages are for additional field office overhead cost due to extended performance time. When a delay causes a construction project to be extended, home office overhead, or general and administrative expenses, will continue to be incurred. Also, a period of delay may cause a contractor to experience the hidden costs of idle or unproductive equipment. Thus, costs for idle or unproductive equipment based on reasonable values are generally included in the contractor's delay damages calculation.

There are other types of impact claims for which the successful claimant can recover damages. Primary, these include lost productivity and acceleration. In lost productivity, the losses are incurred because the labor force was inefficient due to disruption. This disruption can happen due to the schedule delay. It should be noted accordingly, that projects that are delayed frequently also suffer from loss of labor productivity. Acceleration is the process by which the ordinary progress of the work is quickened. Commonly, acceleration is achieved by working overtime or working double shifts, although this practice may reduce productivity.

---

1) Former, Associate Research Fellow in CERIK
Professor in Univ. of Dong Kuk, Ph.D in Architectural Engineering

The most easily recognized costs of acceleration work are the premiums paid to laborers for overtime and shift work. Costs for lost productivity and acceleration therefore, are to be included in the contractor's delay damages calculation.

In addition to the items addressed above, there are other delay damages which may be recoverable. These include interest, profit, and insurance. In determining the damages that cause a problem such as delay, one must consider the impact the problem may have on the overall project, as well as costs that are directly tied to the problem. These delay damages should be proved with sufficient records. Also, damage calculations should be explained how costs are computed and what records support them. Accuracy and support for the delay damages is important.

Ⅲ-6 | October, 1998

Analysis of the Trends in Construction Claims

Je Seop, Lee[1)]

Recent claims by the contractors against the owner in Seoul subway construction projects have motivated the needs for research on construction claims in the Korean construction industry. Furthermore, it is expected that Seoul subway cases will bring an increased number of claims in domestic construction industry. If the construction industry, including the project owner and/or contractor, is to reduce the potential for a claim on a project, the reason for the claims occurring in the industry must be understood.

Nevertheless, to date, there have been few systematic efforts to gather and analyze relevant cases for construction claims. Therefore, previous cases and lessons-learned are not effectively utilized for the claims resolution although their importance in construction claims is widely recognized.

Thus, the purpose of this research is to collect data and come up with effective means to resolve claims in the Korean construction industry. By gathering and analyzing the claim cases, this research proposes a basis for the liability and damages compensation that can avoid legal disputes.

The survey shows an increasing number of lawsuits in domestic construction industry since 1988. Most lawsuits involve 'construction payment' and 'damages compensation', whereas data from an authoritative interpretation show that the majority of questions are concerned with 'contract price adjustment due to cost escalation' and 'contract price adjustment due to design changes'.

The potential claims areas suggested in this research are based on the actual frequency of claims/cases in domestic construction industry. Therefore, it is necessary to preview the

---

1) Former, Associate Research Fellow in CERIK
Professor in Univ. of Dong kuk, Ph.D in Architectural Engineering

potential claims items before signing a construction contract to avoid later disputes. These areas include 'changes in cost', design changes', 'progress payment after termination', and 'damages compensation' in contract conditions, all of which should be reviewed carefully. It should be also noted that the cases and authoritative interpretations for the above areas have happened several times in the same time period. Therefore, it is highly possible for them to happen repeatedly. This situation requires a systematic and continuous gathering and analyzing of cases of potential claims areas in order to create a comprehensive database for construction claims resolution. This will be of benefit for both the project owner and the contractor to avoid disputes and the rapid claims resolution.

In addition, it is required to resolve claims positively with recognizing the benefit of rapid claims resolution for both parties. In order to get the benefit of rapid claims resolution, it is necessary to change the management paradigm in construction projects. Recent lessons-learned from the cases that accelerate the claims resolution process by apportioning the damages according to the relative fault support the needs for paradigm shift. The claims should be resolved rapidly and reasonably in construction site level with negotiation or mediation between the owner and the contractor. The lawsuit is to be used as a final process of construction disputes because both parties lose money and time once the lawsuit is processed. In order to support the claims resolution, it is necessary to adopt an Alternative Dispute Resolution(ADR) as an alternative claims resolution method in domestic construction industry. However, it is essential to recognize the claims as by-products of construction process and rights of the parties. Therefore, it is strongly recommended that the management paradigm in construction projects to be changed from the informal process of claims resolution to the formal and rapid process of claims resolution by exact documentation between the parties.

Ⅲ-7 | January, 1997

A Methodological Improvement of Progress Measurement and Progress Payment Methods in the Construction Project

Bok Nam, Lee[1)]

It is a world wide common approach to summarize the construction project work volume progress status by percent(%), how much has been completed and how much remains to go. However, the methodology to measure the construction progress can be different country by country and company by company, and yet no one can say that a certain method is the best one. Payment method and procedures are also different.

The purpose of this research is to analyze the Korean construction progress measurement method in local construction projects and to identify the potential improvement area. It will identify which progress measurement methods are applied in the local construction industry. To analyze the current method, the local construction projects are categorized into two groups, one for public financed projects and another for private financed projects.

The major findings through research activities are as follows. The method to develop the planned progress curve generation is very subjective and heavily dependent upon personal experiences. The actual progress measurement method is very similar with the physical progress measurement, which compares the actual quantity against scheduled quantity. The comparison baseline is the detail commodity table, which is generally attached to the contract document. The subjective percent complete method is also adopted by some owners. But the earned value approach, a prevailing mechanism in the U.S. construction industry is very rarely applied in the local construction projects.

The significant problems due to unstructured progress measurement methods cause heavy

1) Senior Research Fellow

manpower losses, and high cost expenditures both for the owners and the contractors. Furthermore there is no relationship between construction actual progress and actual payment. The general payment method is based on the actual commodity installation qualities regardless of the contract type. This method also causes the extra cost expenditures to prepare the invoice documents. The payment for the contractor furnished materials is based on actually installed quantities not on purchased quantities, adding financial burdens on the contractors.

To improve the progress measurement methodology for the local construction industry, the standard guidelines and procedures for the systematic development of the planned progress curve are introduced. The actual progress measurement method by the major commodities are also developed. Two basic principle approach to measure actual progress are to adopt the physical progress measurement method and the earned value progress measurement. The selection of the progress measurement methodology is done by mutual agreement between the owner and the contractor. The local and national laws on the contract and construction technological management which need to be revised in order to simplify the payment procedures are also listed.

It is expected that these research recommendations and conclusions can greatly reduce the contractor's construction operating overhead cost and also increase the public owner's management capacities.

Ⅲ-8 | December, 1997

Benchmarking for the Construction Management Business in the Korean Construction Industry

Ye Sang, Kim[1)]

Recently, the Korean government has introduced new construction management contracting systems to the domestic construction industry for the large public construction projects. Since this project delivery approach, which has been universally utilized in the overseas construction market, is expected to bring advancement to the industry, every sector related to construction is preparing for these new systems. Especially many of large construction companies are concerned about entering the new market as a CM contractor and they even established special divisions or task force teams in their organizations to learn CM systems. However, since most of them have grown as general contractors for decades and rarely experienced the CM projects or systems, they seem to need more information and guidance to materialize their effort.

Thus, the purpose of this research is to provide them with useful information about the CM systems through the bench marking studies to reduce the trial and error in this early phase. These bench marking studies have two major parts. The first is an investigation of the activities related to construction management systems with which the large Korean construction companies have proceeded with to find out how they are preparing these new concepts. The second is an examination of the construction managements systems abroad and the operations of foreign construction management companies to learn their systems.

The major findings of the first part of the study show that only a limited number of highly ranked construction companies are preparing for the new systems by establishing an independent construction management division or team. The major role of these divisions/teams is limited to developing management and control systems, procedures and

1) Professor of SungKyunKwan Univ., Ph.D. in Civil Engineering

manuals, or education programs. But the size of such division or team is relatively small with more or less 10 employees on average, which needs more support in terms of top management commitment as well as manpower. They think the prospects on the construction management market in Korea is not encouraging yet, but expect more opportunities in the private sector than the public. For the construction management business as a CM contractor, more companies prefer 'CM-at-Risk' type of projects to 'CM-for-Fee' type. However, the technical capabilities of the Korean companies as a CM contractor are evaluated far behind the foreign companies in every aspect. Especially the management skills in the early phase of the project are the weakest.

Based on such results, it is recommended ; the goals and objectives of the CM divisions/teams should be more clearly defined; the CM divisions/teams need more support and authority from the top management to bring changes to the overall organization ; more specific long term plans with top Management commitment should be established for the activities of the CM divisions/teams and CM business ; more application of the CM approach to the private projects should be encouraged to prove its effectiveness ; more investment is needed to develop skills related to the CM functions.

For the bench marking of the Korean companies and the foreign companies, four U.S CM companies were investigated, Parsons, Bechtel, Turner Steiner International SA, and Hill International, Inc.

As an engineering constructor, their services cover overall project phases including engineering, procurement and construction management, but each company has its own specialty. From the investigations, the following recommendations are derived ; company organization needs to be restructured for more efficiency and effectiveness ; specialization of the company activities is necessary to be more competitive ; companies need more specialists and experts in their specialty area to provide adequate service to the owner ; companies need to enhance experience and knowledge level in every phase of the project, which allows variety of services they can sell to the owners ; company strategies should be differentiated from others for more competitiveness.

Ⅲ-9 | October, 1996

A Study on Introduction of a Truck Mixing As a Production Method of Ready-Mixed Concrete

Min Soo, Choi[1)]

The domestic ready-mixed concrete industry, introduced in 1965, has played an important role as a material supply industry through continuous expansion and modernization of its production facilities.

These days the quality of concrete structure is dependent upon that of ready-mixed concrete. The results of this research show that the prevention of tempering with ready-mixed concrete in construction fields is very important to improve the quality of concrete. In addition, it becomes harder and harder to have a designated slump and workability because of the long driving distance and lengthy delivery time.

In general, there are four types of methods in manufacturing of the ready-mixed concrete. Firstly, as a wet process, the centrally mixed concrete is mixed to completion in a stationary mixer and then transferred to the job site by a truck agitator. Sometimes the central mixer will partially mix the concrete only partially and the final mixing and transporting will be done by a revolving drum truck mixer. This process is often called shrink mixing.

On the other hand, as a dry process, truck mixing is a process in which previously proportioned concrete materials from a batch plant are charged into a ready-mixed truck for mixing and delivery to the construction sites.

Dry-batched concrete, a kind of truck mixing, extends the transportation time. Through this method, dry materials are transported to the job site in the truck drum and the mixing water is transported in a separate tank on the truck. Water is added under pressure, and mixing is completed with the usual 70 to 100 revolutions required for truck mixers.

---

1) Research Fellow, Ph.D. in Architectural Engineering

Generally, there are a number of facilities in other countries that have both dry and central mix capacities within the same plant. There is a little difference of mixing proportion design between the wet and dry process.

On the other hand, until recently, in Korea, ready-mixed concrete has been produced by only central mix method. However, as the traffic gets more congested, the transit-mixed concrete, especially dry batching method, is gradually gaining popularity.

Under the circumstances, the government is trying to propel the introduction of a dry batching method in production of ready-mixed concrete. In this light, this report examines the properties of dry batching system in ready-mixed concrete production as well as the effects and problems accompanied with the introduction of this system.

Furthermore, this report also proposes policy measures to introduce the dry batching system in ready-mixed concrete production. The major requirements proposed in this report are as follows. Firstly, contractors should be allowed to freely choose between the wet and dry process to encourage the introduction of a dry batching system in production of ready-mixed concrete. Accordingly, it is necessary to revise the KS F 4009(ready-mixed concrete) prescribed for the wet process production only.

Subsequently, it is also necessary to increase the production of truck mixers and encourage its usage in place of truck agitators to mix the concrete on job sites and prevent a prolonged-mixed concrete from retempering.

Last but not least, mixer truck driver is also an important element in the quality control of ready-mixed concrete in the dry batching method. It is thus required that drivers of truck mixers receive extensive trainings, on how to operate the vehicle as well as on concrete technology and product quality.