The Role of Project Managers and Risk Management System for the Overseas Construction Project

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Summery

The Role of the Project Manager and the Risk Management System for the Overseas Construction

1. Introduction

Purpose and back ground of the study

The turnover of the Japanese contractors and the consulting firms has kept the level of Yen 1 trillion and Yen 100 billion respectively from 1983 to 2004, in spite of the fact that the size of domestic market is shrinking. This is why they do not have a proper management system, especially risk management system for the overseas construction projects.

There are many studies and textbooks on the risk management, but the risk management of the project is dealt something special in the corporate management and the role of the project manager as the risk manager is not focused.

This study is to analyze the consciousness and knowledge of the risk of Japanese engineers and why their ability of risk management is small, and aims at building risk management system and a developing program which can be applied to reinforcing the ability, based on the author's experience.

2. Situation of the Overseas Construction Projects in which the Japanese Contractors are engaged and the issues

The history of Japanese overseas construction business was reviewed since 1885.

Until the end of World War II, Japanese contractors executed works in overseas territories and occupied areas applying Japanese way.

The turnover of the overseas market reached Yen1.6 trillion in 1997 but it has dropped to Yen 0.9 trillion in 1998 and kept the level of it since then to 2004. They have executed works without considering the gap of the management level required for the overseas construction, and without strategy and tactic including risk management.

The history and present situation of Japan's ODA was reviewed. The problems of general grant aid system without contingency plan have been discussed and the proposals for improvement of the system have been made.

Comparison of ODA system with USA, United Kingdom, Germany and France was made to find they have increased the disbursement of ODA since the terrorism on 2001.9.11 for the reduction of poverty which will cause terrorism.

Comparison of the overseas construction project and domestic construction project was made from the viewpoint of the implementation system of project, bidding system and execution system. In the overseas construction project, a consulting engineer is employed at every stage.

3. Overseas Projects and Risk

Risk is defined as "Uncertain factors and/or unknown factors which will bring a corporate and/or a project opportunities to pursue profit and threats to decrease it.

Purpose of corporate activities is to maximize its profit as a going-concern. Management is run with TQM system which aims to establish a system to supply the deliverables or services satisfying the needs of the client.

A project is to complete the deliverable which will satisfy the requirements of the client within the contracted time and amount. The characteristic it has definite period is different from daily operation.

Risks are classified into the categories of organizational, market, financial, external and pure risk. Some risks which are especially important in the overseas construction project were listed.

Most important risk is assignment of the Project Manager and key staff.

4. Risk Management in the Overseas Project

"Project Risk Management is to convert the unknown factors occurring as the project progresses to definite factors, and systemizing the project management is to develop the measures for such conversion. "

Risk Management consists of following five process ;

(1) Identification (2) Qualification (3) Quantification (4) Response

(4.1) Acceptance (4.2) Mitigation (4.3) Allocation (4.4) Transfer (4.5) Avoidance

(5) Documentation :

The table to identify the risk items of more than 1,000 on the 3rd level in the stage of tender preparation has been presented based on the author's experience. The listed risk items are those to be managed in the execution of the project.

Technique and tools of the corporate risk management shall be applied to the project.

The system to decide the risk response utilizing the risk level calculated in the risk management items and measurement of management ability of the project manager and staff was proposed.

Risk Level = Probability of Risk Event x Impact of Risk

Management Ability = Knowledge x $\sqrt{\mathrm{Pr}\,ojectExperience + ContractExperience}$

Risk Response depends upon the Risk Response Ability = Management Ability/Risk Level

This system is an application of the expert system.

The proposed risk management items have been utilized to establish simplified calculation of the contingency.

The proposed risk management system has been proven to be effective in 3 cases to select an additional key staff and substitute the project managers.

The proposed risk management system will contribute to improving the competitiveness by applying it in the internal business process to minimize risk shown in Balanced Scorecard of corporate strategy.

5. Establishment of a Developing Program of the Project Manager Considering the Characteristic of Construction Industry of Japan

The author analyzed the role of the project manager and the requirements for the project manager from the viewpoint of the risk management, and proposed education items, textbooks and program of 2 weeks education.

This syllabus was proven to be effective by OCAJI who held 2 days seminar for 20 candidates for the project manager with similar program in October, 2005. The author led 2 persons to pass the exam of PMP applying a part of the proposed syllabus.

6. Education of Project Management in the University

Actual situation of education of project management was analyzed from the curriculum of the universities. It was observed that the education has not come up with the change of the environment of the civil engineering. It was proposed that construction management is a platform to realize the basic technologies through cost and time. A framework of education was also proposed, of which backbone shall be the risk management.

7. Conclusion

The fundamental factor of the project management is risk management.

The proposed Risk Management System has been proved as the effective expert system.

It will contribute to improvement of competitiveness of the Japanese contractors by applying it in the internal business process of the Balanced Scorecard. The proposed education program of the project manager based on the risk management system will contribute to improving the management ability and competitiveness of the related firms with the construction.

TABLE OF CONTENTS

The Role of Project Managers and Risk Management System for the Overseas Construction Project

1. Introduction

Purpose and background of the study

For more than 20 years since 1983, before moving to the bubble economy, up to now, Japanese contractors keep their work volume in the overseas market about ¥ 1 trillion per year. It is only 2 % of total amount of their turnover in the domestic market. Consulting firms, on the other hand, keep their work volume about ¥100 billion per year, which is 1 % of their turnover in the domestic market. Why both contractors and consulting firms can not enlarge their work volume in overseas market under the situation that the scale of the domestic market should continue to be reduced? It must be that Japanese construction companies and consulting firms do not have the appropriate management techniques and human resources that are the key requirements for the international construction market. Why don't they have such management techniques and what is the root cause?

The author proposes the measures to solve the problem. How management techniques and human resources shall be developed? Which area shall be focused? The basis of the management technique is risk management. What is required to develop the ability of risk management?

This study is to analyze the consciousness and knowledge of the risk of Japanese engineers and why their ability of risk management is small, and aims at building risk management system that can be applied to reinforcing the ability. This study proposes the measures in a concrete form, verify its effectiveness and evaluate it.

The author has been engaged in the overseas projects for more than 30 years.

His experience started with the feasibility study of the acryl fiber plant to be constructed in Portugal as the joint venture among and between Mitsubishi Corporation (MC) he worked for, Mitsubishi Rayon Co. Ltd and a Portuguese company. From 1974 to 1978, he stationed in Portugal to be involved in the construction and operation of the plant. During the construction period, after the revolution on April 25th, 1974, risk of strikes and fluctuation of foreign currency partly because of political instability were experienced. After the start of operation, as one of the auditors of the Joint Venture Company, risk of securing the raw materials and fluctuation of international prices of the raw materials and the product were experienced.

During 1978 and 1981, in the head quarter, he managed the overseas construction projects in Africa. The biggest project was the construction of the Lilongwe International Airport, in Malawi, under Yen Credit. Mitsubishi Corporation was the contractor of the terminal building, navigation aids and electricity supply system. As the sub-contractor for the terminal building was a Korean contractor who was not so capable but suffered from

financial constraint and the site manager of MC had not enough experience, he stationed in the site for 4 months during the critical period. He managed the project considering the trade off between cost and schedule to avoid the liquidated damages.

During 1981 and 1984, he was representative of MC in Tanzania. He was involved in the supply of construction equipment and co-operated with the consulting firm who extended the technical assistance to the road construction with the supplied equipment. Risks of soil conditions and underground water were learned.

From 1989 to 1990, in the head quarter of MC, he managed the project to run a Hotel in Sofia, Bulgaria constructed under Yen Credit with co-operation of the New Otani Hotel. The importance of the project manager and the big impact of political risk were realized. This project was terminated by the change of policy of Bulgarian Government. Management was concentrated to collect the royalty and remuneration before termination of the project.

From 1991 to 1993, he stationed in Cameroon as the president of MC Cameroon, ltd.
He cooperated with NEC who constructed FM radio relay stations under Japan's grant aid. Risk of custom clearance and importance of communication with the client were realized keenly.

Since 1994 to up to now the author has worked for a consulting firm, named Construction Project Consultants, Inc. and has been in charge of the overseas construction projects. He realized that the ability of the project manager to manage the risk prevents from occurrence of the risk events or magnify the impact of a risk event.

Based on the above-mentioned experiences, the author has proposed the risk management system that will fit to the Japanese engineers. In developing the system, the theory of the Balanced Scorecard was applied.

The background of the study shall be further illustrated.

As the risk management is the basis of management technique and considering that a wide range of risk is involved in the overseas construction project, a project manager of an overseas construction project should be trained with risk management. In the stage of project formation, we must analyze political risks, financial risks, economic risks such as inflation, fluctuation of foreign exchange, labor market's risk, weather risk and so on.
In the stage of executing the project, the project manager continues to face these risks.
Meanwhile, the business corporate continuously faces the above-mentioned risks and has developed many means to respond them to protect their organization against threat or to pursue their profit making use of any chance as a going-concern.

A corporate educates and trains its employees in various ways, but its final purpose seems to develop experts in a specified field, such as an expert of sales, finance, personnel affairs, etc. Therefore, risk management has been dealt as one of the fields which such experts should manage.

However, project manager must deal with all kinds of risks which will give some impact to the schedule, cost and quality of a project. Under such circumstances, the project manager should have knowledge of, at least, tools of risk management which the corporate he belongs adopts to respond to risk events.

Project Manager has not been dealt as the risk manager, but has been deemed as a responsible person to execute the project including risk management. Considering that a loss of an overseas construction project can affect the profit of a corporate, education program of a project manager should be developed.

Studies including textbooks published on risk management are classified into 3 categories;

1) General study or textbooks on the risk of corporate business. Sometimes it includes crisis management (kiki kanri) such as management to respond to the big earthquake or fire of the factory. It illustrates how to respond to the disaster, but does not refer to an ongoing project.
2) Study or textbooks on a risk in a specific field such as financial risk or political risk.
3) Study or textbooks on a risk management of the project. There, a project is dealt as an independent from corporate business.

There, a project is treated as a something special. And the role of the Corporate Risk Manager is discussed, but the role of the Project Manager is discussed only from the viewpoint of execution of the project and risk management is one of the jobs assigned to him.

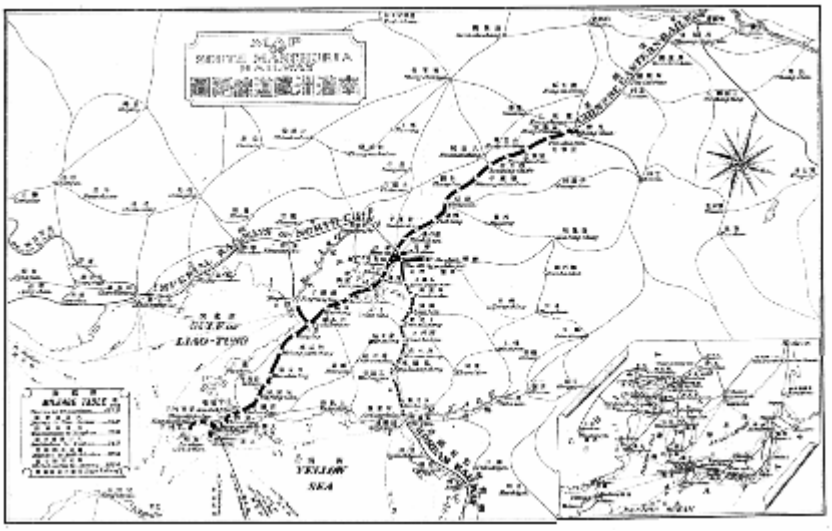
The author would like to discuss risk management integrating the corporate business and the project management especially in the overseas construction project. And, the author would like to propose a development program of a project manager from the viewpoint of risk management, because he thinks that one of the biggest risks for a corporate is assignment of the project manager.

2. Situation of the Overseas Construction Projects in which the Japanese Contractors are engaged and the issues

2.1. Japanese Overseas Construction Business

(1) The Japanese contractors entered into the overseas market in 1885 after the Sino – Japanese Peace Treaty. Most of their activities during 50 years ending in 1945 with the end of the World War II were concentrated in the Japanese colonies or occupied areas such as Taiwan, the Korean Peninsula, Manchuria (currently Northeast China), other parts of mainland China, Sakhalin and nearby Pacific islands. The main projects were construction or improvement of the infrastructure. In Manchuria, important cities like Harbin, Shenyanh were developed and the railway linking them to the Korean

peninsula was completed in 1906. The construction of railway was continued in Manchuria to improve the transport of the natural resources and food and to strengthen the governing power in the area. By 1939, 3,712.3 Km of the railway was completed[1]. Figure 2-1 shows the network of the railway.



Source: South Manchuria Railways Co.

Figure 2- 1 Railway network in Manchuria

They completed various hydroelectric projects in the Yalu river basin during 1926 and 1943. In 1937, the construction of Sup'ung Dam was started aiming to generate electric power of 700,000 KW, which was the biggest in the world at that time[2]. Dimension of the dam is shown in Table 2-1. It was completed in 1944.

Table 2-1 Dimension of Sup'ung Dam

Type	Gravitational Concrete Dam
Height of bank	166.4m
Length of top of the bank	899.5m
Volume of stored water	7,600 million tons
Effective Volume of stored water	11,600 million tons
Dam Lake	Sup'ungho

Source: Dam Mania Home Page: http://www.dam.or.tv/

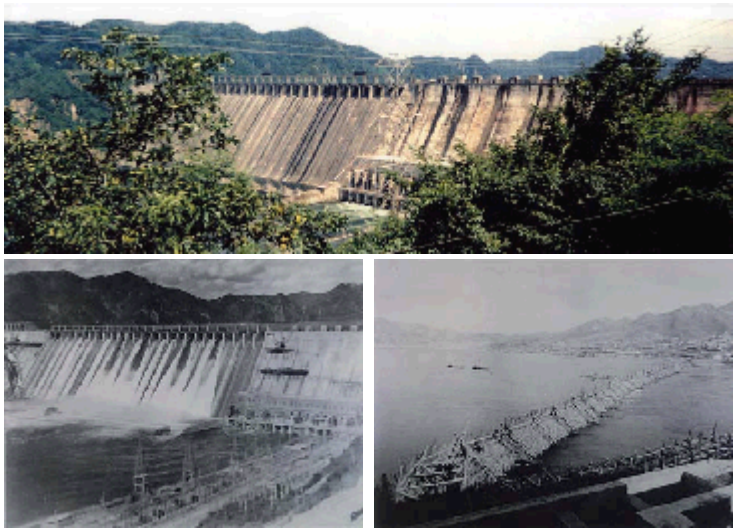


Figure 2-2 Sup'ung Dam
Source: Dam Mania Home Page: http://www.dam.or.tv/

In Taiwan, they constructed many irrigation projects and completed the main traversing railway in 1908.

In 1920, the construction of the Uzangtou Dam was started to irrigate 150,000 ha of land. Dimension of this dam is shown in Table 2-2. It was completed in 1930.

Table 2-2 Dimension of Uzangtou Dam

Type	Semi Hydraulic Fill Method (Center of the bank is in concrete and both sides are in soil, sands and rocks)
Width of the base of the bank	303 m
Width of the top of the bank	9 m
Height of the bank	56 m
Length of the top of the bank	1,273 m
Area of reservoir	6,000 ha
Maximum volume of water storage :	150 million m3
Length of aqueduct tunnel and underground drain	3,800 m
Maximum volume of flow	50 m3/sec.
Total length of irrigation canal	16,000 Km

Source: Japan Dam Foundation

Figure 2-3 Uzangtou Dam
Source: Nomusan Hope Page: http://www.nomusan.com/

These infrastructures still function and serve as the important infrastructures of the industrial developments and alive actively fulfilling their missions splendidly, though Japan has lost these colonies and occupied areas at the end of World War II.

When the World War II ended in 1945, the approximate numbers of civil engineers working in those territories were 2,400. The numbers of construction engineers working in overseas in 1999 are about 2,500 (the data of The Overseas Construction Association of Japan Inc.) which is equivalent to the above numbers and this shows how big were the overseas projects at that time.

As represented by Y. Hamano in the water supply and sewage network development and Y. Hatta in irrigation development in Taiwan, Y. Kubota in the hydroelectric development in Yalu river basin, Japanese construction engineers had carried out those developments and projects by their endless efforts and passions and high skilled techniques. It can be said that those works executed in the colonies and occupied territories outside the mainland of Japan have been executed on the basis of the paradigm which Japanese construction industry possesses. In this sense, during this period, the Japanese contractors worked domestically. At that time, the Japanese did not have an idea that these colonies and occupied areas were “overseas”, but considered them to be “areas outside Japanese mainland”, and though there were some differences by area, Japanese government made it basic policy to transplant the Japanese administrative systems using military power as the enforcing authority. Therefore, the contractors were selected by the then system and they executed works in Japanese way.

However, the necessity of the risk management was as big as the international project. Especially in Manchuria, risk management of the security was larger than that in the present Afghanistan projects because in addition to the threats from Russia, there were many military cliques fighting against the Japanese invasion. Further, procurement and transport of equipment, materials and labors was one of the biggest risk items.

(2) After the World War II, the Japanese contractors resumed construction in Asian countries by executing the projects under Japan's war reparation.

It started in 1954 with the Baruchan hydroelectric project in Burma (at present Myanmar). Such reparation works were done as the tunnels, hotels, bridges in Indonesia and the hydroelectric project in Vietnam and Laos, development projects in Hong Kong Island etc. Non-reimbursable financial assistance (Grant Aid) not related with reparation started in 1969 with the construction of houses for the refugees.

Reimbursable financial assistance with concessionary conditions (Yen Credit) started in 1958 with supply of plants and equipment to India. Since1959, Yen credit was provided not only for the procurement of the equipment but also for the construction project. First project was construction of hydro-electric power station in Vietnam provided in 1959.

From the mid of 1960s when the war reparation works were nearly completed, the commercial-oriented projects and projects under ODA started to increase, and the basis of the business developments also started to change.

Figure 2.4. shows the changes, after 1960, of the amounts invested in the domestic constructions and the cumulative contract amounts of Japanese construction companies in the international constructions market (data of The Japanese Overseas Construction Inc).

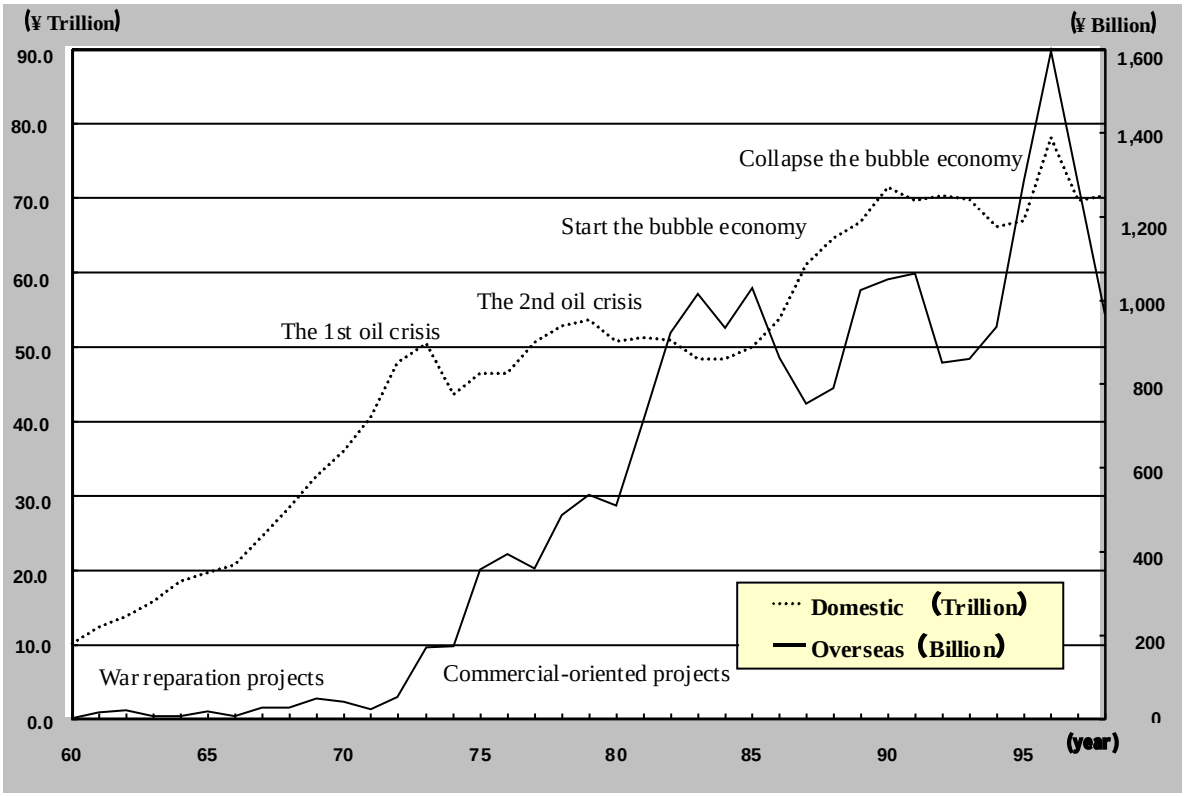


Figure 2.4. Invested amounts in the Japanese domestic construction and the contract amounts of Japanese construction companies in the international constructions market

The cumulative contract amounts in the international markets from the middle of 1960s till the end of 1970s shows at average about 16% annual increase. Most remarkably is the rapid increase in the 3 years from 1981 till 1983 and more than 30% increase is achieved. The background of this sharp increase tells, as indicated in the same Table, the cooling down of the construction investment in the Japanese market, and to compensate this decrease the international projects were aggressively secured. Figure 2.4. also shows the same phenomenon in the decrease of the domestic construction investment immediately after the first oil crisis occurred in October 1973. It can be found following explanation made by S. Kusayanagi in this book[3)].

The international constructions developments of the construction companies have been always changing under the above-mentioned backgrounds, though the engineering companies specialized in the construction of the chemical plants are not the same.

The question is whether or not those developments have been executed with the correct management resources; particularly personnel training and education, and on the basis of the proper "Strategies and Tactics including risk management". In fact, it is quite questionable.

Several years after when the sharp increase was noticed, many of the projects contracted between 1981 and 1883 executed came to have huge losses beyond imagination, partly because of foreign exchange. As the result, the amounts in the international markets after 1985 went down sharply. These changes apparently negatively tell that the real natures of the international construction works are analyzed, sufficient functions and ability of personnel are given, indispensable strategies and tactics are well studied, and the fundamental items are reviewed and re-constructed. In other words, only limited companies have studied "The management technique needed for the promotion of the international projects", and further have established the sure management policies in analyzing/accumulating of the experienced values.

After 1986, the so-called "the bubble economy" started and the domestic markets had produced unprecedented volumes of works. International projects of the construction companies started to shift from the conventional construction works into the new fields of developments such as hotels, office buildings, leisure resorts centering in the North America, Europe, and the Pacific areas. However, those developments failed to create the developing structure of the international constructions, and with the "Collapse of the bubble economy", the astronomic damages/losses are left as the result. Here again, it is difficult to find whether the business strategies focusing on the reality of the international construction markets were planned, the management tactics to carry out the same were studied or not.

As the foregoing graph shows, the work orders of Japan for nearly 15 years long from 1983 till now remains to be ¥ 1 trillion per year approximately. In 1997, it showed ¥1.6 trillion, but in 1998, it went back to ¥ 0.9 trillion. Incidentally, the average exchange rate in that period is US$ 1 = ¥ 120 and fluctuation of the annual exchange rate is about ±16. The Japanese construction companies who manage approximately ¥ 65 trillion worth per year in domestic markets are once competed in the international markets, are driven to get only ¥1 trillion turnover, being 1.5% of the domestic volumes. How comes so? It must be that Japanese construction companies do not have appropriate management technique required for international construction market. Why they do not and what is the real reason?

The basic reason seems to be that it comes from the features of Japanese domestic markets, which are far different from those of the international construction markets. To put it in the opposite way, when compared with the international construction markets, Japanese domestic markets are given the quite unique characteristic. Yet, Japanese companies think the international markets with these management ideas sitting on the special market or on the lines along this. They do not seem to have recognized the gap between the management level required for the overseas

construction projects and that required for the domestic projects. Especially, they have not noticed the fact that risks clearly exist in the stage of tender, which requires high level of the risk management in the overseas project. That is why they get only 1.5% of the domestic volumes, and this must be the right answer to the above question.

If the increase of business volumes in the international construction market is desired, the top management by himself has to accept the difference of the market features, and has to catch the real images through the actual experiences. And at the same time, it becomes necessary to make good use of the features of Japanese construction companies, to create the project management technique including risk management well based on the ideas of the international markets, and to go with them. The problem is that even though systematized project management technique for the domestic market has not yet been established in Japan, and it shall be required to build up from the quite basic structure.

The governmental procurement treaty of the WTO has been effective since January 1996, and has penetrated into the Japanese markets in more concrete style, and this open market will invite the international construction project in the Japanese domestic market. Actually, American Government showed interest in the major projects to be realized in near future such as the New Kitakyushu Airport, Kobe Airport and so on. Therefore, the developing of the project management technique is not only required for the overseas markets but also for the domestic construction market in the future[3)].

Japan's ODA is composed of 2 types; one is reimbursable aid, so called Yen Credit and the other is non-reimbursable aid, called Grant Aid. Until the beginning of 1990's, the procurement conditions of Yen Credit was tied to Japanese, i.e. the nationality of the contractor was limited to Japanese or the recipient country's. In the Grant Aid, the contractor has been limited to the Japanese. As having been mentioned above, after the World War II, the Japanese Contractors went into foreign market to construct infrastructure facilities provided under Japan's ODA.

In 2003, total sales amount of overseas construction business of 45 general contractors, who are member of the Overseas Construction Association of Japan, Inc., was Yen 898.2 billion (about US$ 8.16 billion) increasing Yen 1.4 billion from 2002. In 2003, Yen Credit project shared Yen 104.2 billion.

Even under such ODA system, the procurement of a contractor for the projects under Yen Credit was in accordance with the rule prevailing in the international market. Procedures for the International Competitive Bidding have been applied. And, to execute the contract, the international standard contract known as 4th Edition 1987 of FIDIC (International Federation of Consulting Engineers) has been applied. There, a consulting firm is employed as the Engineer for the project owner and a supervisor of the execution. FIDIC defines the Engineer as follows; " Engineer means the person

appointed by the Employer to act as Engineer for the purposes of the Contract and named as such in Part II (Conditions of Particular Application) of these conditions"

To comply with such rule, Japanese contractors had to do what were different from the domestic market, especially in the projects under Yen Credit or financed by the multi-national financing agency such as the World Bank of which construction period is normally 4-5 years. Main differences are as follows;

1) In the stage of offer, they are requested to make a detailed technical proposal including construction schedule and mobilization program and to submit detailed breakdown of the prices fulfilling the Bills of Quantity prepared by the Engineer. In a project under Yen Credit, it is normal that evaluation of offer is made in 2 stages. In the first, technical evaluation is made to evaluate following items in case of the civil works;
   - Construction Schedule and Methodology
   - Quality Assurance Plan
   - Security Plan
   - Plan to Avoid Environmental Pollution
   - Plan to Control Traffic (in case of road project)
   - Mobilization Program of Equipment
   - Procurement Schedule of Materials
   - Organization of Site and Mobilization Program of Key Staffs with their Curriculum Vitae
   - Plan of Temporary Works
   - Schedule of Progress Amount and Cash Flow [4)]

   If the score in this stage is not high enough, the offer is rejected by the Employer and bid price is not opened in the 2nd stage.

   The World Bank normally applies following criteria[5)] ;

   1) Minimum technical score required to pass: 80 points
   2) The weights given to the Technical and Financial Proposals are:
      T = 0.8, and F = 0.2

   In the domestic market, because of budget system, a project is dealt dividing into some lots so that one lot should be completed within one fiscal year. There is quasi BOQ (actually it is the breakdown of the contract sum), but it can be submitted only after the award of the contract for the reference. Because the contract is lump sum contract based on the principle of the good faith as the Construction Business Law stipulates;

   Clause 18.

   "Parties involved in a construction contract shall make the contract based on equal footing and implement own duties in faithfully and honestly."

Further, Standard Conditions of Contract stipulates as follow;

Article 3 (a) Bill of Quantities and Work Program

3.1. Based on the Drawings and Specifications, the Contractor shall prepare Bill of Quantities (hereinafter referred to as "BOQ"), and the Work Program, and submit BOQ and Work Program to the Owner. The BOQ and the Work Program shall be approved by the Owner.

3.2. Unless otherwise specifically provided in this Contract Form, the BOQ and the Work Program shall not be binding on the Owner or the Contractor.

There are no contractually binding elements except the achieved result of the contract sum and completion period.

With such background, contractor is selected only by bidding price. It is a unique system that the bidders put a paper with their bid price into a bid box as shown on the picture. This system aggravated the bid-rigging practice, which the contractor is pre-arranged by agreement of the designated bidders. Actually the practices of a tendering system are quite different compared with the international construction market.

In a case of the tender for the road construction project invited by a civil works office of a prefecture, schedule of the tender was as shown in Table 2-3.

Table 2-3 Schedule of Tender for the Road Project

Cost estimation by the owner	Invitation for Tender	Bidding	Evaluation of tender documents	Award of the Contract
July 15	August 6	August 21		August 24
Preparation work for tender call	Duration of tender estimation & documentation		On the Lowest Bidder only. Evaluation	

22 days	15 days		period 3 days	

This table raises some questions. Firstly, if the Project owner is so capable and efficient as shall complete the estimation of cost and tender documents within such short period? Secondly, is it possible for the bidder to complete the tender documents in 15 days? Thirdly, Evaluation of the tender documents can be finished in only 3 days? In other words, the Project owner can properly confirm the ground of the bid price without examining construction plan, construction schedule, Bills of Quantities, etc? Is it reasonable that the lowest bid price becomes the contract price?

It can be said the above-mentioned overseas system of tendering and evaluation replies to these questions.

However, in the system of general grant aid, JICA adopted almost same system to make the lowest bid price the contract price.

2) In the stage of execution, the works are supervised by a consulting team employed by the project owner as the Engineer. The working drawings must be approved by the Engineer. Materials to be used are subject to the approval. Daily progress is checked by the Engineer, and sometimes corrective actions are required. For example, Clause 37.1 of FIDIC 4th edition stipulates as "The Engineer shall at all reasonable times have access to the Site and to all workshops and places -----." In a domestic project, such daily check is not made but some inspectors from the Employer visit the site for inspection from time to time, because the project owner sometimes employ a consultant whose position is just a helper to the project owner. In the Standard Conditions of Contract between the project owner and the contractor, there is not any clause to stipulate the role of a consultant.

According to the Standard Conditions of Contract applied to the domestic public works, the Project Owner can dispatch supervisor(s) to make working drawings or to approve working drawings submitted by the contractor and to control and inspect the progress, or to test or check the materials. Such supervisor does not always station at the site but stays at their office.

3) In a project under the standard contract of FIDIC, contractors are allowed to submit their claim if they find some defect in BOQ, drawings or instruction. Clause 53.1 of FIDIC stipulates "Notwithstanding any other provision of the Contract, if the Contractor intends to claim any additional payment pursuant to any Clause of these Conditions or otherwise, he shall give notice of his intention to the Engineer within 28 days after the event giving rise to the claim has first arisen."

However, it has been said Japanese contractors are not good at claiming, because they are not accustomed to such system. 2003 version of the Standard Conditions of Contract stipulates some cases of extension of time and change of the contract amount, but in every case the settlement shall be made by mutual agreement. If the parties do not reach agreement within a specified period, the Employer decides and notifies it to the Contractor. Further, Clause 30 stipulates " In the cases where the contract amount shall be increased or the Employer shall bear the cost, if there are some special reasons, the drawings can be changed instead of increase of the amount or payment of the cost. In this case, contents of change of drawings shall be agreed between the Employer and the Contractor within a specific period. If the parties fail in the agreement, the Employer shall decide and notify it to the Contractor." The basic idea is to solve the problem in a good faith. There is not any procedure of evaluating the Contractor's request for the increase of cost or extension of time. And most of such cases are treated by the modification of the drawings, because the Employer has the mind of that he needs to show that they have solved the problems on the ground of their pride and their authorities and responsibilities.

2.2. Basic Study of the Projects under ODA

2.2.1. Definition of ODA

ODA is flow of fund from the developed countries to the developing countries with following 3 conditions[6)] ;

1. Fund is provided by a government or an executing agency of the government.
2. The fund is provided for the purpose of economic development or improvement of the welfare in a developing country.
3. Grant Element shall be more than 25 %. The grant element reflects the financial terms of a transaction: interest rate, maturity and grace period. Only loans with a grant element above 25% qualify as ODA It become bigger as the rate of interest lowers and the period of reimbursement is longer. In case of Grant Aid, Grant Element is 100%.

2.2.2. Countries concerned with ODA

2.2.2.1. Developed countries to provide ODA

DAC- Development Assistance Committee of OECD – Organization for Economic Co-operation and Development deals with issues of co-operation with the developing countries. 22 member countries of DAC provide ODA to the recipient countries.

Table 2-4 Member countries of DAC

Australia	Finland	Italy	Norway	United Kingdom
Austria	France	Japan	Portugal	United States
Belgium	Germany	Luxembourg	Spain	-
Canada	Greece	Netherlands	Sweden	-
Denmark	Ireland	New Zealand	Switzerland	-

2.2.2.2. Recipient Countries

Recipient countries of ODA are shown in Part I of DAC list. This list is reviewed every three years. If GNI per capita of a country exceeds the amount defined for Part I, it moves to Part II.

Table 2-5 DAC list of Recipient Countries As at 1st January , 2003

Part I: Developing Countries and Territories (Official Development Assistance)					Part II: Countries and Territories in Transition (Official Aid)	
Least Developed Countries (LDCs)	Other Low-Income Countries (Other LICs) (per capita GNI < $745 in 2001)	Lower Middle-Income Countries (LMICs) (per capita GNI $746-$2975 in 2001)	Upper Middle-Income Countries (UMICs) (per capita GNI $2976-$9205 in 2001)	High-Income Countries (HICs) (per capita GNI > $9206 in 2001)	Central and Eastern European Countries and New Independent States of the former Soviet Union (CEECs/NIS)	More Advanced Developing Countries and Territories
Afghanistan Angola Bangladesh Benin Bhutan Burkina Faso Burundi Cambodia Cape Verde Central African Republic Chad Comoros Congo, Dem. Rep. Djibouti Equatorial Guinea Eritrea Ethiopia Gambia Guinea Guinea-Bissau Haiti Kiribati Laos Lesotho Liberia Madagascar Malawi Maldives Mali Mauritania Mozambique	*Armenia *Azerbaijan Cameroon Congo, Rep. Côte d'Ivoire *Georgia Ghana India Indonesia Kenya Korea, Democratic Republic *Kyrgyz Rep. *Moldova Mongolia Nicaragua Nigeria Pakistan Papua New Guinea *Tajikistan *Uzbekistan Viet Nam Zimbabwe	*Albania Algeria Belize Bolivia Bosnia and Herzegovina China Colombia Cuba Dominican Republic Ecuador Egypt El Salvador Fiji Guatemala Guyana Honduras Iran Iraq Jamaica Jordan *Kazakhstan Macedonia (former Yugoslav Republic) Marshall Islands Micronesia, Federated States Morocco Namibia Palestinian Administered Areas Paraguay Peru Philippines Serbia & Montenegro South Africa Sri Lanka St Vincent & Grenadines Suriname Swaziland Syria Thailand +Tokelau Tonga Tunisia Turkey *Turkmenistan +Wallis and Futuna	Botswana Brazil Chile Cook Islands Costa Rica Croatia Dominica Gabon Grenada Lebanon Malaysia Mauritius +Mayotte Nauru Panama +St Helena St Lucia Venezuela **Threshold for World Bank Loan Eligibility ($5185 in 2001)** +Anguilla Antigua and Barbuda Argentina Barbados Mexico	Bahrain	*Belarus *Bulgaria *Czech Republic *Estonia *Hungary *Latvia *Lithuania *Poland *Romania *Russia *Slovak Republic *Ukraine	+Aruba Bahamas +Bermuda Brunei +Cayman Islands Chinese Taipei Cyprus +Falkland Islands +French Polynesia +Gibraltar +Hong Kong, China Israel Korea Kuwait Libya +Macao Malta +Netherlands Antilles +New Caledonia Qatar Singapore Slovenia United Arab Emirates

Myanmar Nepal Niger Rwanda Samoa Sao Tome and Principe Senegal Sierra Leone Solomon Islands Somalia Sudan Tanzania Timor-Leste Togo Tuvalu Uganda Vanuatu Yemen Zambia		Niue	+Montserrat Oman Palau Islands Saudi Arabia Seychelles St Kitts and Nevis Trinidad and Tobago +Turks and Caicos Islands Uruguay			+Virgin Islands (UK)

* Central and Eastern European countries and New independent States of former Soviet Union (CEECs/NIS)+ Territory

Source : DAC

Note: Amount of GNI is that of 2001

2.2.3. Japanese ODA System

(1) Purpose of Japan's ODA[7)]

Japan's ODA is provided to solve following issues;

(a) Poverty Reduction

Poverty reduction is a key development goal advocated by the World Bank and shared by all assistance organization, and is essential to eliminate terrorism and other causes of instability in the world. Japan will put high priority on the sectors of education, health care and welfare, water and sanitation and agriculture, which are essential part of Millennium Development Goal.

(b) Sustainable growth

Japan will assist the endeavor of the developing countries for the sustainable growth. To achieve it, Japan will place high importance on the assistance for the development of socio-economic infrastructure, policy making, the development of institutions and development of human resources.

(c) Addressing global issues

Global issues such as environmental problems, population, food, energy, natural disasters, infectious diseases, terrorism, drugs and internationally organized crimes shall be addressed immediately by the coordination of the international community.

(d) Peace-Building

After cold war, as the regional and domestic conflicts frequently occur, the role

of ODA has become more important to prevent from the conflicts, to solve the conflicts, to restore peace and to develop the country. Japan will positively participate in the process of peace-building making use of ODA.

(2) 2 types of ODA in Japan's ODA system.

One of them is reimbursable Aid, so called Yen Credit which extends a financial assistance with soft conditions to the developing countries. Under Yen Credit, project loan and commodity loan are extended. The latter is a kind of direct finance to the recipient country, because the proceeds of loan are used for import of commodities except ammunition and food under KR grant (Food Aid).

The other is non-reimbursable Aid, generally called Grant Aid which extends a financial assistance as a grant to the recipient Government. In this type, there are 6 categories;

i) General Grant: Aid for the implementation of a project including provision of equipment. Construction of infrastructure facilities is included in this category.

ii) Fishery Grant: Grant to promote and develop fishery industry in a developing country. It includes construction of a fishery port.

iii) Kennedy Round: Grant of food, mainly rice or wheat

iv) Kennedy Round II: Grant to increase the production of food in a developing country. Fertilizer, pesticides and/or agricultural eqyuioment are supplied.

v) Culture Grant: Aid for strengthening the cultural relationship with the developing countries. Equipment for a museum, sports or musical instruments etc is supplied. Maximum amount of grant is J. Yen 50 million.

vi) Technical Assistance: JICA(Japan International Cooperation Agency, the executing agency of the Grant Aid) dispatches experts in various sectors for long term or short term to extend technical assistance on the project base or to assist capability building of the recipient government.

The Japanese contractors are pursuing the projects under Yen Credit and above category i) and ii) of Grant Aid.

(3) Objective sectors of ODA

The characteristic of Japan's ODA is that shares of infrastructure sector are very big. As the sectoral distribution shows, total share of social infrastructure and economic infrastructure exceeds 60 % of the bilateral ODA. Japanese contractors have participated in the construction of these infrastructure facilities.

Table 2-6 Distribution by Sector of Japan' ODA

Year	2002						(Commitment Base, Unit: US$ Million)	
Sector / Form	Grant Project Aid	Technical Assistance	Grant Aid Total	Share %	Loan	Share %	Bilateral ODA Total	Share %
Social Infrastructure	809.95	1,104.77	1,914.72	43.14	395.39	7.73	2,310.11	24.18
Economic Infrastructure	199.57	191.64	391.21	8.81	3,239.23	63.31	3,630.44	37.99
Production Sector	191.60	454.63	646.23	14.56	440.87	8.62	1,087.10	11.38
Multi Sector assistance	5.54	66.59	72.13	1.63	354.81	6.93	426.94	4.47
S.T.	1,206.66	1,817.63	3,024.29	68.14	4,430.30	86.59	7,454.59	78.02
Commodity/Program Assistance	38.42		38.42	0.87	0.00	0.00	38.42	0.40
Debt Relief	232.46		232.46	5.24	590.30	11.54	822.76	8.61
Emergency Assistance	36.13		36.13	0.81	96.02	1.88	132.15	1.38
Administrative Expenses	110.66	996.57	1,107.23	24.95	0.00	0.00	1,107.23	11.59
G.T.	1,624.33	2,814.20	4,438.53	100.00	5,116.62	100.00	9,555.15	100.00

Source: White Paper of ODA, 2003 by Ministry of Foreign Affairs

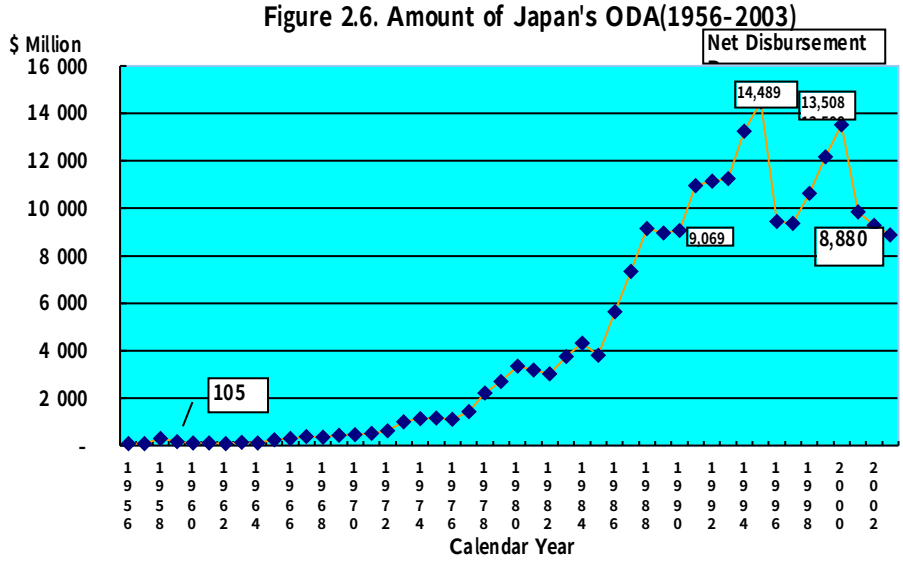
(4) Volume of Japan's ODA

In 1976, last payment of reparations to Philippines was made. Taking this opportunity, international and domestic societies requested Japan for expansion of ODA to contribute to the economic development of the developing countries. In 1970s, Japanese economy has rapidly expanded and the trade surplus increased year by year. The international opinion requested Japan to return the trade surplus to the international society through ODA. In 1973 when oil crisis occurred, Japanese societies asserted that oil resources should be secured by way of providing ODA to the oil producing countries. In the background of such discussion, there was a strong opinion that ODA should be utilized for national security because by the Constitution Japan is prohibited to contribute to the international security by military activities while other developing countries can exercise military influence under the cold war. ODA was considered to substitute military activities[8)] .

Under such background, in 1978 the Japanese Government announced the First ODA Medium Term Plan to double the ODA amount in 3 years from US$ 1,420 million attained in 1977. Since then, the amount of Japanese ODA was increased

every year. In 1983, Japanese ODA amount reached US$ 3,761 million, being ranked 3rd biggest in DAC countries exceeding Germany, and in 1986 Japan was ranked 2nd in DAC with amount of US$ 5,634 million surpassing France. In 1989, net disbursement amount reached US$ 8,965 million exceeding that of USA for the first time to become the biggest donor country. During 1990s, total amount of ODA of the world tended to be decreased, but for the 10 years from 1991 to 2000, Japan has supplied about 20 % of the ODA by DAC countries and kept the position of the biggest donor.

Figure 2.6. Amount of Japan's ODA(1956-2003)



Note: Exclude Aid to Eastern Europe and Graduated Countries.

Source: Ministry of Foreign Affaires, White Paper on ODA 2004

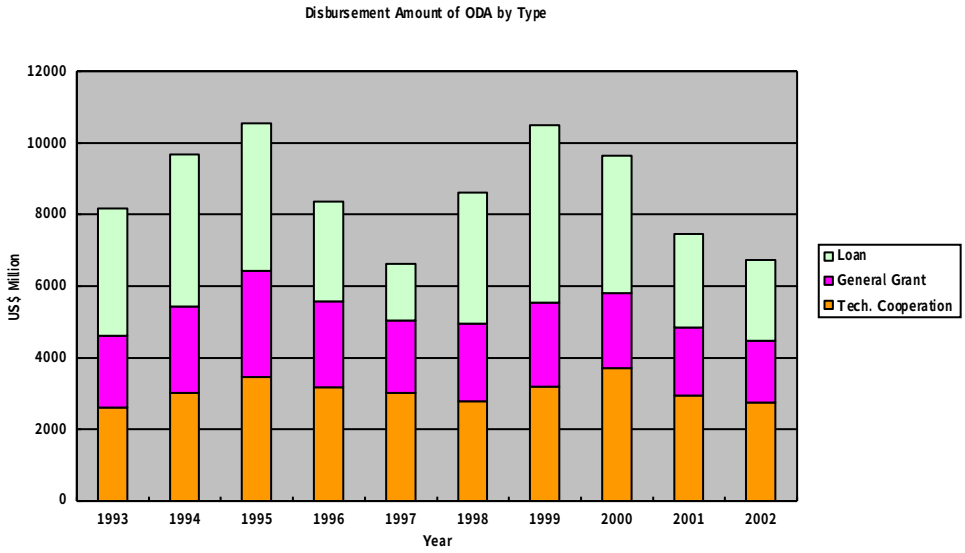


Figure 2.7. Disbursement Amount of ODA by Type

Source: Ministry of Foreign Affairs, White Paper on ODA 2003

After 2000 due to financial constraint and as Figure 2-6 shows, net disbursement amount of Japan's ODA has been continuously decreased as Table 2-7 shows;

Table 2-7 Net Disbursement Amount of Japan's ODA

Year	Disbursement Amount US$ Million
2000	13,508
2001	9,847
2002	9,283
2003	8,880

Source: White Paper of ODA, 2003 Ministry of Foreign Affairs

Main part of decrease was due to decrease of Yen Credit. In 2003, because of increase of repayment for the Yen Credit, net amount of disbursement of Yen Credit decreased by 34.8 % on US Dollar base compared with 2002 as the Table 2- 8. shows;

Table 2-8 Japan's ODA in 2003 by type, finalized figures		(Net Disbursement Basis)
Aid Provided (2003)	$million	Share of Total type

Type of Aid	2003	2002	2002/03 Growth rate(%)	ODA total	Bilateral total
Grant Aid	1,699.03	1,718.26	-1.1	19.5	28.3
(Excluding Aid to East Europe and Graduated Countries)	1,695.72	1,715.99	-1.2	19	26.8
Technical Cooperation	2,845.18	2,754.49	3.3	32.7	47.3
(Excluding Aid to East Europe and Graduated Countries)	2,747.38	2,656.66	3.4	30.8	43.4
Grant Total	4,544.21	4,472.75	1.6	52.3	75.6
(Excluding Aid to East Europe and Graduated Countries)	4,443.10	4,372.65	1.6	49.7	70.1
Government Loans	1,469.44	2,253.17	-34.8	16.9	24.4
(Disbursed Loans)	-6,069.78	-5,315.59	-14.2	-69.8	-100.9
(Amount Repaid)	-4,600.34	-3,062.42	-50.2	-52.9	-76.5
(Excluding Aid to East Europe and Graduated Countries)	1,891.13	2,319.64	-18.5	21.2	29.9
Bilateral ODA 計	6,013.65	6,725.91	-10.6	69.2	100
(Excluding Aid to East Europe and Graduated Countries)	6,334.23	6,692.29	-5.4	70.9	100
Contributions and Subscriptions to International Organizations	2,677.70	2,633.29	1.7	30.8	
(Excluding contributions to EBRD)	2,598.67	2,590.67	0.3	29.1	
(Including Aid to East Europe and Graduated Countries and Contributions to EBRD)	8,691.35	9,359.21	-7.1	100	
(Excluding Aid to East Europe and Graduated Countries and Contributions to EBRD)	8,932.91	9,282.96	-3.8	100	
Nominal GNP Preliminary Estimates ($/Yen billion)	4,375.70	4,043.89	8.2		
Percentage of GNP 比(%)：(Including Aid to East Europe and Graduated Countries and Contributions to EBRD)	0.2	0.23			
(Excluding Aid to East Europe and Graduated Countries and Contributions to EBRD)	0.2	0.23			

Note:(1)Graduated countries are following 13 countries/region(Brunei、Kuwait、Qatar、Singapore、U.A.E.、Israel、Hong Kong、Cyprus、Korea、Macao、Libya、Malta、Slovenia).

(2)DAC exchange rate for 2003：$1=¥115.9 円(down ¥9.30 from 2002).

(3) Totals do not add up exactly because of rounding.

(5) Procedure of Grant Aid

Procedure of Grant Aid starts with the request for the project from a developing country's government to the Japanese Government. Normally, the letter is addressed to the Embassy of Japan in the country. The reason why the request is required is that the policy of Japan's ODA is to assist the self-help efforts of a developing country. Such request is deemed to show that the government of the developing country seriously studied the project for the development of a sector and requested for the assistance to raise the fund to realize the project.

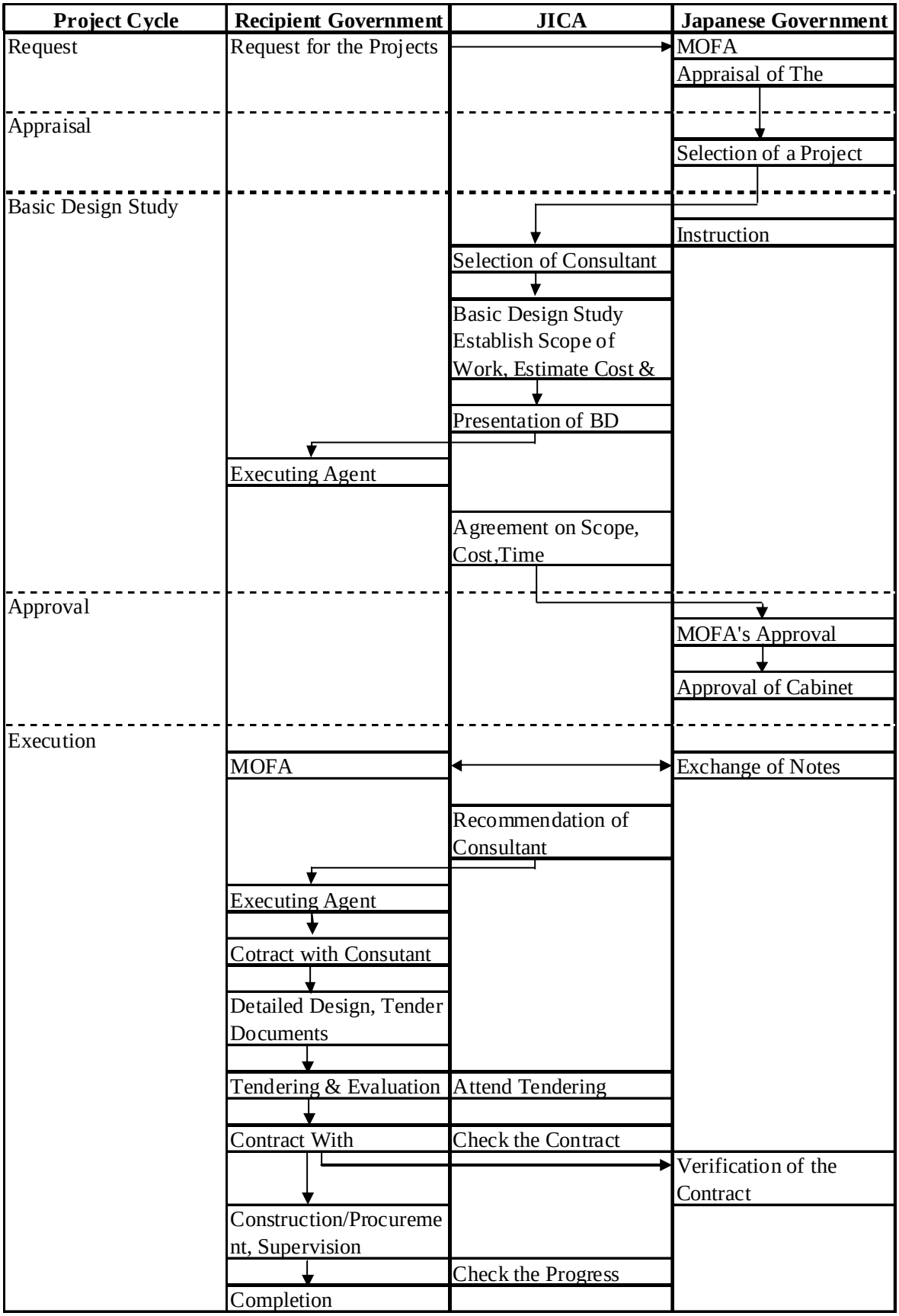

Project Cycle
Recipient Government
JICA
Japanese Government
Request
Request for the Projects
MOFA
Appraisal of The
Appraisal
Selection of a Project
Basic Design Study
Instruction
Selection of Consultant
Basic Design Study
Establish Scope of
Work, Estimate Cost &
Presentation of BD
Executing Agent
Agreement on Scope,
Cost,Time
Approval
MOFA's Approval
Approval of Cabinet
Execution
MOFA
Exchange of Notes
Recommendation of
Consultant
Executing Agent
Cotract with Consutant
Detailed Design, Tender
Documents
Tendering & Evaluation
Attend Tendering
Contract With
Check the Contract
Verification of the
Contract
Construction/Procureme
nt, Supervision
Check the Progress
Completion

Figure 2- 8 Procedure of the Grant Aid
(figured from Guide to Grant Aid by JICA)

MOFA: Ministry of Foreign Affairs

JICA: Japan International Cooperation Agency

2.2.4. Problems of General Grant Aid System

(1) Principle of Single Fiscal Year

Japan's Grant Aid system makes it principle to execute within a fiscal year. Therefore, time schedule is very tight. Typical one is as follows; (Note: Japanese fiscal year starts in April)

1) Middle of April: Announcement of procurement of a consulting firm for a project.
2) Middle of May: Selection of a consulting firm. Start of Basic Design study.
3) End of June: Completion of Basic Design Study.
4) End of July: Decision by the Cabinet to provide a grant aid to the project.
5) Beginning of August: Exchange of Notes between Japanese Government and the recipient Government.
6) Middle of August: Contract between the consulting firm and the recipient government. Start of Detailed Design.
7) End of December: Completion of Detailed Design and tender documents.
8) Middle of January: Announcement of the tender for a contractor.
9) End of February: Tender close and award of contract.
10) End of March: Completion of contract. If not completed, validity of exchange of notes will be extended by one year.

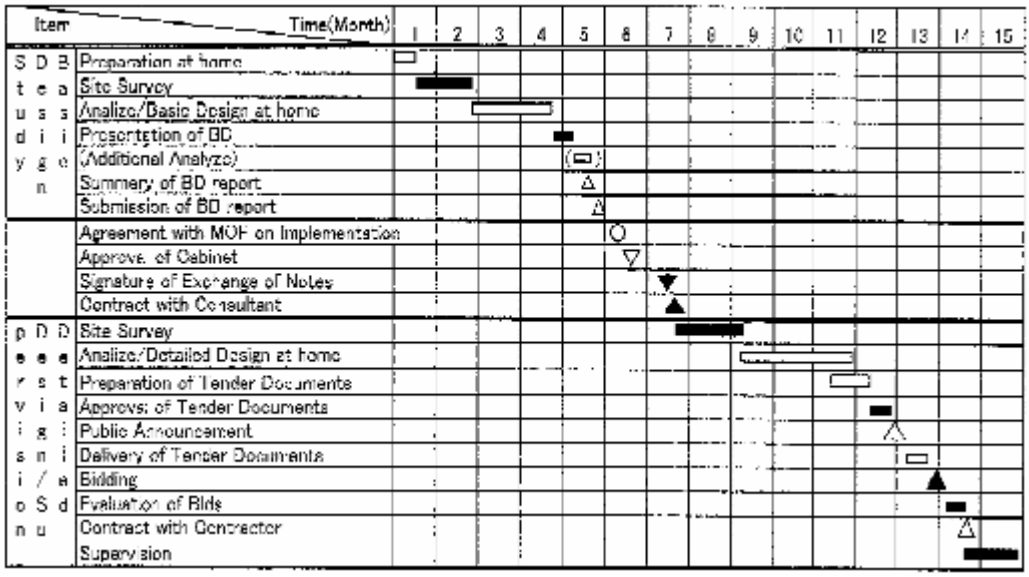


Figure 2- 9 Standard Schedule of General Grant Project

Source: Guide to Grant Aid, JICA

There are some modifications to the above principle. In case of a construction project, it is divided into some lots one of which could be completed in one year. Sometimes, in the first year only Detailed Design is completed and in the second year, construction is made. If announcement of tender for a consulting firm delays, it is clear from the beginning that exchange of notes must be revised. The biggest problem is that time for basic design is not enough especially in a construction project involving earth works. Sometimes boring survey is not made but altered by collecting old survey data because of time constraint. Further, under such conditions accuracy of cost estimate is required to be within 10% difference of detailed design

(2) No contingency is estimated:

According to the guideline of JICA for cost estimate, items to be included in the estimate in a construction project are as follows;

(a) Construction Cost

(a-1) Direct cost

(a- 2) Temporary works

(a- 3) Transport & packing cost

(a- 4) Expenses to dispatch engineers

(a- 5) Site expenses including personnel expenses

(a- 6) General administration expenses

(b) Machinery Cost

(c) Detailed Design and Supervision Cost

As above any contingency is not included. It does not matter if construction period exceeds one year or not. What will happen if unexpected problems to increase the cost occur? In the Exchange of Notes, the amount of project cost is defined and can not be changed during the construction period. That means neither Japanese Government nor the recipient Government is obliged to take care of such increase of cost. Therefore, the contractor must bear the increased cost, unless they terminate the contract. But in the contract, there is no clause of termination except the case of force majeure.

In 2004, some contractors actually suffered from such loss. Cost estimate was made in 2003 and construction works started in the beginning of 2004. After that, price of oil has increased by almost 45 % which caused the increase of prices of oil based commodities and prices of steel products have increased also by almost 50%. In a case, the contractor was obliged to bear the increase of cost caused by an insufficient soil survey. In the course of construction of 38 Km of road, black cotton soil (swell type soil) with depth of 1.2 m was found over 20Km. During the Basic Design study, such soil was not reported though some boring study was made. In the feasibility study which had been made before request for grant aid was made, there was not any description of existence of such soil. It was quite obvious that the contractor had entitlement to compensate for removing the black cotton soil and refill it with acceptable material. However, the contractor was forced to do those works without any additional cost and extension of time.

(3) No additional cost and extension of time

As there is not any contingency, it is a natural conclusion that additional cost could not be accepted. The model of contract between the Recipient Government and the Contractor made by JICA stipulates as follows on disputes and arbitration;

"1. This contract shall be executed by the parties hereto in good faith, and in case any doubtful point is raised or any dispute occurs concerning the interpretation or performance of this Contract, such matters shall be settled through consultation of the parties.

2. In the event that an amicable settlement cannot be reached through consultation, the matter shall be referred to arbitration."

These clauses are exactly same as the clauses stipulated on the Standard Condition of the Contract for domestic projects in Japan.

On the other hand Basis of Contract is defined as follows;

"Any and all stipulations of this Contract shall be consistent with content of the Exchange of Notes. Should any of the stipulations of this Contract be in conflict with the Exchange of Notes, such stipulations shall be deemed null and void ab initio."

As Exchange of Notes defines the cost of the project without contingency and time (normally end of the fiscal year), stipulations of claim which may allow to exceed the defined amount can not be approved. There has not been any case that the conflicts were referred to arbitration, but always the contractor was obliged to bear the loss. The reason why the contingency is not included in the above model contract of JICA can be considered as follows;

1) The standard model of conditions of contract of JICA is that they followed after the Japanese Standard Conditions of Contract (JSCC) applied to the public works in the domestic market. The Standard Conditions of Contract was made by the group of organizations led by former Ministry of Construction (since 2001 Ministry of Land, Infrastructure and Transport), and was distributed to all public employers including municipality. The problem is that the Standard Conditions of Contract is based on only Lump-sum Type of contact. Therefore owners of project do not seriously consider about the necessity of contingency.

2) The standard model of conditions of contract of JICA is followed after JSCC and all the articles in the Standard Conditions of Contract are set up strictly in accordance with the Accounting Laws and Regulations in the country that basically have no philosophy regarding contingency in project budget allocation. It is one of the examples, but, the Article 3 regarding Breakdown of the Contract Amount and Construction Schedule in the Standard Conditions of Contract, 2003 version, stipulates as follows :

1) The Contractor shall submit the breakdown of the contract amount (hereinafter referred to as "Breakdown") and construction schedule based on the design documents to the Employer for the approval.
2) Unless otherwise stipulated in other articles, Breakdown and the construction schedule shall not bind the Employer nor the Contractor.

What this article says is that only the contract amount and the completion date are contractual binding matter in the contract between a project owner and a contractor. As it is said before, the JSCC is based on Lump-sum Type of contact. It is hardly seen to set up contingency in the contract.

With regard to the extension of time, the JSCC stipulates as follows;

Article 21 (Request for Extension of Time by the Contractor): The Contractor is allowed to request the Employer in writing for the extension of time in the case that the Contractor can not complete the works within the contracted period for

the reasons of bad weather or the causes not liable to the Contractor.

Article 23 (Change of Construction Period): Change of construction period shall be decided through discussion between the parties. Provided that, if the agreement can not be made within ___ days after starting discussion, the Employer shall decide the new period and notify it to the Contractor.

Judging from these articles, JSCC still keeps room for acceptance of the extension of time. However, the Standard Conditions of Contract of JICA has no room for it. It means that SCC of JICA is quite unilateral standard conditions of contract for implementation of the project.

2.2.5. Proposals for Improvement of System

(1) Improvement of Exchange of Notes to include contingency

As the Basis of Contract of the model contract of JICA projects is the Exchange of Notes (E/N) between the Japanese Government and the recipient Government, the contents of the E/N shall be improved so that following effects should be included;

(a) The amount of contingency and the objective of contingency shall be stipulated.

(b) Re-allocation of contingency shall be agreed subject to the concurrence of JICA as the executing agency of the Japanese Government to the application by the executing agency of the recipient Government.

(c) In case, as the result of re-allocation, the extension of time over the current fiscal year should be required, the Governments concerned shall exchange the notes.

The reasons and the background of the above proposal are discussed hereunder in (2) and (3).

(2) The reason for the Necessity of Contingency Plan

It is not fair to oblige the contractor to bear the loss from unexpected increase of cost such as fuel and steel mentioned in previous chapter. It is a kind of exploitation by the Government.

To respond to such change or newly found facts in the course of construction, contingency shall be added to the items of cost estimates of a construction project. At least, contingency for price escalation shall be prepared. Newly found facts such as black cotton soil must be dealt with modification of the design. Black cotton soil is derived from the basalt and has a characteristic to develop its colloidal conditions with water. If road is constructed on this soil, after the rain water penetrates into the base, this soil expands itself in colloidal condition and cause the cracks on the pavement. Such cracks are observed in 2-3 years after the construction, if soil is not treated properly. The case of black cotton soil may be exceptional one, but it is quite difficult to get precise data of the geological conditions at the design stage. In the most of cases,

the estimated volume in the Bills of Quantity related to geological works increase. Such contingency shall be prepared too.

It can be called that the construction contract is "The Incomplete Contract", because contract conditions in a construction project are set up on the basis of assumptions. In the contract with Bills of Quantity, total amount of contract is described but this amount does not bind the parties. It means the contract is based on the premises that conditions of the contract can always be changed. FIDIC 4th edition stipulates such premises of change in following logic;

1) The Contractor shall be deemed to have inspected and examined the Site and its surroundings and information available to have satisfied himself.
2) The Contractor shall be deemed to have satisfied himself as to the correctness of and sufficiency of the Tender and of the rates and prices stated in the BOQ.
3) However, during the execution of the Works, even experienced Contractor encounters physical obstructions or physical conditions which were not foreseeable.

The Engineer, if in his opinion such obstructions and conditions could not have been reasonably foreseen, shall determine, after due consultation with the Employer and the Contractor, any extension of time and amount of costs incurred to the Contractor by reason of such obstructions or conditions encountered.

To determine the extension of time and amount of cost as having been mentioned above, contingency plan is indispensable. Without any budget, such decision to increase the amount cannot be taken.

Further, in a project in the developing countries as being shown in DAC list of recipient countries of ODA, there are many uncertain conditions. For example the land of the site has not been properly expropriated because the government has not fully paid the compensation to the landowners. Such fact will delay the commencement or progress of the work. Sometimes site must be closed for the security because of a big political demonstration or riot. Like this, it is not proper to apply the ways of construction projects in Japan to the project under ODA to be executed in developing countries.

From the past record of the project under Yen Credit, 5 % of the total construction cost will be sufficient, considering the following difference of the amount and the period of the contract.

In case of Yen Credit, the amount ordinarily exceeds Yen 3 billion (US$ 27million) and construction period is 5 years, while the amount of Grant Aid is in standard Yen 1 billion(US$9 million) per year and construction period is divided into one year even if the total length of the project exceeds 2 years. In Yen Credit project, 5 to 10 % of contingency is estimated in the appraisal stage of the project. It is needed to propose contingency which can be prepared even now. At present, if the contractor's bid price

falls short of estimated amount, the difference is immediately returned to the treasury. Though such amount may be very small, such difference should be kept as contingency. It is possible to make the contingency plan within the philosophy of the existing system of the Exchange of Notes.

(3) Claim for additional cost and extension of time

If contingency is prepared, claim for additional cost and extension of time by the contractor can be acceptable. The role of a consultant will be expanded. The capability of the consultant to evaluate the claim will be required. Actually, the consulting firm dispatches a resident engineer to the site, but many of such resident engineers do not supervise the works in a real sense. They only approve what the contractors have done. Such situation comes from the lack of tension between the parties partly because claims are not submitted by the contractor. Under such circumstances, even if basic design and following detailed design were with some defects, JICA and consulting firms do not suffer from any loss. Thus period of basic design study remains short of required one. Therefore, admitting claim will lead to the better quality of the study and increasing the capacities of the resident engineers. It will also give a good chance to study the global standard to the contractors and the consultants. From such viewpoint, contingency shall be prepared first.

(4) Longer period of Basic Design Study

Typical time schedule mentioned in chapter 4 is applied to all projects, no matter whether it is a heavy civil engineering project, architectural building project or supply of equipment. In a project of heavy civil or building, numbers of study team members are increased compared with a project to supply equipment, however basically the study and design period is too short to execute enough activities. In an extreme case, it was required that study work, including field survey and basic design of 180Km of road should be completed within 3 months only.

It is admitted to employ local sub-contractors to complete the study within the limited time, but it happens in developing countries that number of engineers belonging to such sub-contractor is limited and that they have not enough tools and instruments, which must be brought from Japan. Under such circumstances, JICA should set longer period of basic design study according to the type of project, encourage using faculties from local university, and at the same time, flexible application of the standard shall be made. At present, there is no room to negotiate on the period between JICA and the consulting firm. Negotiation should be approved considering the availability of local engineers and tools needed for the study. Such longer period of study and involvement of local university will improve the quality of study and accuracy of cost estimate, helping to incorporate indigenous technology and enhance capacity of local university.

(5) Introduction of Construction Management Method

Under the present system of Japan's Grant Aid, the contractor for the building and civil works shall be a Japanese construction company. For many reasons, construction cost of a Japanese contractor is frequently criticized to be higher than international standard. To decrease the cost, construction management method shall be introduced where reliable sub-contractors are available. In this case there are two ways. One is that the consulting firm who made a basic design study and detailed design would become the construction manager. The other is that the construction manager would be selected by bidding. The consulting firm will remain as the consultant for the project owner. Advantages of this method are as follows;

a) Local materials will be utilized as much as possible.
b) Technical transfers to the local contractor will be enhanced. Even now, the contractors employ many local sub-contractors, but technical transfer is made only in the scope of the sub-contract.
c) Employment of local engineers, technicians and labors will be increased, which will lead to the increase of income of the site region.

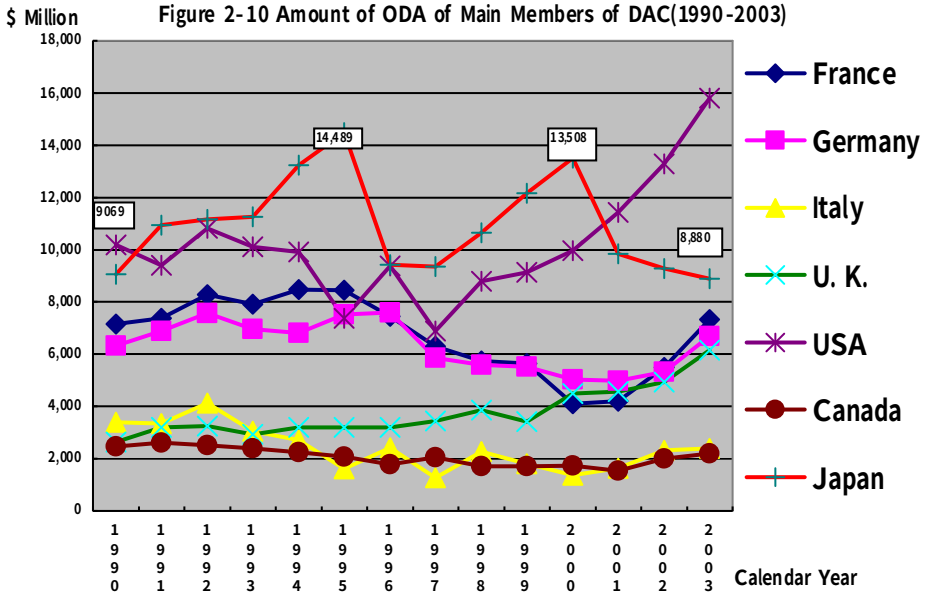
However, under the present system, the risk of price escalation, unforeseen items or event such as disaster during construction period still remains. In this sense, introduction of contingency plan shall be the first issue.

2.2.6. ODA system of other advanced countries

For comparison, the system of other donor countries is studied. As being shown in Figure 2-6, Japan has kept the position of the biggest donor until 2000, and in 2001 this position was reversed by the United States of America.

On 9.11. 2001, the USA was attacked by the terrorist. 2 air planes crushed into twin tower building of New York World Trade Center and more than 6000 of people were killed. The USA and other advanced countries in Europe realized that terrorism is fostered by the poverty. Since then, the USA has rapidly increased the amount of ODA to appease the people of the countries who might be sympathetic with terrorist against the USA. Other countries in Europe such as United Kingdom, France and Germany have also increased the amount of ODA partly from the threat of terrorism and mainly for the poverty reduction meeting to the Millennium Development Goals adopted in 2000 by the United Nations.

Only Japan has decreased the amount due to financial constraints and partly because the nation is insensitive to the terrorism, but still keeps the position of 2nd biggest donor in the world.



Note：(1)Exclude Aid to Eastern Europe and Graduated Countries.
：(2)Amount of USA in 1991 and 1992年 excludes military debt relief.
：(3) Figures in 2003 are tentative ones except Japan.

(1) United States of America

ODA of United States of America is extended through United States Agency for International Development (USAID). USAID receives overall foreign policy guidance from the Secretary of State in implementing ODA projects.

USAID works U.S. foreign policy objectives by supporting economic growth, agriculture and trade, global health and democracy, conflict prevention and humanitarian assistance. These objectives are almost same with Japan's, but it is remarked that supporting "democracy" is clearly mentioned as the objective.

The USA is the biggest donor of the world. USA has increased the amount of the ODA especially after the event of 9.11, 2001 to fight against terrorism that may be supported by the poverty.

In 2001, net amount of USA's assistance was 11,429 million US dollars. This amount was increased to 13,290 million and 15,791 million in 2002 and 2003 respectively.

The characteristic of USAID's assistance is that almost 100 % of the aid is grant. For example, in 2002 amount of committed ODA was 15,292.7 million US Dollar of which US$ 15,149.1 million was grant aid.

Regional distribution of USAID's assistance in 2002 was as follows;

Table 2-9 Regional distribution of USAID's assistance in 2002

Region		ODA Amount (US$ million)		
		Total ODA amount	Grant amount	
1	Middle East & North Africa :	**2,462.00**	**2,462.00**	**100%**
2	Asia	**2,190.70**	**2,140.70**	**98%**
3	Latin America & Caribbean	**1,803.30**	**1,770.10**	**98%**
4	Sub-Saharan Africa	**1,788.00**	**1,759.00**	**98%**
5	Oceania	**180.90**	**180.90**	**100%**
6	Eastern Europe	**629.20**	**629.20**	**100%**
7	Western Europe	**220.60**	**220.60**	**100%**
	Total	**9,274.70**	**9,162.50**	**99%**
Source: USAID Annual Report 2002				

Table2- 10 Grant Aid of USAID 2001- 2003

Unit: US$ million

Year / Region	2001	2002	2003
Middle East & North Africa	1,669.9	2,337.1	6,608.9
Sub-Saharan Africa	1,637.8	1,982.1	3,149.1
Latin America & Caribbean	1,398.1	1,753.9	2,059.8
Asia	1,066.6	2,157.0	1,878.9
Oceania	163.8	189.1	174.4
Eurasia	1,050.8	1,046.1	723.1
Eastern Europe	915.9	696.6	582.3
Western Europe	62.3	223.3	1,060.0
Canada	0.0	0.0	23.7
World(Not Specified)	3,498.9	4,408.1	3,541.3
Total	11,464.1	14,793.3	19,801.5

Source: USAID Annual Report 2004

From the above, it can be watched that USA puts most importance on Arab countries.

(2) United Kingdom (UK)

The development assistance of UK started from that to her colonies in 1929. Her ODA is carried out by the Department for International Development （DfID） headed by a Secretary of State with a cabinet rank who is formally responsible to Parliament.

The objectives of DfID's assistance are to pursue eight Millennium Development

Goals (MDGs) which were agreed at the United Nations Millennium Summit in September 2000. MDGs range from poverty reduction to protecting environment, improving health and sanitation including combat HIV and AIDS and tackling illiteracy and discrimination against women. These objectives are fundamentally same with those of Japan.

UK DfID has increased its amount of assistance from 2002 like USA, though they do not refer officially to fight against terrorism as follow;

Table 2-11 Disbursement of ODA by DfID

Year	Amount £ million
2001／02	3,170
2002／03	3,549
2003／04	3,921

Source : DfID Annual Report 2005

From the historical reasons, 48 % of DfID's bilateral assistance was spent in sub-Saharan Africa in 2002/2003 amounting to UK£ 663.2 million. Asia and Pacific follows by amount of UK£ 450.7 million.

Table 2-12 Regional Distribution of DfID's bilateral assistance

Region	2002/03 UK£ million	2003/04 UK£ million
Sub- Sahara Africa	663.2	639.0
Asia	450.7	538.5
Europe/Central Asia	82.9	69.5
Americas/Overseas Territories	87.3	74.1
Middle East/North Africa	41.3	47.7

Source: DfID Annual Report 2005

Objective program is concentrated on poverty reduction.

Bilateral assistance is provided as Grant Aid.

DfID's fund is not tied to UK. Any contractor or supplier can participate in the tender if they register in advance.

(3) France

The amount of France's ODA has also increased since 2002. In 2001, it was US$4,198 million, but was increased to US$ 5,486 million in 2002 and US$7,337 million in 2003.

French Government carries out its ODA through the Agence Française de

Developement(AFD) under the aegis of the Ministry of Economy, Finance and Industry, the Ministry of Foreign Affairs and the Ministry of French Overseas Territories.

AFD finance the development projects of the Governments, territorial authorities, and other public institutions of the developing countries through subsidies or soft loans.

In 2003, geographic distribution of Project Aid was as follows;

Table 2-13 Geographic Distribution of Project Aid of AFD

In millions of Euro

Region	Amount
Sub-Saharan Africa and Indian Ocean	443
Mediterranean	302
Asia and the Pacific	131
The Caribbean and Latin America	39
Multi-region	32
Total	947

Source: AFD Annual Report 2003

Sector distribution was as follows;

Table 2- 14 Sector Distribution of Project Aid

In millions of Euro

Sector	Amount
Regional Planning, Infrastructures and Urban Development	504
Productive Sectors	293
Human Development	111
Miscellaneous.	39
Total	947

Source: AFD Annual Report 2003

Since 1st January 2002, AFD funding has been untied.

(4) Germany

German ODA has also been increased in2003 to US$ 6,694 million from US$ 5,324 million in2002.

The objective of German assistance is to pursue eight Millennium Development Goals (MDGs) which were agreed at the United Nations Millennium Summit in September 2000.

The German Federal Ministry for Economic Cooperation and Development (BMZ) carries out ODA through 2 agencies, GTZ (The Deutsche Gesellschaft fur Technische Zusammenarbeit GmbH and KFW Development Bank.

GTZ is mainly in charge of technical cooperation provided to the developing countries as grant aid. In 2003, BMZ allocated fund of Euro 763.1 million of which Euro 631.8 million was provided for bilateral technical cooperation.

Among the regions, Sub-Saharan Africa shares 26.2 %, followed by Asia 20.8% and Latin America 15.4%. (Source: GTZ Fiscal report 2003)

KFW finances the projects in the developing countries in the form of grant and loan.

In 2003, Euro 757 million of total budget fund of Euro 1,085 was provided as grants.

Regionally, Asia and Oceania shares 32%, followed by Europe and Caucasus 19%, Latin America 18% and Sub-Saharan Africa 18%.

Table2-15 Total commitments by region in 2003

In Euro Million

Region	Amount	Share %
Supra-region	10	0
North Africa/Middle East	276	13
Latin America	367	18
Sub-Saharan Africa	369	18
Europe and Caucasus	406	19
Asia and Oceania	672	32
Total	2,100	100

Source: KFW Annual Report 2003

2.2.7. Comparison of Japan's ODA system and the other Advanced Countries' ODA

(1) Ratio of Grant Aid:

As having been stated in the above, USA and UK provide bilateral aid in the fund of grant aid, while the ratio of grant aid of Japan is about 46% including technical assistance. In project aid, the amount of grant aid is about one sixth of soft loan. The ratio of grant aid should be increased.

(2) Tied or untied:

In case of Japan, fund of Yen Credit is in principle untied. As Yen Credit was considered to be one of the means to increase the export since it started in 1954, procurement condition was tied to Japan. However, in 1960s, Japan has accomplished high rate of economic growth, which made the link of ODA and

export very weak. So, in1972 the Japanese Government, by cabinet decision, adopted the policy to untie the procurement condition of the Yen Credit. In 1980, almost 100 % of untied was realized. This change is shown in Figure 2-10.

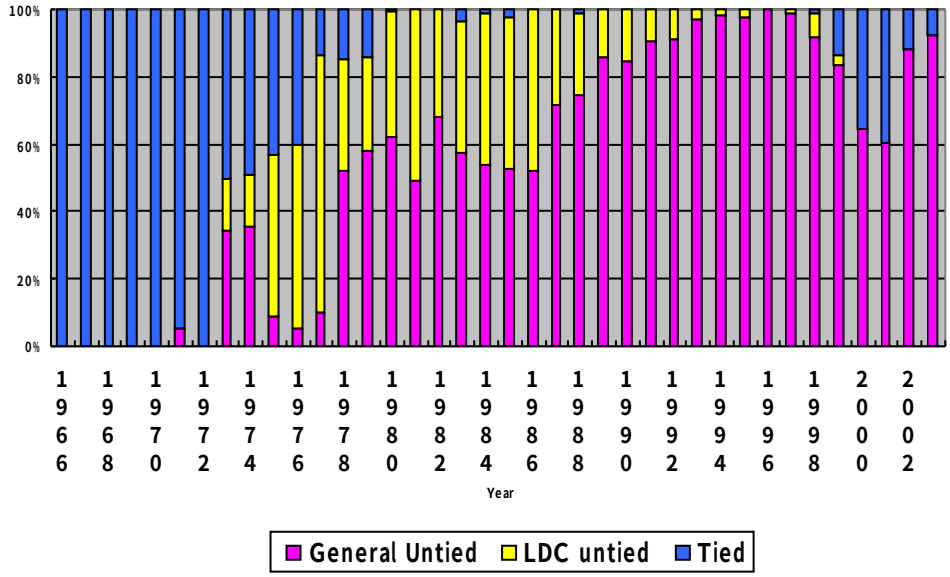


Figure 2-10 Change of ratio of tied Yen Credit

Source: White paper on ODA 2003, Ministry of Foreign Affairs

The beneficiary can procure goods and services from anywhere. Fund of Grant Aid is tied to Japan. The Contractor or supplier shall be Japanese firms, though some materials or equipment can be procured from a third country.

USA's fund is tied to the USA. Like Japan, the contractor or supplier must be an American, though materials, equipment and sub-contractor can be procured from a third country. KFW and GTZ of Germany are tied to German contractor.

UK and France untied their fund, but actually system is carried out as tied. For example, if a Japanese contractor tries to purchase the tender document, the consultant or the owner rejects it for the reason that fund is French.

(3) Standard Conditions of contract:

As for the study made by the author, the terms and conditions of the contract applied to the construction project funded by USA, UK or France is similar to those of FIDIC, international standard contract. It is only Japanese grant aid system that lump sum type of contract is adopted. The engineer is employed to assist the project owner. In the cost, contingency is included. In the construction project under Japan's Grant Aid, no contingency is included in the project cost.

2.3. Overseas Construction Project and Domestic Construction Project

2.3.1. Difference of implementation system of a project

(1) 2 Actors Project Execution System:

In Japan, the parties concerned with construction projects are the project owner or the employer and the contractor only. This system may have been effective in the ages when many kinds of infrastructure such as roads, railways, dams, irrigation systems, etc had to be constructed rapidly after the world war II. In this background, since Meiji era, the government authority has almost monopolized the modern technology and this self-confidence or pride led to the myth of infallibility of the bureaucrats. The employer is bureaucrat who can not make a mistake. With such background, the consultant employed as an independent professional in overseas is not needed to be employed. On the other hand, people respect them as the person with authority and rich knowledge, and tend to obey them as "Okami (god or governor)". From such history, procedures of the construction project are not always transparent. They still stick to the old principle "Let the people know the result, let them be governed". Difference of implementation system between the Japanese and the Overseas comes from such opaque procedures.

(2) Feasibility Study:

In overseas project, whenever the project owner identifies a project, he employs a consultant to make a feasibility study, and the result of the study is published. In domestic project, the project owner, the biggest one is MLIT, Ministry of Land, Infrastructure and Transport, normally does not make real meaning of feasibility study like other countries are doing. Sometimes MLIT employs a specific Authority under the Ministry for doing a study, but it is only to justify the implementation of the project, and it does not include accurate study of macro economy, trend of the growth in a sector of the project etc. Moreover, in the most of cases, the result of the study will not be published. They announce budgeted cost and time schedule only.

Every feasibility study of the overseas project includes analysis of macro economy, trend of the growth in a sector of the project, environmental impact of the project and feasibility of the project in matter. Since the Millennium Development Goals were developed in 2000, in some projects, the effect to the poverty reduction has been added.

(3) Design Works:

In overseas project, for making basic design and detailed design, a consultant is employed and the same consultant undertakes basic and detailed design to keep consistency.

The consultant can design making the best use of its technology and know-how.
In domestic project, it often happens that a consultant for basic design is different from that for detailed design. Such system has an advantage that some mistakes of basic design can be corrected in the detailed design, but it has a big disadvantage that the concept of the design is changed in the stage of the detailed design. Consultant is bound by the guidelines stipulated in detail. Further, The Standard Conditions of Contract for Engineering Services in Public Civil Engineering Works developed by the then Ministry of Construction in 1995 stipulates as follows;

Clause8.2. In addition to powers which the Owner entrusts to the Manager among powers of the Owner in this Contract Form, the Manager shall have the following powers as stipulated in the Services Description

8.2.1. Instructions regarding the execution of the Services for the Engineer or the Superintendent to complete the Report in accordance with the intention of the Owner.

Actually, the person in charge of a consulting firm is occupied with response to the instructions or inquiries of the Manager appointed by the Owner.
Thus the consultant has not any freedom to propose their idea, but is treated as a drawing expert, though the referred Contract on Design Works admits the contractor to propose an alternative or some improvement.

(4) Bidding System for Consulting Works:

In overseas project, procurement of a consultant and a contractor starts from pre-qualification. Anyone who satisfies pre-qualifying conditions can participate in the tender.
The period of the preparation for the tender is long enough in a overseas project. In case of JBIC, Japan Bank for International Cooperation, in the guidelines tender period is stipulated to be 60 – 90 days according to the size of the project. Even JICA stipulates the tender period to be minimum 6 weeks in case of construction project. This is for the purpose that the contractor could make enough site survey and prepare the tender documents to his satisfaction. In Japan, as having been discussed in Chapter 2.1 tender period is very short.
In case of international tender, the offers from pre-qualified bidders are firstly evaluated from the viewpoint of technical proposal, and the highest evaluated bidder shall be invited for the final negotiation of the contract. In other case, technical mark shares 70% or 80% of the total mark. Then, financial proposal is

opened, and the difference of a bid price from the lowest bidder will be converted to the evaluation mark in the range of 20% or 30%. Therefore, the lowest bidder does not always get award of the contract if their technical mark is not so high.

In domestic project, some designated bidders only participate in the tender. It is not clear how the project owner selected the designated bidder. Technical proposal is not required. Since 2003, Ministry of Land, Infrastructure and Transport introduced so called proposal method, which select a consultant for design by the proposal for the design concept. But the share of design adopted such method in the total number of order is still less than 10%. Tender in this method is sometimes by the designated bidders and sometimes by public tender. So, United States raised concerns with design proposals as procedures are not clear.

In case of the tender for the construction works, the bidder is not requested to submit their technical proposal as having been discussed in the Chapter 2.2.3. Bidders put their priced papers into the bidding box. This system has aggravated bid-rigging practices so called "dango", under which companies consult and prearrange a bid winner.

In these 3 years, some local government announces the " target price" before the tender with the intention of avoiding bid-rigging, because in case of bid-rigging, contract amount comes very near the owner's estimated amount. Since then, many contractors have bid very near amount to the target price and the contractor was decided by lot. However, recently, it can be observed that many contractors bid 50- 60 % of target price to secure the contract. Even in such case of low price bid, contractor is sometimes decided by lot. In this case, the project owner does not clarify so seriously the reasons for such low price. The project owner does not think their target price was not appropriate. In overseas, the project owner has information of the Engineer's estimated amount. If the bid price differs so much as 20 % from the Engineer's estimate, the project owner instruct the Engineer to clarify the reasons for such difference.

(5) Supervision of the works:

In overseas project, the project owner employs a consulting firm for supervision of the works. The consulting firm daily controls the execution of the works in cost, time and quality.

In domestic project, the project owner, especially MOLI&T, himself supervises the works. Actually, he does not supervise but sometimes inspect some points only. The Japan Highway Authority and local government employ some members of a consulting firm for supervisory works but these consultant's personnel acts as the members of the project owner, not independent personnel

from the Owner.

(6) Payment for the Works:

In Japan, on the signature of the contract, 40% of the contract amount is paid to the contractor as the advance payment, and the balance of 60% is paid at the time of completion of the project. It means that no progress payment will be made. In the overseas contract, the amount of advance payment is 10 to 15 % of the contract amount and refunded from the progress payment.

2.3.1 3 parties Execution System – Participation of the Consulting Engineer

(1) As having been mentioned above, in the overseas construction project, a consulting firm is employed in every stage of the project implementation as the Engineer. Especially, in the execution of the project, the role of the consulting engineer is important.

Normally, a consulting engineer undertakes detailed design, preparation of the tender documents including criteria of pre-qualification, assistance for the tender, evaluation of the bids and supervision of the works. With the consulting engineer, transparency of the procedures and fair competition is secured. For example, if the owner wants to change result of the evaluation by the Engineer, he will face a much of difficulty to justify the change to the donor. The Engineer secures the accountability of the project owner.

(2) In the construction stage, the Engineer will carry out daily inspections, and supervising the progress of contractor's works. He is authorized to request the contractor for revising the construction schedule if it is delayed, as FIDIC 4th edition stipulates in Clause 14.2 as follows;

" If at any time it should appear to the Engineer that the actual progress of the Works does not conform to the programme -----, the Contractor shall produce, at the request of the Engineer, a revised programme showing the modifications to such programme necessary to ensure completion of the Works within the Time for Completion." He surveys daily progress and certificates the volume and amount of executed works. He is entitled to deal with the claims from the contractor and advise the project owner to change the order or volume of an item, and if necessary to re-allocate a part of contingency to the increased works.

He is authorized to request for correction or re-work if he finds the quality of the works does not meet the requirement.

In this way, unfair dealings between the project owner and the contractor are excluded, and the quality of the deliverables is secured.

2.3.2. Status of the Consulting Engineers in Japan

(1) In Japan, a consulting engineer is not legally admitted in the sense that there is not an accounting code of the consulting fee in the national accounting system. In the budget of the Ministry of Land, Infrastructure and Transport, there is not an item of consulting fee. They pay the consulting fee as "the Miscellaneous Payment".

(2) In design stage, a consulting engineer is employed, but as having been stated in section 2.3.1, he is bound by the guidelines. For road construction, there are many guidelines stipulating in detail. For bridge construction, situation is same. And these guidelines are sometimes behind the times.

For estimating the cost of projects, MLIT every year issues the index book that has prices of materials, equipment and labors. The consulting engineers use the listed price provided by the MLIT for estimation of projects. So, consulting engineers do estimation work that is not respective of market prices.

Note: Actually in Japan, the occupation like quantity surveyor does not exist.

(3) In construction stage, basically the project owner supervises the works by himself. There is no room for a consulting engineer. In some cases, consulting firms dispatch their engineers to the construction office of the project owner, but such engineers works as the staff of the owner. As having been mentioned before, they do not work as an independent consultant.

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3. Overseas Projects and Risk

3.1. Definition of Risk

Project Management Body of Knowledge published by PMI, Project Management Institute defines the risk as " Opportunities to pursue profit and threats to decrease it. [1] " A business corporate is engaged in its works to pursue profit. Therefore, some

threats to decrease such profit are risk. But on the other hand, such risk event can be opportunities for getting profit. If a corporate is engaged in the export and import at the same time, fluctuation of the foreign exchange may be threat for the importing section but may be opportunities for the exporting section. For a manufacturer, an order received from the client to deliver the product one month later is a certain information, but foreign exchange one month later is uncertain and unknown. It is a risk how forecast the future foreign exchange.

A project is executed to earn profit from it. Therefore, some negative event to decrease such profit is risk. But, if expected event does not occur, it can be opportunity to pursue profit. For example, in a country where soil works during rainy season are scheduled to be suspended, if the start of rainy season is delayed, it will give a good chance to earn more progress than expected.

From above examples, the author defines the risk as "unknown factors and/or uncertain factors which will bring the corporate and/or the project opportunities to pursue profit or threats to decrease it."

3.2. Corporate Business Risk and Project Risk

3.2.1. Purpose of Corporate Business Management

Japan's amazing economic development during the postwar decades was attained through highly effective innovations in techniques in a variety of industrial sectors.

These technological innovations would not have been made, if it had not been for the improvement in quality control techniques carried out through a united effort by labor and management. Japan's quality control techniques, which drew the world's attention, are based on statistical quality control established through the research by Dr. W. A. Shewhart and others of the United States

Purpose of corporate activities is to maximize its profit as a going-concern.

Management is run with Total Quality Management (TQM) system, which aims for " Establishment of a sustainable system with which a corporate is run from the viewpoint of the customers who are source of profit and continuously create new value for the customers.[2)] " The idea of TQM was developed in the USA based on the Japanese style of TQC (Total Quality Control). In 1980s, the American executives, economists and system engineers studied eagerly the Japanese TQC applied in the many manufacturers to revive the competitiveness of the American industries. The Japanese TQC was created from QC circle activity that was a kind of group activities for the quality improvement. Even now, it is quite common in Japan. TQC was originally advocated by Mr. A. V. Feigenbaum, Director of Quality Control of General Electric Company, in 1950s that TQC was to

administrate, in total, the daily efforts of each department to develop, maintain and improve the quality of the products at the most economical standard which will satisfy the customers. In 1960s, this concept was introduced to Japan and was developed as the activities of all participants. QC circle is a small group composed of a foreman and workers to share the philosophy of quality control and improvement. The group will propose the ideas to improve the quality from the working fronts to the management. In the USA, for the reasons that such activities led by the group of workers does not meet to the management system because it is based on Top-Down Decision-Making Approaches. Well running of QC circle activities is deeply related to Japanese management that is based on Bottom-Up Decision-Making Approaches and life employment system etc. System of TQM is to establish management strategy first, and break down it into improvement of customer satisfaction and improvement of quality. In Japan, from about 1994 the word of TQC was changed to TQM. In 1996, Union of Japanese Scientists and Engineers (UJSE) changed the wording of TQC to TQM and promoted TQM activities. UJSE defined TQM that frame of TQM succeeds basic concept and methodology of TQC.

1950's	TQC	TQC was advocated by Mr. A.V. Fergenbaum.
1960's	TQC	TQC was introduced to Japan. QC circle activities were developed.
1980's	TQM	Japanese TQC was introduced to USA. USA developed the idea of TQM.
1990's	TQM	The idea of TQM was introduced to Japan.
About 1994	TQM	Word of TQC was changed to TQM
1996	TQM	UJSE changed TQC to wording of TQM

Figure 3-1 History of the idea of TQM in Japan.

TQM is based on the following concepts;

(1) Quality to evaluate the needs of the customer.

ISO9001 which was published in 1987 as the Standard of Quality Management and revised in 2000 stipulates in Article 4.2 to develop a quality system and a manual that describes it, and in Article 4.3 to develop and document procedures to coordinate the review of sales orders and customer contracts. These stipulations aim at evaluating and confirming the needs of customer.

(2) Leadership of the management staff.

ISO9001 Art. 4.1 Management Responsibilities requires the management to define a quality policy and a procedure that the senior managers can use to review

the effectiveness of the quality system. Here, leadership of the management is clearly required.

(3) Continuous improvement of system and process.

ISO 9001 Art.4.5 Document and data control stipulates to develop procedures to review, approve, and manage all of quality system and data, and to develop procedures to control changes to document and data.

(4) Human resources development.

ISO 9001 Art.4.18 Training requirements stipulate to develop quality training procedures. This Article requires human resource development in quality management.

(5) Quick response to the market and customers.

ISO 9001 Art. 4.3 stipulates to develop procedures which specify how customer contracts are amended, and which ensure that changes in contracts are communicated throughout the organization. This Article requires quick response to the customers.

(6) System of cooperation.

ISO 9001 Art. 4.1 stipulates to define the organizational structure which is needed to manage the quality system, and Art. 4.2 requires to develop quality plans which will show how to fulfill quality system requirements. Further, Art.4.3 requires to ensure that the customer is included in the process of review of customer contract. These Articles requires that system of cooperation not only inside the organization but also with the customer.

(7) Responsibility for the environment and society.

ISO 14000 stipulates the responsibility for the environment.

As having been mentioned above, ISO 9001 is a kind of TQC from the viewpoint of the customer required for the supplier, while TQC or TQM is to manage the corporate itself to the satisfaction of the customer and society.

These concepts can be applied to the project.

3.2.2. Definition of the Project

A project is a temporary endeavor undertaken to create a unique product or service to satisfy the requirements of a client[3].

Corporate organizations perform work which generally involves either operations or projects, though the two may overlap. Operations and projects differ primarily in that operations are on-gong and repetitive while projects are temporary and unique.

Temporary means that every project has a definite beginning and a definite end.

Unique means that every project delivers something which has not been done before. There may have been many similar projects, but every project is unique –

different owner, different design, different location, and so on. Thus, project can be defined as "the works to complete deliverables required by a client within the contracted period and amount."

Typical operations are seen in the manufacturing industry. The steel makers or automobile manufactures produce based on their forecast of market needs and their capacity. A steel maker continues to produce the hot coil or cold coil as far as the needs exist. Once facilities for production have been constructed, procedures of production are repeated every day and as far as the equipment works, production goes on. Such industry is called "prospect industry".

Projects are seen in the order industries such as construction industry or engineering industry. A contractor starts construction only when he gets order from a customer. Even if the contractor has a prospect customer, he can not start construction because it is not clear if the customer places order with him. The project is to complete the deliverable specified in the scope of the works within the contracted time. In a road construction project, design speed with traffic volume is decided first and to realize the speed and secure traffic volume, thickness of a base course, upper base course, binder pavement and pavement, number of lanes, width of the right way and shoulders, drainage, hand rails, lighting, signals and traffic signs are stipulated together with materials to be used. Designs and Bills of Quantity are made to fulfill the scope of the works.

A project is recognized by the project owner when the project is identified and decided to make a feasibility study. In accepting the outcome of the feasibility study, the project owner defines the scope of the works, budget amount of the works and required time for completion of the works and he identifies the main risk items.

The consultant and the contractor recognize the project when they are invited for the tender. In this stage, they have not any idea of the project. All items including the project site are risk items for them. The scope of work, cost, specifications and period of construction depends upon the order. It is unique and temporary. The procedures to implement such an order are different from routine management. The contractor forms a specific team to execute the ordered job, called the project team.

From the viewpoint of risk, in the prospect industry, market needs or customer's needs are captured on the level that quality of the products and the quantity of production can be controlled. While, in the order industries, the customer's needs are not always defined well. This fact raises importance of risk management.

3.2.3. Main Risk

In corporate business, risk is divided into two basic types. The first of them, business risk, includes the inherent chances of profit or loss associated with the

particular business endeavor.

In this type, there are categories of organizational risk, market risk, financial risk, and external risk including political risk and patents.

The second type of risk is usually called pure, or insurable risk. Insurable risk differs from business risk in that it involves only a chance for loss and no chance for profit[4]. In project too, risk is divided into two basic types. One is pure risk or insurable risk. The other is related with the project endeavor resulting from uniqueness and temporariness of the project. Categories are the same with corporate business risk.

3.2.4. Organization and Risk

Types and categories of corporate risk are common to project risk, though size and duration of the organization and impact of a risk event is different. It can be figured out that categories and kind of risk in a project corresponds to those in corporate business as shown in Table 3-1.

Table 3-1. Categories and kind of Risk

Category of Risk	Corporate Business Risk	Overseas Project Risk	Domestic Project Risk in Japan
Organizational risk	Employment Risk	Staff Assignment Risk	Site Engineer Assignment Risk
	Human Development	Team Development	N.A.
	Human Mistake	Human Mistake	Human Mistake
Market Risk	Fluctuation of Prices	Fluctuation of Prices	Fluctuation of Prices
	New Technology	New Technology	New Technology
Financial Risk	Financial Sources	Financial Sources	N. A.
	Foreign Exchange	Foreign Exchange	N. A.
	Credit Risk	Credit Risk	N. A.
External Risk	Country Risk	Political Risk	N. A.
	Security Risk	Security Risk	Security Risk
	Regulatory Risk	Regulatory Risk	N. A.
	Change of Climate	Weather Risk	Weather Risk
Pure Risk	Earthquake, Fire, Flood, War, Traffic Accident, Terrorism, Kidnap, Explosion etc	Earthquake, Fire, Flood, Traffic Accident, Terrorism, Kidnap, Explosion etc	Earthquake, Fire, Flood, Traffic Accident, Explosion etc

The above project risks were listed taking into consideration of the standard

conditions of FIDIC 4th edition and Japanese Standard Conditions of Contract (JSCC) as follows;

1) Assignment risk:

FIDIC Sub-clause 16.2 stipulates that the Engineer can request removal of any person of the Contractor for reasons of misconduct or improper performance. To avoid such removal of a person, team development is the responsibility of the project manager.

JSCC Clause 12 stipulates that in case the site agent of the Contractor is considered to be very improper in the execution of his jobs, the Employer can request the contractor for the proper measures against him in writing with the reasons for such request. Other staff than site agent is not the object of the request of the Employer.

2) Fluctuation of prices:

FIDIC Sub-clause 70.1 stipulates that contract price shall be added or decreased according to the rise or fall in the cost of labour and/or materials or any matters affecting the cost of the Works.

JSCC Clause 25 stipulates that after one (1) year passed from the date of the contract, if the contract amount is considered to be improper due to fluctuation of prices of commodities or wages in Japan, the Employer or the Contractor can request for the change of the contract amount. Sub-clause 25.5 stipulates that if the contract amount is considered to be improper in the contract period because of a big fluctuation of the prices of main materials due to special reasons in Japan, the Employer or the Contractor can request for the change of the contract amount.

3) New technology:

FIDIC Sub-clause 28.1 stipulates to the effect that the Contractor shall not infringe any patent rights.

JSCC Clause 8 stipulates to the effect that responsibilities for the use of the patented materials or construction methods shall be taken by the Contractor.

4) Foreign Exchanges:

FIDIC Sub-clause 72.1 stipulates that payment in foreign currency shall not be subject to variations in the rate of exchange between such specified foreign currency and the currency of the country where the works are executed.

JSCC has no stipulation of foreign exchange.

5) Political Risk:

FIDIC Sub-clause 20.4 defines political risk such as war, rebellion, revolution and riot as the Employer's risks, but the Contractor shall rectify the loss or damages(sub-clause 20.3).

JSCC Clause 20 stipulates that the Employer must notify the contractor of the

suspension of the works, when the Employer admits that the works can not be continued for the reasons of the damage on the works or change of the site conditions due to events such as storm, flood, --- riot, disturbances etc. Sub-clause 20.3 stipulates that in the above mentioned case of suspension, if necessary, contract period and amount must be changed and the increased cost must be born by the Employer.

6) Credit Risk:

FIDIC Sub-clause 4.1 stipulates to the effect that Contractor can employ sub-contractor, but that the Contractor is not relieved from the liabilities and obligations of the Contract. It means the Contractor owns credit risk with sub-contactor.

JSCC Clause 6 stipulates that the Contractor shall not sub-contract the whole or major part of the contract or construction of the structure which is deemed to be independent of the other part of the works. In principle, sub-contract is prohibited.

7) Security Risk:

FIDIC Sub-clause 19.1 stipulates that the Contractor is responsible for the safety and security of the persons and the site.

JSCC has not a specific clause related with security, but Clause 51 requires the Contractor to insure on fires and construction works.

8) Regulatory Risk:

FIDIC Sub-clause 26.1 requires the Contractor to comply with the statutes, laws, or by-law. The effect of this sub-clause is to keep the Employer indemnified against all penalties or loss caused by incompliance of the Contractor, but, sometimes a change of a law or regulation causes the increase of cost.

JSCC Sub-clause 1.1 stipulates that the contract applies to the laws of Japan.

9) Weather Risk:

FIDIC Sub-clause 44.1 entitles the contractor to claim for extension of time in the event of "exceptionally adverse climatic conditions".

JSCC Clause 21 stipulates that in case the Contractor can not complete the works for the reasons which are not liable to the Contractor such as bad weather, the Contractor can request for the extension of time in writing with the reasons.

10) Pure risk:

FIDIC Sub-clause 21.1 requires the Contractor to insure the Works, together with materials and plant, the Contractor's equipment and other things brought onto the site.

JSCC Clause 51 requires the Contractor to insure the objectives of the works and materials on site against fire and accident.

3.3. Risk important in the Overseas Construction Project

Project is the works within the contracted period to deliver the product or service meeting to the requirement of the project owner or client. It means the cost, time and quality of the deliverable are defined in the requirements of the owner and that definition of cost and time is on the other hand constraint to the contractor. The author made the analysis based on his long experience of carrying out different types of construction projects and in different countries. There are some risks which would give a bigger impact than in domestic projects.

(1) Assignment of the Project Manager and project staff: The project manager is responsible for the execution of the project under constraint of cost and time and sometimes human resources. He is also risk control manager of the project. If he does not properly manage mobilization of the project, the project will get delay of the schedule. To catch up the schedule, he may need to increase work resources. It will lead to the increase of the cost, and also delay of income from progress payment. If he under-estimates the impact of a risk event, it will cause a big loss to the project. In this sense, assignment of the project manager is a big factor of risk.

(2) Fluctuation of prices: As having been mentioned before, FIDIC standard conditions of contract are usually applied to most of international construction projects. It has the formula for covering price escalation. However, if the duration of the project is long, fluctuation of prices may not be neglected from the risk of the project execution.

(3) Foreign Exchange Risk: Fluctuation of foreign exchange rate is a risk. Actually, a contractor suffered from the big fall of the foreign currency portion of the advance payment.

(4) Credit Risk: In a project of a developing country, even if some donor finances the project cost, some local portion remains to be born by the project owner. Sometime the ratio of such local portion reaches 15-20% of the total project execution cost. It often happens that the project owner, normally a Governmental Institution, delays the payment because of luck of income. It needs much effort and takes long time to collect such payment even after the completion of the project. It must be taken into account as a part of project risk.

If the Contractor employs a sub-contractor and pays them the advance payment, the Project Manager shall watch the financial situation of them until the advance payment should be refunded.

(5) Security Risk: In developing countries, burglars or thieves, local riot and terrorism, kidnappings, these kind of matters are happened. It needs to consider that Security risk always exists. Not only to arrange guard system and insurance

cost but also expenses and efforts to build up good atmosphere with local society shall be seriously considered.

(6) Weather Risk: In some countries, rainy season does not change every year. During such period, progress of the works shall be estimated as almost zero and labors shall be laid off. Actually, there is a case that a contractor submitted work schedule on a constant pace of works even in the rainy season and was finally requested for the liquidated damages. This is the case where the Contractor neglected the weather risk.

(7) Soil conditions risk: In the civil works, information of soil conditions is given by the Employer. This information is basic one and the Contractor is requested to forecast of the change of soil conditions, however, it is practically impossible to make detail soil investigation survey by the contractor before the contract.

(8) Procurement Risk: In the course of project, market situation changes. It happens that a supplier bankrupts and causes the shortage of supply of materials. It happened due to rapid increase of demand in China, supply of steel products to other markets was limited. Project Manager should always secure multiple supply sources.

In developing countries, supply of fuels and materials is unstable. Almost all materials including fuels are imported. In a country, supply of petrol was stopped for more than 2 months mainly because of lack of foreign currency and partly because of stoppage of the transport due to heavy rain from the port of neighbor country. Like this case, in developing countries, import, period of custom clearance of imported goods and transport are unstable. The project manager is requested to have adequate volume of stock of the materials.

(9) Environmental Risk: Environmental risk, especially social environmental risk is increasing. In case where relocation of the inhabitants is involved and where the local government does not treat them properly, the contractor is obliged to suspend the construction until the problem is solved. Sometimes, a supporting organization expedites the government to solve the problem. In such case, it falls in the job of the project manager to expedite the government to solve the problems and to communicate with the supporting organizations like NGO in a proper way, though it is not a contractual duty.

References

1) PMI: PMBOK p111, 1996
2) Tomohiro Takanashi: Introduction to Risk Management, P73, 1997.7.7
3) PMI: PMBOK p4,1996
4) Tomohiro Takanashi: Introduction to Risk Management, P38, 1997.7.7

4. Risk Management in the Overseas Project

4.1. Risk Management

4.1.1. Definition of Risk Management

In corporate management, risk management is to identify potential risks in the organization or its activities, assess them, plan the best response within the available resources of the organization and put it into practice.

In the execution of the overseas construction project, technical measures such as design, technical investigations and construction plan are taken as a matter of course, but additional management technique, which is not always required in the domestic project, must be exercised in such field as the employment of laborers, procurement and maintenance of the construction equipment, control of the stocks of the materials, administration of contracts with the employer and the sub-contractors, getting approval or license of import and export of the related equipment and materials, obtaining entry visa, resident visa and work permit etc.

a) Uncertain factors in the construction project and how to deal with them:

Any business is attended with uncertain factors (risks). To convert uncertain factors to definite factors, it is necessary to identify the content and size of each uncertain factor, that is to say, to analyze correlation between the uncertain factors and their impact on the planned business. Only with such process, an effective measure to convert uncertainty to definitiveness can be developed. In a construction project under study, similar process should be taken, but to identify the uncertain factors, it should come first to clarify the characteristics of the construction project or construction industry.

It is said manufacturing industries can be classified into 2 categories of prospect industry and order industry. The former is to "commercialize the products manufactured based on the prospect for the needs" of the market or the customers, and the latter is to "commercialize the product which will fulfill the needs of the customer" upon the order. Except some special case, a construction project is executed only after receiving the order. In this sense, construction industry is the typical order industry.

There is no difference between the prospect industry and the construction industry in the sense that a product is delivered to the customer, but if we consider the relationship between the difference of above-mentioned producing process and the uncertain factors, many different characteristics are observed. Figure 4.1 shows the conceptual difference of the uncertain factors at the time of starting production between the prospect industry and the construction industry.

Uncertain Factors	Construction Project	Manufacturing Industry	Note

Client's needs/requirement	△	○	Degree of definite-ness at time to start production ○Definiteness High △ Definiteness Medium ▲ Uncertainty Medium ● Uncertainty High *1; depends upon the conditions of contract. *2; Assumptions of geology, hydraulics, ocean, etc.
Regulations on the product	△	○	
Negotiations with the public authorities	△	○	
Plan/Design of the product	△*1	○	
Criteria of completion*2	▲	○	
Fund for production	▲	△	
Procurement of equipment & materials	▲	△	
Procurement of Labors	▲	△	
Transport of equipment & materials	▲	△	
Environment/conditions of production process	●	○	
Cost of production	●	△	
Quality control of the product	●	●	
Completion of the Product	—	—	
Acceptance of the product by the client	△	●	
Collection of fund for production	▲	△	
Quality Guarantee of the Product	●	●	

Figure 4.1 Uncertain Factors in the production activities of the construction project and the general manufacturing industry

(Made on the experiences of the author in the overseas construction projects)

From the above analysis, it is understood that, in the construction project, uncertain factors are managed in parallel with production activities. It can be said that the number and areas of uncertain factors in the construction project are much larger than those of prospect industry. It leads to the definition of risk management of a construction project as follows;

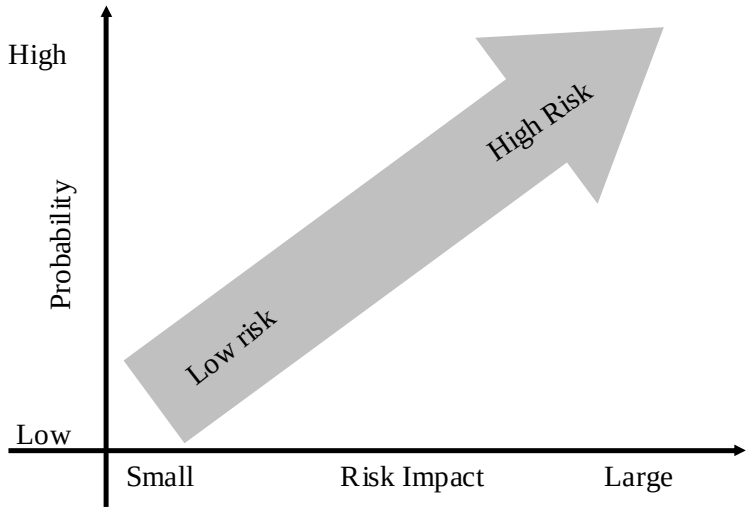
"Project Risk Management is to convert the unknown factors occurring as the project progresses to definite factors, and systemizing the project management is to develop the measures for such conversion."

4.2. Process of Risk Management

4.2.1. Risk Identification

It is required to identify characteristic of each objective risk such as probability and magnitude before start to handle the risk. There are two ways to identify risks; one is the Qualitative analysis and the other is Quantitative analysis. In this study, the author aims to set up the way of quantification of the project risk. For this purpose he made careful step of the study.

Figure 4-1 Risk Qualification Chart



4.2.2. Risk Qualification Analysis

This process is to assess the impact and probability of identified risk events and determine their range in terms of the possible impact to the organization or the project. Probability and size of the impact are expressed in qualitative words such as high, medium, low, large, normal or small. Degree of the risk is measured by the interrelation of the probability of the risk events and its size of impact to the completion of the project. Such interrelation can be figured out as Figure 4-1. It may not be exact straight line, but it should be near the linear line.

4.2.3. Risk Quantification analysis

In this study, the author tries to find out the way of quantification of the project risks based on his long experience carrying out overseas projects.

This process is to analyze numerically the probability of each risk and its consequence on the project objectives. In a project, the probability to achieve the objectives of the project is quantified and required cost to respond to the risks is estimated. Advantage of this process is to give a rational basis for contingency

planning and evaluation. In case a risk event occurs, time and cost are incurred to respond to it. Time can be converted into cost by calculating man/months, cost of equipment and overhead cost. Therefore, size of risk is estimated by following formula;

R = PB x IP

R: Size of risk. PB: Probability IP: Risk Impact= cost of risk consequence.

Impact can be categorized by the word of very small, small, medium, large and very large.
Probability is categorized by the word of very low, low, medium, high and very high.
By way of coding to the above mentioned words as follows, it will become easier to grasp the size of risk numerically;

Table 4-1: Code for Risk Management

Item	Abbreviation	Category Code & Levels	
Probability	PB	Very low	1
		Low	2
		Medium	3
		High	4
		Very High	5
Impact	IP	Very Small	1
		Small	2
		Medium	3
		Large	4
		Very Large	5
Risk Management Category	RC	Not Applicable	0
		Acceptable	1
		Mitigable	2
		Allocatable	3
		Transferable	4
		Avoidance	5

Risk management category will be discussed later in the section of risk response and management.
Result of Quantification will be shown in Table 4-2 in the column of Risk Analysis.

4.2.4. Risk Response:

Risk response is to develop options and determine actions to enhance

opportunities and reduce threats to the organization or project objectives. The Figure 4-2 shows the ways of response to risks. It is generally accepted that there are 5 options [(1)] such as Acceptance, Mitigation, Allocation, Transfer and Avoidance.

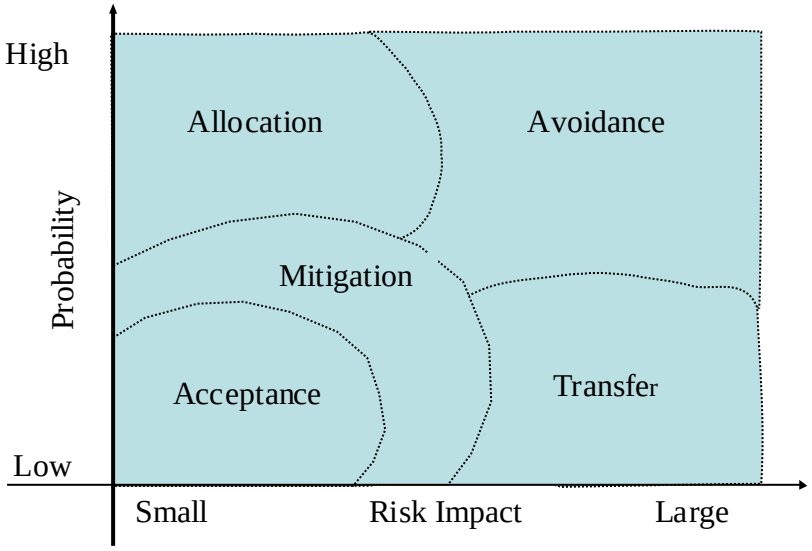
To keep record of actual situation is a vital part of project activity. The purpose is to build a reliable database not only for the current project but also for all subsequent projects. The document is to accumulate the result of assessment of the risks, identification, qualification and quantification, and response plan. This document should be reviewed in the course of project cycle.

Risk response may change in the course of the progress of the project. However, in general, risks with high probability and large impact shall be avoided, allocated or transferred.

Risks with medium probability and impact can be mitigated, because controllability will be bigger than the above.

Relation among quality, quantity of risk and response can be figured out as follows;

Figure 4-2 Response related with probability and impact



Each way of risk response can be explained as follows;

(1) Acceptance:

This option is to accept consequence of a risk occurrence as it is. Passive acceptance requires no action, leaving the project team to deal with the risks as they occur. Active acceptance includes developing a contingency plan to execute, should a risk event occurs. A contingency plan is applied to identified

risks that arise during the project. The most usual risk acceptance is to establish a contingency allowance or reserve for known-unknown risks. The allowance should be determined by the impacts, computed at an acceptable level of risk exposure, for the risks that have been accepted. Typical allowance is contingency allowance for the price escalation.

(2) Mitigation:

Mitigation seeks to reduce the probability and/or consequences of an adverse risk event to an acceptable threshold. It may take the form of implementing a new action that will reduce the problem. For example, conducting engineering tests, or choosing more reliable sub-contractor. It may involve changing conditions so that probability of the risk occurring could be reduced. For example, adding resources to the schedule or changing the incapable project manager. In a project, there was a work to tile the 3,000 m^2 of the wall. This work was sub-contracted to a Korean contractor. As their tilers were not good at the tiling works, the lines of the joints between the tiles were not straight. The architect did not approve the works of the first 50 M^2 but requested correction. To improve the quality and prevent from delay of works, the author dispatched 2 Japanese tilers to the site on the account of the sub-contractor. In this way, risk of re-works of the tiling and delay of the schedule was reduced to almost zero.

(3) Allocation

Allocation is to allocate the consequence of some specified risks to a third party together with the ownership of the response.

The contractors sometimes employ the sub-contractor for executing specific works such as drainage or earthworks even if risk of the works is not so big to lower the total cost compared to direct execution. Such action may be called "allocation" of risk.

(4) Transfer:

Risk transfer is to hedge the consequence of a risk to a third party together with ownership of the response. This way is most effective in dealing with financial risk exposure. It includes the use of insurance, performance bond, warranties and guarantees. Many of pure risks can be insured.

Contracts can be used to transfer liability for specified risks to another party. Consulting firms often form a joint venture to share the risk. For example, in a project to construct a road and a bridge, if a consulting firm has not availability

of bridge engineer, they form a joint venture with a consulting firm whose bridge engineer is available. In this way, the consulting firm can transfer the primary risks related with bridge construction, by the internal agreement that the jobs should be executed jointly and severally. In this case, the responsibility of a whole project remains with the Project Manager, but the assessment and response of the risks can be transferred to the other party.

(5) Avoidance:

Risk avoidance is changing the project plan to eliminate the risk or condition or to protect the project objectives from its impact. The extreme case of avoidance is to decline to participate in the tender because of too big risk. Adding resources or time, adopting a familiar approach instead of an innovative one, or avoiding an unfamiliar subcontractor are examples of avoidance. In the rural area of the developing countries, to construct in short period and to avoid the risk of unstable supply and transport of the materials, steel truss bridges like Bailey bridge are constructed instead of concrete bridge.

4.3. Identification of the Overseas Project Risk

This process consists of identifying all the possible risks which may significantly impact the success of the business activities or the project. Risk identification should address both internal and external risks. Internal risks are things that the organization can control or influence, such as project leader, project manager and staff assignment. External risks are things beyond the control or influence, such as market shifts or government action. Table 4-1 shows risk management items categorized in the internal and external risks.

The table also shows the level of uncertainty both in case of overseas construction projects executing in developing countries and domestic construction projects in Japan. It can be seen the difference level of uncertainty between overseas project and domestic projects.

Table 4-1 Risks of the construction project

Stage of Project	External Risk	Overseas Project*	Domestic Project	Internal Risk	Overseas Project	Domestic Project
Preparation for Tender	Country risk	H	L	Team leader assignment	H	M
	Financing source	H	L	Team staff assignment	H	L
	Local regulations	H	L	P.M. assignment	H	M
	Price fluctuation	H	L	Project staff assignment	H	L
	Foreign exchange	H	L	Cost estimation	H	M
	Labor Market	H	L	Scheduling	H	M
	Site conditions	H	H	Cash flow	H	L
	Climate of site	H	M	Design	H	L
	Type of contract	H	L	Quality assurance	H	L
	Scope of works	H	L	Patent rights	H	M
Execution of Project	Political risk	H	L	Performance of P.M.	H	M
	Local regulations	H	L	Performance of the foreign staff	H	N.A.
	Security risk	H	L	Performance of the local staff	H	L
	Contract administration	H	L	Performance of labors	H	L
	Price fluctuation	H	L	Procurement	H	L
	Foreign exchange	H	L	Contract Administration	H	L
	Project Site work conditions	H	L	Cash flow control	H	L
	Geological Conditions	H	M	Cost control	H	M
	Weather	H	M	Progress control	H	M
	Offshore transportation	H	L	Quality control	H	L
	Inland transportation	H	L	Performance of subcontractor	H	L
	Import and Export	H	L			
	Natural Environment	H	L	Communication *	H	L
	Pure risks	H	L			
Close out Contract	Acceptance	H	L	Defects liability	H	L
	Release of Bonds	H	L		H	

* Level of Uncertainty H= High, M= Middle, L= Low

* Overseas Project : In case of executing in developing countries.

*Communication risk may be considered to be in-between risk, because the project owner will also have the same level of risk with his contractor.

4.3.1. Risk management items in the stage of tender

In the overseas construction project, risks are biggest in the stage of tender, because there are many uncertain factors especially when the project is carried out in the developing countries, and/or in the first country to go into. The Table 4-2 shows risk items in an overseas construction project identified in the stage of preparation for a tender from the viewpoint of the contractor. The table contains 210 items on the level 2 and more than 1,100 items on the level 3. As the items are listed up categorically and comprehensively, the investigation items will vary depending upon the size and type of project. This table is the part of risk management system that is created by the Author during this study.

Table 4-2 Risk items in the stage of tender preparation

Code No.			Investigation Items	Information	Risk Analysis		
				Number of sub-items	PB	IP	RL
01	**00**	**00**	**Outline of Project:**				
	10	00	Outline of Project	3	1	1	1
	40	00	Topography, geology and climatic conditions	15	4	4	16
	50	00	Site conditions	6	3	4	12
	60	00	Regulations for construction works	8	1	2	2
02	00	00	Type, conditions of contract	6	3	3	9
03	00	00	General situation of country	8	1	1	1
	30	00	Public security conditions	16	3	2	24
	50	00	Communication facilities	16	4	1	4
04	00	00	Transport to the site, import, custom clearance	16	3	2	6
05	00	00	Taxation, financial and accounting consideration	8	4	3	12
	40	00	Insurance	4	1	1	0
06	00	00	Living conditions	6	5	1	5
07	00	00	Work resources, working conditions	5	3	3	9
08	00	00	Local contractors	5	3	4	36
	30	00	Foreign contractors' activities	8	4	5	80
09	00	00	Local procurement for plant and equipment	19	1	4	4
10	00	00	Local procurement for materials and products	20	1	4	4
							Total R= Σ (PB x IP)=124

This table is abstract of the main items. Number of sub-items is that of level 2. Full text of the table is attached as Annex A.

Column of risk analysis will be discussed later.

PB: Probability

IP: Risk Impact

RL: Risk Level Analysis

The table 4-2 is made to decide if a contractor participates or not in the tender and to identify and quantify the risk items. Each item must be carefully examined as being explained below.

1) Outline of Project:

The first risk item is project location. If there is a too big security risk, no one will participate in the tender for such projects as in Iraq. The author has declined to tender for a building construction project in a country because of procurement risk. In that country neither material nor equipment was available. Once participation in the tender has been decided, it means the company has accepted such qualitative country risk. Next risk item shall be that involving cash out-flow like bid bond. It sometimes happens that the bid bond is not released after expiry date and the banking charges must be paid until the contractor returns the original of the bond to the bank. As the impact is small, rating is also small.

2) General Situation of Country:

General situation of country is taken into consideration when a contractor decides to participate in the tender. The items to give impact on the project will be the political stability and the strength of the local currency. In a country of Africa, every year riot occurred requesting for the payment of salaries and the foreigners were obliged to evacuate to the neighbor country for a short period. So, a contingency for the evacuation was prepared.

3) Project site Location:

Project site Location is usually not a big risk item. However, if the location is far from a city area, airport and/or harbor, it will be required to consider about safety and security of life, transportation etc.

4) Topography and Geology:

The biggest risk item shall be the underground conditions. In a case of the road construction, specifications say that the slope to be cut is described as " 20 % of rocks will be included". In such a case, it will be the contractor's strategy of risk management whether they estimate the prices in accordance with the specification together with the strategy of claim for additional cost and/or extension of time or prepare contingency from the beginning to meet the case

where volume of rocks are found to be bigger than expected.

5) Climatic Conditions:

The risk items shall be strong wind, rainfall and snowfall. If there is a rainy season, the contractor must take into account of the duration of stoppage of the earth works during the season. In a cold country, even if it does not snow, if the temperature goes down below minus, the earth works and concrete works shall not be executed unless the contractor has appropriate heating systems. Such information will give impact on the cost and schedule.

6) Harbor:

Risk item shall be the unloading capacity and robbery at harbor. They will give impact on the cost and schedule. In the harbor of developing countries, there are many robberies. In a case, all side mirrors of the construction machineries were stolen at harbor before custom clearance. The supplier aired them to keep the delivery time. Some contingency shall be prepared to cover such loss.

7) Import and Export Custom Clearance: In a project that the equipment, materials and goods for the project are exempted from the import taxes, critical item shall be the period to get tax exemption. If it takes long time after arrival of cargoes, you must pay the storage charges for the period, which is not a negligible amount as the case may be.

8) Transport of Construction Plant, Equipment and Materials: The items to give an impact on the cost and schedule will be availability of vehicles to be rent and traffic regulations. It sometimes happens the reserved transportation vehicles do not come up to the project, because bridges have not enough bearing capacity for heavy trucks. It shall be obliged to detour the route. Further, in many of developing countries, there is a risk of robbery or burglar on the way of land transport from the harbor.

9) Site Condition:

Risk items shall be stoppage of power and water if supply facilities exist. If it happens frequently, the contractor must arrange diesel generator or water tank. Next one will be underground facilities. It shall be the contractor's strategy whether they survey the site by themselves and estimate the cost of treatment as accurately as possible or estimate in accordance with the drawings and claim for the increase of cost if new facilities are found.

10) Inspections:

Risk item shall be time for getting permit of import and use of the explosives. In some case, permit of use of the explosive is given only after confirming the measures of environment protection.

11) Company registration and corporate tax: Risk items are Corporate Tax and

Value Added Tax. Impact on cost is rather big if the tax rate is high. Even in a project that tax exemption is admitted for the contractor in the loan agreement or in the Exchange of Notes, the local government often collects these taxes. There is a risk such taxes are not refunded or it takes long time to get them refunded. It will be practical to estimate the cost with the assumption that these taxes shall be paid and interest for the period of refund shall be added.

12) Personal Income Tax:

It depends upon the company's policy whether the company bears personal income tax or not. In some companies, personal tax on the salary received in the overseas country is paid by the person because he does not pay tax in Japan. In such a case, this item is not a risk.

13) Financial and Accounting Considerations:

Risk item is fluctuation of foreign exchange rate. In case there remains some surplus of the local currency portion and such surplus can be remitted to Japan, profit or loss of foreign exchange will occur. In case plant or materials are imported on the way of the progress, foreign exchange rate should be different from that in the time of tender preparation. Some contingency shall be prepared in accordance with the mobilization schedule.

14) Insurance:

Impact on cost is small. Risk is that a local insurance company has not enough fund to pay the insurance money if the accident is big.

15) Public security conditions:

In developing countries, security is a big risk item. Burglars or robberies are considered to be ordinary. In a riot, it can happen that plant yard would be attacked.

16) Living Conditions:

It is a company's policy of welfare how comfortable living conditions shall be arranged for the employees. Risk is epidemic diseases like malaria.

Pre-arrangement of a doctor or hospital will be necessary.

17) Working conditions:

There is almost no risk if a company complies with the local regulations and customs. Risk event will occur if the manager dismisses worker(s) or local staff(s) without enough explanation.

18) Sub-contractors:

Normally, risk is small if the contractor researches well the capability and financial situation of the sub-contractor. But, sometimes risk event occurs when the sub-contractor gets another contract. In this sense, impact is large.

19) Local procurement for plant, equipment and materials:

Risk item is workshops for the plant and vehicles. It happens that repair cannot be made due to lack of spare parts. Some stock of spare parts shall be prepared.

20) Activities and Accomplishment of Foreign Contractors:

This item is important to know the capability of the competitors and their price level. Their prices of the last contracts will give a benchmark to the bid price.

As having been mentioned above, the items in the Table4-2 are those of risk items to be managed in the stage of the execution. In this sense, this investigation system is "Start up system" of the risk management.

4.3.2. Risk identification of each party

Risk items for the contractor and the consultant are almost same. The item of existing contractors shall be deemed as existing consultants. For a contractor, an existing foreign contractor in the objective market will become a big competitor or a partner to form a joint venture. It is same with a consultant. If existing foreign contractors are considered to be competitors, they are the source of threat for the bidder, but if they are considered to be a partner of Joint Venture, it is a good opportunity to pursue for the successful bidding.

For the consultant, if the tender includes the detailed design and supervision of the works, the bigger risk item is whether the local consultants or survey companies are well equipped and capable, because the risk in the stage of detailed design is bigger than that in the stage of supervision in a sense that a mistake or omission in the detailed design will trigger the risk in the stage of the execution of the project. If equipment is not enough, it will increase the bidding price by way of importing survey equipment. If they are not capable enough, surveyors or designers must be procured from Japan or other countries, which will increase management cost and bidding price.

In the stage of tender, biggest risk for the project owner is to collect contractor who does not have enough capacity to execute the works due to financial constraint. Therefore, the project owner puts severe conditions on the financial qualifications. Further, a project owner limited number of sections to be awarded with the contract. In a project to construct a road, the tender was divided into 3 sections each of which was estimated to be almost same cost. Therefore, the project owner put conditions that a bidder shall prioritize 2 sections at maximum in the tender, though he can bid for 3 sections.

Conditions for financial qualification were as follows in the above-mentioned project;

(1) General Experience: The applicant shall meet the following minimum criteria:

(a) Average annual " roads and bridges construction or rehabilitation" turnover

from contracts as prime contractor (defined as billing for works in progress and completed) in the last five(5) years converted to US Dollars, at the rate of exchange at the end of the period reported, as specified below.

Section 1: US$ 30 million or more (1.5 times of the owner's estimated cost)

Section 2: US$ 30 million or more (Ditto)

Section 3: US$ 40 million or more (Ditto)

(b) To have experiences as prime contractor, successfully executed, of at least three (3) projects, each of which contract amount is not less than US$ 10 million, of a nature and complexity comparable to the proposed contract in the last five (5) years.

(2) Financial position.

(a) The Applicant should demonstrate that it has access to or has available, liquid assets, unencumbered real assets, lines of credit issued by a reputable bank and other financial means sufficient to meet the construction cash flow for period of 6 months during the contract, estimated as below specified, net of the Applicant's commitments for other contracts:

Section 1: US$ 5.0 million

Section 2: US$ 5.0 million

Section 3: US$ 5.0 million

(b) The Applicant shall demonstrate its shareholder's equity not to be less than value, as specified below:

Section 1: US$ 20.0 million

Section 2: US$ 20.0 million

Section 3: US$ 20.0 million

(c) The Applicant shall demonstrate the soundness of its financial position showing long-term profitability and reliability by submitting the audited balance sheets and other financial statements for the last five (5) years. Where necessary the Employer will make inquires with the Applicant's bankers.

Next risk for the project owner will be price escalation and fluctuation of foreign exchange. It is normal that the contingency for the price escalation is prepared in the stage of project appraisal. To avoid the risk of fluctuation of foreign exchange, some project owners fix the exchange rate to that of the contract date. Other project owners fix the rate to that of the expiry date of the bid. They transfer the risk to the contractor in these ways.

4.3.3. Risk identification in the stage of effectiveness of contract

In the stage of effectiveness of contract, risk items are decreased because some

items become known and some items are not needed to consider.

The items related with project information have become known. The items related with the foreign contractors are not necessary to be considered any more. However, the items related with the availability of equipment and capability of the local contractors with whom the contractor committed sub-contract or a joint venture remain as risk items in the stage of the execution.

For the project owner, the biggest risk contained in the contract under terms and conditions of FIDIC with the consultant is whether the proposed engineers in the tender documents are dispatched actually or not. It sometimes occurs in case the effectiveness of the contract is delayed much because of some procedures such as delayed approval of the tender committee or delayed concurrence of the financing agency that the proposed engineer does not take his office, but is already assigned to another project. To respond to such risk, the project owner put conditions on the change of the engineer as follows;

(1) If the alternative engineer is not proposed in advance, 10 % of the remuneration for the original engineer shall be deducted.
(2) The alternative engineer shall pass in the interview with the project owner, even if his experiences in the Curriculum Vitae are equivalent to the original one.

The project owner transfers the risk to the consultant by these conditions.

In this stage, the project owner's risk on the financial constraint of the contractor is mitigated by receiving performance bond and required insurance policies related with execution of the works.

The risk that remains to the contractor is whether the advance payment is paid as per the contract.

4.3.4. Risk in the stage of execution of the works

Risk items are identified in advance, but such risk actually occurs in the stage of the execution of the project. There are many causes to make such risk events occur, but they are classified into two kinds. One is based on the human activities and the other is based on the physical conditions including natural conditions.

In the stage of the detailed design, the consultant surveys the natural conditions such as geology, soil quality, underground water and underground facilities. The consultant makes a research of climate conditions, available sites of the quarry or the borrow pits, area to be expropriated, if necessary, and availability of materials and equipment to complete the detailed design, Bills of Quantities and tender conditions. Risk events are latent in this stage.

If the geological survey is not enough, in the stage of the execution, difference of

the soil quality occurs and the consultant owes the risk to be claimed for change of materials and extension of time required for such arrangement. In a project, the volume of the soil to be acquired from a borrow pit was not enough to complete the required works, but the contractor was obliged to find an additional borrow pit.

In a road rehabilitation project, as the land surveyor was not capable enough, center line of the road deviated from the existing one. The consultant was obliged to survey again.

In a project, the consultant's survey of the underground facilities was incomplete, and as the works progressed, many underground facilities were discovered. The contractor claimed for the increase of the cost and extension of time as a matter of course.

In a project, the project owner could not complete the land expropriation in time, but accordingly, it delayed to give the contractor possession of site within the period stipulated in the contract. This delay was caused by the wrong estimation of the time and cost required for the land expropriation by the project owner.

There are many projects where the contractor is not paid for local currency portion to be born by the project owner due to financial constraint of the Government. A contractor was obliged to leave a person for more than one year to collect such delayed payment after the completion of the works.

The above cases are examples of the risk occurrences based on the human activities. Risk occurrences based on the external conditions are illustrated as follows;

In a project, due to a big devaluation of the local currency, the contractor suffered from a big loss, because the exchange rate was fixed to that of the date of contract. In this case, the delay of local portion of the advance payment increased the loss.

In a road construction project, unprecedented rainfall was observed and after that the underground water level was heightened. The consultant could not but change the materials of the base course to meet to such water level. In this case, the record of rainfall in the last 30 years was available and the design was made based on the average rainfall taking into consideration of cost. It was known that abnormal rainfall appears once 25 years, but the response to such abnormal rainfall was considered in the design of drainage. Thus, abnormal rainfall during the construction period remained as a risk item.

In a project to construct a concrete bridge, as the temperature of the site in the daytime rose more than 35℃, while average temperature in that season is 27℃, the contractor was obliged to do the concrete works in the early morning or after sunset.

In a tunnel project, though geological data were available, actual geological

conditions were different from the data and small size of collapse occurred to injure one worker. This case was considered to show the limit of geological survey in a tunnel project.

Existence of these risks is known in advance, but when and how these risks occur is not known. The list of check items in the stage of preparation for the tender is made use for identifying such known-unknown risks.

It is the project manager's role to notice the occurrence of a risk event and respond to it as soon as possible and at the least cost.

4.4. Technique and tool of the Project Risk Management

As a project team to execute a project is a kind of ad hoc internal team organized to execute a project, risk management system of the corporate can be applied to the project risk management modifying some points adapting to the situation.

The technique and tool applied to employment risk and human development risk can be applied as they are to assignment risk and team development risk, if the Project Manager considers properly the project's objective and period to be engaged.

Financial sources risk of a project is smaller if the fund for the project is secured in advance by the client. However, in the case of a construction project financed by the World Bank or a bilateral financing agency like JBIC, local portion to be financed by a recipient government remains as a big risk item.

Foreign exchange risk and credit risk can be managed by utilizing same measures with the corporate. For example, foreign currency forward contract can be made, if the delivery period of materials or equipment is long enough.

Market risk and external risk can be managed in same management system. In a plant construction project, it is possible that the project is suspended because the planned product should lose the expected market by newly developed technology. Such case can not be managed only by a project manager, but should be managed by a corporate management.

Pure risk or insurable risk management is also same. It is sometimes observed that if a kind of risk is insured on corporate level, some favorable insurance premium is offered to a long term overseas insurance.

In the construction project, there are some insurance specific to the project. One is to cover the cost of remedy works or increase of construction cost caused by a design mistake up to the limited amount.

In accordance with the process of risk management, following technique and tools are applied;

(1) Risk identification: Brain storming is one of the best tool to identify the risk events. The participants should have past project files and experience. The

outcome of the brain storming shall be integrated into such a list as shown in Table 4-1.The Working Breakdown Structure (WBS) gives a basic reference to identify the risk at each level of works. Public databases, such as weather record, labor market, prices of commodities are useful to collect past history. By development of IT technology, collection of data has become much easier, but there is much information which can be collected only at site. The best tool should be site survey.

(2) Risk Qualification: Interview with the experts including those who have experience of similar projects will be effective. For example, the experienced person can tell how long rainfall will last in rainy season, or how often burglars or thieves happen.

(3) Risk Quantification: To sum probability distributions, the mean, standard deviation and variance for each activity are calculated. To calculate the mean, PERT approximations can be used.

PERT approximation : Mean = (O + 4M + P)/6

O: Optimistic estimate. M: Most Likely estimate. P: Pessimistic estimate

(General Theory of PERT)

To increase the accuracy of the quantification, sensitivity analysis or decision trees are sometimes used.

4.5. Risk Management System

4.5.1. Role of Each Party

The project owner who has been involved from the identification stage of the project should know well where the risks are latent. Accepting the feasibility studies, he has decided the budget amount and construction period. As his main interest is to keep the budget and time as having been planned, he takes all measures to respond to the risks. As having been mentioned, he prepares the contingency for the price escalation and tries to avoid or transfer the risk to delay the execution schedule in the stage of the contract award. Sometimes, he prepares physical contingency for some difficult works. If some uncertainty is remained in some works, temporary prices are counted in the form of provisional sum. If a risk event occurs, the project owner will do his best to curb the increase of cost and extension of time, or try to transfer the responsibility to the consultant or the contractor, within the scheme of the contract and the specifications of the works.

The consultant who works as the Engineer shall carry out the duties specified in the contract. The Engineer shall work for the project through the contract, which will result in working for the Project Owner. The engineer is authorized to issue variation orders that may be necessary or appropriate to the contractors. It means that the Engineer is

authorized to make any variation of the quality or works if he finds some symptom of the risk event. When the underground water level was found to be heightened after a big rainfall, the Engineer immediately issued the variation order to change the quality of base course soil to the ballast materials to avoid waste of soils. In case some risk events occur and the contractor suffers from a loss and/or requires for remedial works, the Engineer shall assess such loss and cost of remedying works upon the receipt of the claim from the contractor with substantiation. Such assessment shall be made from the viewpoint of an independent engineer for the project. However, actually such assessment of the cost is made considering the total budget to convince the project owner.

The contractor works for the profit from the project. He works for the project in the sense that he tries best to complete the works within the contract period with the required quality. He prepares well to respond to the risk events, but once a risk event has occurred, it is a good chance to claim for the loss incurred. Or if he finds some mistake in a drawing, it gives him good reason for claiming additional cost incurred from corrective actions. In this sense, a risk for the project owner and the Engineer is a good chance to pursue for the profit. A contractor makes it their strategy to get profit by claims after getting contract with a cheap price. In an African country, it is said that the average final contract amount with European contractors reached 2.5 times of the original contract amount.

However, a loss from a risk event can not always be covered by claims, because assessment of the claim by the Engineer tends to be less than the claimed amount. It happens partly because the Engineer takes into consideration of the total budget of the project which will become the ceiling amount, and partly because the documents of the substantiation are not satisfactory to convince the Engineer and the project owner. Therefore, the contractor also prepares contingency and tries to avoid the risks as much as possible.

4.5.2. Risk Management

Risk has been quantified in the following formula;

R= PB x IP

R : Size of Risk PB: Probability IP : Impact

There are following ways to respond to the risks as having been illustrated;

1) Acceptance
2) Mitigation
3) Allocation
4) Transfer

5) Avoidance

Risk management is to choose the most proper way to respond to a risk event.

For that purpose, risk level should be analyzed. A risk can be allocated and at the same time it can be transferred. In such case, by showing numerically the level of the risk management, it will be helpful to decide the way of response. Risk level shall be analyzed by following formula;

RL= PB x IP

RL: Risk Level, PB: Probability, IP: Impact.

If Risk Level of an item is high, another way to respond to the risk shall be seeked, or manager should continuously pay attention to the item. If the Risk Level of the project is considered to be too high in the stage of the preparation for the tender, decline to tender shall be considered. Actually, if the financial source is local government without guarantee of the central government, probability of delayed payment is too high to participate in the tender.

And the RL will show the required ability of the project manager. For example, if the data of underground water level are not enough at a site where the level can be heightened considering the geological conditions, probability of the loss from heightened water level can be very high and impact is very large. In such a case, there are 3 ways to manage the risk of the earth works, i.e. acceptance, allocation, or transfer. The ways shall be selected considering the risk management ability of the project team, not only the project manager but the ability of his staff and other personnel concerned with the project. Risk Management Ability will be discussed in 4.7.

As the final risk remains in the responsibility of the contractor, even if the works should be transferred or allocated to the sub-contractor or a partner of the joint venture, high level of the risk management is required. Then, it should be better to accept the risk and prepare some contingency for the works. Such decision shall be made by the management of the organization in charge, but the management of the works including the risk at site shall be made by the project manager.

Such risk management level is shown in Table 4-2 the check list for the preparation of the tender.

4.6. Contingency Plan

As having been discussed in section 4.2.(4), as a response to accept, contingency plan is developed.

There are many ways to classify the risks. One is to classify by source, the other is to classify according to the impact on the project. Considering that in the construction projects, many uncertainties remains even after commencement of work, the author adopts following classification proposed by Mr. R. Max Wideman.

A way to classify risks is to describe uncertainties in terms of three categories as follows[3];

1) known
2) known-unknown
3) unknown-unknown.

A known is an item or situation containing no uncertainty. An example is that a man is mortal. A known-unknown is an identifiable uncertainty, but we do not know how they will affect us. An example is earthquake in Japan. We know it will occur, but we do not know when, where it occurs and how big the disaster affects us.

The specific items described in the item of 4. 2. (3) Quantification are known-unknown items. We know there is a robbery but it is not certain when and how it occurs.

Unknown-unknown is an item we do not know if it happens nor the impact if it happens. An example is so called the first oil shock. No body knew Arab oil countries would have raised prices of oil, nobody could imagine how big the impact would have been.

Contingency plan is developed for known-unknown items, i.e. highly uncertain items. As the preposition of contingency plan, a realistic project schedule and budget must be approved as the baseline.

The ways to set contingencies vary from applying standard allowances, to percentages based on past experience, to a careful assessment based on the sum total of the probability and consequences of the various risk items identified. The latter is pro-active and proper approach to project risk management. A simple format of this assessment is as follows;

Description of Risk event	Probability of Occurrence	Estimated Cost of Consequence	Risk Event Status $
Risk Event no.1	Probability P_1	Cost C_1	$P_1 \times C_1$
Risk Event no.2	Probability P_2	Cost C_2	$P_2 \times C_2$
Etc.	Probability P_n	Cost C_n	$P_n \times C_n$
Project estimating contingency			$\Sigma P \times C$[4]

In actual projects, percentage based on the past experience seems to be prevailing.

In Yen Credit projects, OECF and JBIC has prepared 3 types of contingency;

1. General Contingency : total amount of contingency is included in the project cost.
2. Price Escalation Contingency: this item is separated from General Contingency.

3. Foreign Exchange Contingency is separated from above 2.

Depending upon the project size and location, but usually percentage of contingency will be not more than 15 % of the project cost. In other words, if the contingency will be required more than this range, the project shall be reconsidered whether it should be implemented or not. And, contingency will be allocated in following way;

1. Physical Contingency：To prepare for the modification of the conditions such as change of design, extension of time, etc.
2. Price (Escalation) Contingency：To meet to price fluctuation.
3. Special risk contingency: In a project to consider a special risk.

However, the problem is how to define the appropriate range of contingency. Actually, there is not any theoretical way to define it. The author tries to establish simplified calculation of the contingency. Figure 4-4 shows the way of quantification of contingency in the stage of tender as an example.

Figure 4-4 Calculation of contingency

Item	Size of Risk R=PB x IP	Amount Involved (B)	Contingency
.01 Outline of project	1	P1	=1/124xP1
0140 Topography & Geology & Climatic conditions	16	P2	=16/124xP2
0150 Site conditions	12	P3	=12/124xP3
0160 Regulations for construction works	2	P4	=2/124xP4
02 Type, conditions of contract	9	P5	=9/124xP5
03 general situation of country	1	P6	=1/124xP6
0330 public security conditions	6	P7	=6/124xP7
0330 Communication facilities	4	P8	=4/124.xP8
04 Transport to the site, import, custom clearance	3	P9	=3/124xP9
05Taxation. Financial and Accounting Consideration	12	P10	=12/124xP10
0540. Insurance	1	P11	=1/124xP11
06 Living conditions	5	P12	=5/124xP12
07 Work resources, working conditions	9	P13	=9/124xP13
08 Local contractors	12	P14	=12/124xP14
0810 Foreign contractor's	20	P15	=20/124xP15

activities			
09 Local procurement for plant and equipment	4	P16	=4/124xP16
10. Local procurement for materials and products	4	P17	=4/124xP17
Total	124		Σ R/124 x B

(1) The amount involved in each item is considered to be the maximum amount of risk. For example, in Item 1. surety is included as sub-item. The amount involved shall be banking charges to arrange the surety. If the submitted surety is not released in time, the banking charges will become risk money. Amount involved in soil conditions shall be that of earth works.

(2) Therefore, R x (B) shall be maximum amount of contingency.

(3) To calculate more accurately, size of risk of sub-item shall be used. And items categorized as Acceptance only shall be picked up.

(4) Adjustment of the amount shall depend upon the policy of the management. For example, the obtained amount exceeds 5 % of the estimated cost, it will be decreased by the judge of the Manager from his experience.

The advantage of this method is that in the stage of quantification, knowledge and experience of the staff can be made best use. The disadvantage shall be that grasping the amount involved may be a little bit complex.

4.7. Management level of the personnel for the overseas construction project

4.7.1. Required staff of the contractor

In a contractor to undertake the overseas construction project, following personnel is required;

Table 4-4 Required staff of the contractor

1100	**工事指導員.**	Supervisor	
2100	**工事指揮･監督員.**	Superintendent	
3000	**工事指揮･監督責任者.**	General Superintendent	
3100	**工事計画管理者.**	Technical Engineer	
3200	**契約管理担当者.**	Office Engineer	
3300	**コスト管理者.**	Cost Controller	
3400	**品質管理担当者.**	Quality Controller	
3500	**資機材調達担当者**	Purchasing Manager	
3600	**機械管理担当者.**	Plant & Equipment Controller	
3700	**経理担当者**	Accounting Manager	

3800	労務担当者.	Personnel Section Manager	
3900	総務･渉外担当者	Public Relation Manager	
4100	工事遂行部門責任者	Project Execution Div. Manager	
4200	工務部門責任者	Project Control Div. Manager	
4300	管理部門責任者	Administration Div. Manager	
5100	プロジェクト総括責任者	Project manager	
5200	プロジェクト総括責任者補佐	Assistant Project Manager	

4.7.2. Required personnel of the consultant

In the consultant who mainly works for the road and bridge projects, following personnel is required in the construction stage;

Table 4-5 Required personnel of the consultant

1100	工事検査員	Inspector	
2100	工事監督員	Supervisor	
3000	工事監督主任	Chief Supervisor	
3100	常駐監理技師	Resident Engineer	
3200	材料管理技師.	Material Engineer	
3300	契約管理技師	Contract Engineer	
3400	出来高査定･コスト管理技師.	Quantity Surveyor	
3500	品質管理技師.	Quality Engineer	
3600	道路担当技師	Highway Engineer	
3700	構造物担当技師	Structure Engineer	
3800	橋梁担当技師	Bridge Engineer	
3900	舗装担当技師	Pavement Engineer	
4000	経理担当者	Accountant	
4100	技術部門責任者	Technical Div. Manager	
4200	管理部門責任者	Administration Div. Manager	
5100	プロジェクト総括責任者	Project manager	

4.7.3. Measurement of Basic Ability

Basic ability of a staff is measured by his knowledge of the task and his experience about the task. There is some difference in the way of the measurement in the contractor and in the consultant.

Basic ability is required for risk management. If the risk level related with the soil conditions is high, an engineer with high management level in the geotechnical engineering shall be assigned.

4.7.3.1. Measurement of Basic Ability in the contractor

In the contractor, following way to measure the basic ability of the personnel is adopted;

Check Item	abbreviation	Level	
Knowledge about the Task **業務に関する知識**	KL	Very Low	1
		Low	2
		Intermediate	3
		Well	4
		Very Well	5
Experience of the Task at Overseas projects **国際建設プロジェクトにおける業務に関する経験**	PE	New experience	1
		Less tan 2 projects	2
		2 to 5 projects	3
		5 to 10 projects	4
		More tan 10 projects	5
Experience and Knowledge of the international construction contract **国際建設契約に関する経験と知識**	CE	New experience	1
		Less tan 2 projects	2
		2 to 5 projects	3
		5 to 10 projects	4
		More tan 10 projects	5

Note: 1) KL 1: He has the basic knowledge to manage one item of project management such as schedule control.

KL 2 : He has the basic knowledge to manage 3 items of project management.

KL 3 : He has the basic knowledge to manage 1 section of project management.

KL 4: He has the basic knowledge to manage 1 department of project management.

KL 5 : He has the basic knowledge to manage the project as a whole.

2) Number of project is counted only if the person is actually engaged in the project as a member of the project team or directly involved in the management of the project for 6months or more.

3) International construction contract means FIDIC or its equivalent.

Management Ability; ML = KL x $\sqrt{PE + CE}$

Management ability is considered to be multiplier of knowledge and experience, but ability obtained from experience will not be expanded in the linear line, but on a certain level the marginal expansion will be decreased. That is why square root of PE + CE was proposed.

From the author's observation, for the project under Japan's grant aid, the Projector Manager of the Contractor is sometimes selected if ML= KL4 x PE1 =4, if

he has some experience of domestic project. In such case, technical engineer or accounting manager has high level of ML such as 6 or 7 to assist the newly assigned project manager. This fact shows that the Contractor does not well recognize the gap of the management level, especially risk management level, between that required for the overseas project and that required for domestic project.

4.7.3.2. Measurement of Basic Ability in the consultant

In the consultant, there are 2 ways of the measurement. One is the same way with that of the contractor. Another is to add the years of experience of the similar task instead of the knowledge. The first one is used rather inside the organization or group because in the organization everyone, at least the manager knows well the depth of the knowledge of a person. The employer or third party judges the ability of personnel only by the Curriculum Vitae submitted by a candidate. So, the years of experience in a task are considered to prove his knowledge. Thus, following formula is applied to measure the basic ability of their personnel.

Check Item	abbreviation	Level	
Years of Experience in the Task 業務に関する経験年数	YL	0 to 7	1
		7 to 10	2
		10 to 15	3
		15 to 20	4
		More than 20 years	5
Experience of the Task at Overseas projects 国際建設プロジェクトにおける業務に関する経験	PE	New experience	1
		Less than 2 projects	2
		2 to 5 projects	3
		5 to 10 projects	4
		More than 10 projects	5
Experience and Knowledge of the International construction contract 国際建設契約に関する経験と知識	CE	New experience	1
		Less than 2 projects	2
		2 to 5 projects	3
		5 to 10 projects	4
		More than 10 projects	5

Note: 1) Number of project is counted only if the person is actually engaged in the project as a member of the project team.

2) International construction contract means FIDIC or its equivalent.

Management Ability ML= YL + PE + CE

For example, the Employer puts the conditions to qualify a resident engineer as " The

Resident Engineer shall have the experience of the similar job for more than 15 years and that of more than 2 of the similar projects. Experience in the same area will be appreciated."

4.7.4. Application of Management Level to Risk Management

Application of above mentioned management level of a contractor is presented in Table 4-6 utilizing an abstract of the Bills of Quantity of a road project.

Management level mentioned in the table is required one to manage the risks which are latent in the category of works. If the management level should not reach the required one, some means to reach the level must be taken. It will be discussed in the following section.

Table 4-6 Application of Management Level to the Category of Works

Bill No.	Category of Works	Risk Analysis			Management Level		
		PB	IP	RL	KL	$\sqrt{PE + CE}$	ML
1	Earth Works	4	4	16	4	4	16
2	Road Pavement	2	3	6	3	2	6
3	Side Roads	4	4	16	4	4	16
4	Consolidation Works	3	2	6	3	2	6
5	Crossing with NR00	4	3	12	4	3	12
6	Drainage	2	1	2	3	2	6
7	Guard Rail	1	1	1	3	1	3
8	Road Signing after execution of works	3	2	6	3	2	6
9	Temporary Traffic Management	1	1	1	3	1	3
10	Landscape	1	1	1	3	1	3
11	Divers Works	1	1	1	3	1	3
12	Culverts	2	3	6	3	2	6
13	Overpass	3	4	12	4	3	12
14	Railway overpass	3	4	12	4	3	12
U*	Relocation and Protection of Services(including underground cables and ducts)	4	4	16	4	4	16

* If the new underground facilities are discovered during the construction of the Works, the variation orders to relocate or protect such facilities shall be issued.

4.7.5. Evaluation of Risk Response Ability

Risk response ability is evaluated from the evaluation of the management level of personnel. If the project manager has enough knowledge and experience, he can manage the risk. If only his management level is not enough to deal with a risk item, the management ability of a staff who is able to deal with the risk item shall be added. In this way, the risk response ability of the project team is evaluated. Formula of the evaluation is as follows;

RA = ML/ RL

RA: Risk Response Ability. ML: Management Level. RL: Risk Level

Risk Level, Management Level and Risk Response Ability are evaluated utilizing the risk management items prepared for the tender.

Taking example of a project manager with EX level 3, PE level 3 and CE level 2, RA is calculated as per the following table;

Table 4-7 Example of Risk Response Ability

Code No.	Investigation Item	Risk Level Analysis	Management Ability	Risk Response Ability
011000-013000	Outline of Project	34	54	1.60
014000	Topography, Geology and Climatic Conditions	78	63	0.80
015000	Site conditions to be confirmed	11	27	2.43
015040/50/60	Obstacles, Temporally Structure Areas, Special Conditions	48	67	1.40
016000	Related Regulations	3	27	8.94
017000	Technical Difficulty of the performance	65	47	0.72
Total		239	265	1.11

Note: 1) The Project is supposed to be financed by the JBIC. Scraper building or Dam is not included.

2) Figure of RL and ML is the total figure of sub-items, which are shown in the Annex A.

It is observed that the project manager is weak in the topography and geology, but as a whole he would be able to manage the risk. Weak point should be reinforced by other staff.

Like this, RA indicates the way of risk response.

The author proposes following formula to select risk response category ;

RA≧ 0.80 Acceptance

0.80 > RA≧ 0.65 Mitigation

0.65 > RA ≧ 0.35 Allocation or Transfer.

0.35 > RA Avoidance

Mitigation can be made by increasing the number of staff to the project manager. Table 4-7-2 shows the example of the mitigation. The project manager has not enough ability on the contract matters, an expert who knows the contract better was added to increase risk response ability.

Allocation or Transfer shall be selected considering the height of probability, size of impact and trade off between the cost and schedule.

In the stage of investigation, it is normal that matters related with the transportation shall be allocated to the transport department, because transport department knows better the probability of risk events than the project manager.

Affairs of custom clearance are normally transferred to the forwarding agent because they know better the procedures than transport department in case some troubles should happen on the way of procedures.

Table 4-7-2 Example of Mitigation

Code No.	Investigation Item	Risk Level Analysis	Management Ability	Risk Response Ability
0210/0250	Type of Contract/ Special conditions	129	(PM) 91 (Staff) 36	0.71 0.28
	Total	129	127	0.99

The above figures to select risk response have been proposed based on the author's experience. If the management level of a contractor should be improved by the accumulated experience and education, these figures may be varied.

The proposed system is an application of the theory of the expert system, which is based on the idea that expert knowledge in a domain is a combination of a theoretical understanding of the problem and a collection of effective problem-solving rules that experience has shown. Expert system is constructed by obtaining this knowledge from a human expert and coding it into a form that a computer may give a user the same

solution as the expert.

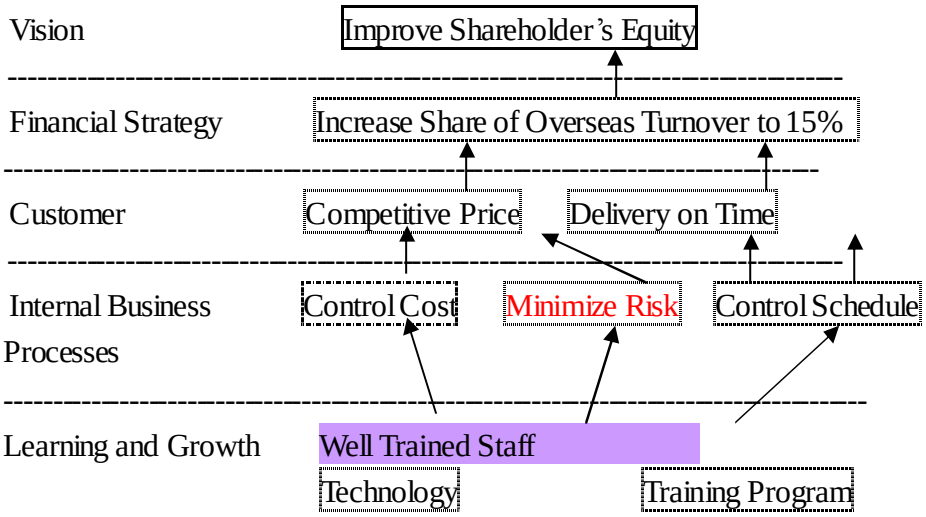
As the proposed risk management system is made in Microsoft Excel, everyone using this system will be able to analyze the risk properly.

4.8. Application of Risk Management System in Corporate Management Strategy

4.8.1. Corporate Management Strategy

A contractor is supposed to have established following strategy;

Fig. 4- 5 Strategy Map of a Contractor



This strategy map was made based on the concept of Balanced Scorecard (BSC), which is a conceptual framework for translating an organization's vision into a set of performance indicators distributed among four perspectives: Financial, Customer, Internal business processes, and Learning and Growth.[5] It is a management tool to plan and manage the corporate. The advantage of BSC is to visualize the strategy and actions by each organization from the 4 perspectives.

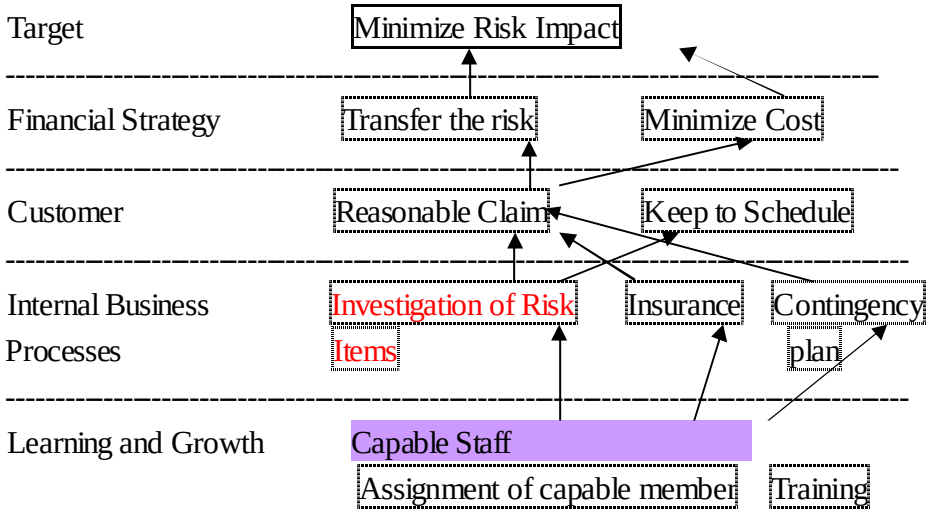
In the above strategy map, Risk Management System is applied to execute the Internal Business Process to "Minimize Risk" to achieve the corporate vision. Applying the risk management system will contribute to achieve competitive prices, through estimating the risk response cost more accurately and avoiding over estimation of contingency. And BSC itself will be optimized by adding the process to minimize risk.

Training program shall be developed to improve the management ability of the personnel based on the evaluation of the ability conducted in Section 4.7.

4.8.2. Target of Risk Management

Following the strategy map, target of the risk management is presented as follows;

Fig. 4-6 Target Map of Risk Management



It is shown that the risk items listed in Section 4.3.1 is the basic process in the risk management and the measurement of ability of the staff stated in section 4.7.3 is made best use for the assignment of the project team member. If the risk response ability of a candidate for the project manager is less than 3.5, he should be avoided. Such evaluation will eventually minimize risk impact and meet to the strategy of the corporate.

From the risk items functional departments besides the project execution department are identified to execute the investigation and the project effectively;

Table 4-8 Functional Department involved in the Risk Management

Code No.			Investigation Items	Functional Department
01	30	11	Tender bond	Finance Dept.
		12	Performance bond	Finance Dept.
02	10	00	Type of Contract	Legal Dept.
	30	00	Standard conditions of the contract	Legal Dept
	40	00	Conditions of contract	Legal Dept
	50	00	Special conditions	Legal Dept
	60	00	Payment conditions	Legal Dept & Finance Dept.
03	30	00	Public security conditions	General Affairs Dept
	50	00	Communication facilities	General Affairs Dept
04	00	00	Off shore and inland transportation	Transportation Dept.
04	13	00	Special privileges: tax	Finance Dept

			exemption, etc.	
05	00	00	Taxation	Finance Dept
05	20	00	Financial & accounting consideration	Finance Dept. Accounting Dept
05	40	00	Insurance	Insurance Dept.
06	00	00	Living conditions	General Affairs Dept.
07	10	00	Labor Regulations	General Affairs Dept.
08	00	00	Local Contractors	Finance Dept.
09	00	00	Foreign Contractors Activities	Finance Dept.

As these functional departments are engaged in the corporate risk management from their professional viewpoints, they will contribute to the effective investigation of risk items, qualification, quantification and developing a contingency plan for the project.

Management level of the main person in charge should be at least

KL 3+ $\sqrt{PE + CE}$ =5.4, considering the importance of the overseas project in the corporate strategy.

Training program should be made aiming the Knowledge Level of each staff should reach level 4. In the civil engineering field, OJT will be most effective.

4.8.3. Rolling of Project Management System

Even if BSC should not be adopted in the management system, it is normal that the corporate strategy is reviewed and revised at least once a year analyzing what has been attained and the causes of what has not been attained. Such rolling should be made to the risk management system, too. This rolling shall be made by feed back of the outcome of the risk items investigated in the stage of tender preparation. Accuracy of the investigation should be compared with the actual happening. It will give the information of measuring the performance of not only project execution department but also of the functional departments concerned. BSC is the means to measure the performance of the staff or business unit concerned.

For example, in a project to construct bridges under Japan's grant aid, the person in charge of a contractor estimated the period required for custom clearance of the construction machinery with taxes exempted as one (1) month. However, actually it took three (3) months to get the certificate of tax exemption. This was caused by insufficient communication between the Ministry of Works in charge of the project and the Ministry of Finance in charge of customs. The contractor investigated in advance the procedures of custom clearance and tax exemption and believed in the information that the letter of Minister of Works requesting tax exemption to Minister of Finance is enough to get tax

exempted, but actually such letter did not work at all. Ministry of Finance had their own procedures irrespective of the international agreement. If the contractor obeyed to the procedures, custom clearance could have been completed in one month, but insisting on the letter from Ministry of Works resulted in the delay of the procedures, because the person in charge of the Ministry of Finance thought the letter is just interference of MOW. Such event should be added to the data and recorded as a lesson learned.

As the project is executed, such difference between the data collected in the investigation and the actual phenomena will occur one after another. Piling up such differences will lead to the rolling of the risk management system and improvement of the knowledge and ability of the staff concerned.

Further, by evaluating the Management Ability of the project managers, team members and other related staff every year, scorecard of each individual will be improved. Such review will indicate the advantage or fault of the existing training program. In this way, risk management and the analysis of management level will contribute to the balanced scorecard system and vice versa.

4.9. Effectiveness of the Risk Management System

Effectiveness of the Risk Management System has been proved by the fact that the System can be a tool to review the competitiveness by adopting in the balanced scorecard system, which visualizes the corporate strategy. In the actual project, effectiveness was proven by the following 3 cases.

1. Assessment of claim for protection and relocation of the underground facilities:

In a project to construct a bypass road, many underground facilities not included in the drawings were found. There were electric cables, telephone cables, water pipelines and steam pipelines. Every time such facility was found, the Contractor was obliged to stop the works, design the way of relocation or protection and sub-contract with the specified contractor to execute the works.

The Engineer was responsible for approving the design and assessing the sub-contract amount. Further, big problem was claims from the Contractor for the delay of the works caused by the insufficient original drawings, though the Contractor could access the more detailed information of the underground facilities before the tender.

At this stage, Risk Management Ability of the Project Manager of the Engineer was assessed as follows;

Knowledge Level: Generally 4, Underground Facilities 3.

Project Experience (PE): 3

International Construction Contract (CE): 3. But, he had no experience of assessment of claim from the Contractor.

Risk response ability to deal with underground structures and claim was assessed in Table 4-9 utilizing the list of investigation items.

Table 4-9 Risk Response Ability to deal with underground facilities

Code No.			Investigation Items	Risk Analysis			Person	Management Ability				R.R. Ability
				PB	IP	RL		KL	PE	CE	ML	
01	50	41	Underground Structures	4	4	16	P.M.	4	3	3	10	0.61237
				4	4	16	Staff	4	4	3	11	0.66144
							S.T.				20	1.27381
02	50	20	Conditions related to Claims	5	4	20	P.M.	4	3	1	8	0.4
				5	4	20	Staff	5	5	5	16	0.79057
							S.T.				24	1.19057

As the table shows, Risk Response Ability of the project manager to deal with underground facility was 0.61 which requires mitigation by increasing a staff. So, an engineer specialized in the underground facilities was mobilized. The facilities engineer assessed the designs of protection or relocation and sub-contracts in a short period and supervised the executing works. The total period related with the underground facilities was shortened by 1 month compared with the period for which the contractor requested.

Risk Response Ability of the project manager to deal with the claims was evaluated as 0.4 which level requires allocation. Therefore, a Contract Engineer with qualification of the Chartered Quantity Surveyor was employed. He had experience to have dealt claims in more than 10 projects in Australia, Oceania and East Asian countries. He assessed the claims from the Contractor for Euro 2 million and evaluated them as the worth of Euro 0.9 million. The Client and the Contractor appreciated it and accepted this assessment.

Without proper assessment of the ability of the Project Manager, such response as having been mentioned above would not have been taken timely. It was utilized also to get the Client understood of bearing the cost to employ additional personnel.

This case shows the effectiveness of the risk management system.

2. Change of the Project Manager:

In a Project to construct a new road in an East European Country under Yen Credit, the Client requested the Engineer's firm, to which the author belongs, to change the Project Manager.

Reasons for the request were as follows;

1) His capability of English is not enough to understand some complex matters.

2) He does not know well the conditions of FIDIC 4th edition.

3) He does not keep the time to complete the report.

Through the discussions with the Client, the author noticed that the real reason for the request was that they had a fear that his assessment of the claims from the Contractor was rather favorable to the Contractor. To find the successor, the author assessed 2 candidates from the viewpoints of the Project Experience, Contract Experience and assessment of claims as the table 4-9-2 shows.

Table 4-9-2 Assessment of Candidates for the Project Manager

Code No.			Investigation Items	Risk Analysis			Person	Management Ability				R.R. Ability
				PB	IP	RL		KL	PE	CE	ML	
02	50	20	Conditions related to Claims	4	3	12	Existing P.M.	4	3	3	10	0.8165
				4	3	12	Candidate A	4	3	2	9	0.74536
				4	3	12	Candidate B	4	3	3	10	0.8165

As the candidate A had a smaller experience of international contract, Risk Response Ability was less than candidate B. Candidate B had the equivalent ability to the existing project manager. But, at this stage not so big claim had been submitted, the author recommended candidate A to the Client, partly because candidate B had been assigned to a section of the project. As the author had been afraid, the candidate A did not pass the interview where the Client asked the process of dealing with the claims in detail. Then, candidate B was recommended and was approved.

As the table shows, Risk Response Ability of the candidate A did not reach the level of acceptance, though the gap is very small. This fact shows the Client proved the effectiveness of the proposed risk management system.

3. Change of the Project Manager of the project under Japanese grant aid:

In a project to construct a new road on the soft ground under Japan's grant aid, the Contractor delayed the works 1 month behind the schedule. The Project Manager of the Contractor had difficulty to re-schedule the construction plan. The Engineer was afraid that the works would not progress enough to get completion certificate in the end of the fiscal year, and assessed his ability as follows from his curriculum vitae.

Knowledge Level: 3

Project Experience: 3.

International Contract Experience: 2

As the critical path was the earth moving works on the soft ground, risk response

ability of the earth moving works was assessed as the table 4-9-3;

Table 4-9-3 Risk Response Ability of The Project Manager

Code No.			Investigation Items	Risk Analysis			Person	Management Ability				R.R. Ability
				PB	IP	RL		KL	PE	CE	ML	
01	70	30	Earth Moving	3	3	9	Existing P.M.	3	3	2	6.7	0.74536
				3	3	9	Substitute	3	3	3	7.3	0.8165

From this table it was proved that ability of the Project Manager did not reach the level of acceptance, but needed some assistant to mitigate the risk.

Therefore, the Engineer requested the Contractor to change the Project Manager with more experience who will reach the acceptable level or to dispatch an engineer experienced in construction schedule. The Contractor checked the progress of the works and finally changed the Project Manager. New Project Manager re-scheduled the construction plan and caught up with the original schedule. This fact shows that the Risk Management System is effective even if a specific risk occurs.

References

1) R. Max Wideman, Editor: Project & Program Risk Management, pII-3, PMI, 1992

2) PMI: PMBOK p111

3) R. Max Wideman, Editor: Project & Program Risk Management, pIII-2, PMI, 1992

4) R. Max Wideman, Editor: Project & Program Risk Management, pIII-6, PMI, 1992

5) Balanced Scorecard Home Page:
http://professionals.pr.doe.gov/ma5/MA-5We.nsf/Business/Balanced+Scorecard

5. Establishment of a Developing Program of the Project Manager Considering the Characteristic of Construction Industry of Japan

5.1. The Roles and Requirements for the Project Manager

5.1.1. The Roles of the Project Manager

The typical Project Manager may have been successful in a specific discipline. Project Manager's works are not limited to those in his discipline, but include those project execution elements such as planning, organizing the work, scheduling, estimating, monitoring, and reporting as the manager.

The Project Manager must fill several roles in the completion of a project.

(1) First of all, the Project Manager must fill the role of an integrator. He must coordinate the efforts of team members and workers toward the accomplishment of project goals. He must integrate the project team into a single functional unit. He must also explain and integrate the project with members outside the project team such as the customer and the other functional managers within the organization.

(2) The Project Manager must be a communicator to upper management, to the project team, and to the stakeholders outside the project team. The project manager is responsible for the contents of message, establishing distribution channel of message, and translating the message into a language that all can understand.

(3) The Project Manager must fill the role of a team leader. He must solve problems as they occur, get the team members convinced of this solution, explain well to the managers from different functional areas, and coordinate the project to show his leadership capabilities.

(4) The Project Manager must fill the role of a decision maker. The specific decision may vary according to the stage of a project, but in any event he must decide. His decision may be related with cost, time or human resources, but his decision will cause important consequence on the project. In this sense, he must be a risk manager.

(5) The project Manager must fill the role of an atmosphere builder. He must create a bright atmosphere so that the team members could work together.

5.1.2. Requirements for the Project Manager

In Japan, most project managers have a technical undergraduate degree and have a great deal of knowledge and a rich experience in a specific technical field, but their knowledge of other technical field or managerial field is very limited.

To fill the role of the Project Manager, the ability to manage should be gained through experience and education. He should be required to have a minimum basic knowledge or competency in following areas;

- Personnel (staffing and evaluations)
- Psychology
- Labor Relations
- Law
- Accounting
- Economics and Financing
- Statistics
- Contracting and Procurement
- Organization Theory

- Environment Protection
- Computer Applications

Further, the Project Manager should also be required to have a basic knowledge of tools in following areas unique to the projects;

- Project evaluation
- Schedule planning including CPM and PERT
- WBS and Cost Estimate
- Quality control

Project Manager should have following skills through experience in the organization to which he belongs and later these skills should be supported by some lectures;

- Safety Management
- Conflict management
- Labor relations, particularly union practices
- Personnel management techniques
- Training method
- Procurement practices
- Negotiation techniques
- Contract Administration

5.2. Education of Project Management in Japan

5.2.1 Execution System of a Project and the Education

- Form of Contract and its function to train the Project Manager-

A contract of the project contains following terms and conditions;

(1) Scope of Works.
(2) Specifications of the deliverables.
(3) Delivery schedule.
(4) Prices.
(5) Payment conditions.
(6) General terms.

The life cycle of a project proceeds as conceptual phase, planning, implementation and phasing out. Normally the Project Manager of a consulting firm or a contractor is assigned just before the start of Implementation phase, when they prepare for the tender documents. As having been stated before, the project manager and key persons are objects of the evaluation. Therefore, he must start with reviewing the project plan and preparing for the proposal. The requirements for the Project Manager do not differ so much whether he belongs to a consulting firm or a

contractor. The Project Manager of a consulting firm may be required to have a little bit deeper knowledge of analyzing cost or scheduling compared with a contractor's, because he must evaluate the tender documents. The contract will give the project manager a chance to practice and learn many things related with the contract.

If the payment conditions are based on progress payment, the Project Manager will have to know how the progress amount is calculated if it is based on the Bills of Quantity, or he must do all efforts to complete the works required for progress payment, if it is based on mile stone, e.g. paved 10km in the road construction project.

In Japan, the contract is lump sum contract. And, as having been discussed in 2.3 BOQ is not binding the parties. Therefore, measurement of daily progress is not made by the project owner.

As the project manager is normally authorized to procure a sub-contractor or materials, he must know how to make a sub-contract or supply contract.

If daily check of the quality by a third party is conducted, the project manager should have knowledge of the quality control, even if an expert of the quality control is assigned. In Japan, daily check of the quality is not made. Inspection by the project owner is requested for the materials and the works specified in the drawings only. Further, the Contractor must apply for such inspection in advance. In overseas, the Engineer can inspect the site at any time.

The project manager should learn how to communicate with the stakeholders, such as other functional management of the organization he belongs, the project owner and the donor. Sometimes he will have to negotiate with the project owner on the progress amount evaluated or on the change of the specification or scope. To be a good communicator, he should learn the difference of the philosophy of the contract in Japan and in the international construction market. Japanese construction contracts are based on "mutual reliance" as being stipulated in Article 18 of the Construction Industry Law as "Both parties of the contracts are required to enter into fair agreement on an equal basis and to carry out the same with loyalty and good faith".

As having been discussed on the modification of design, the project owner of the public works is practically deemed to be in governing position in spite of the stipulation of "equal partner". Therefore, all requests from the contractor are submitted in the form of "petition". The project owner is decision maker even after a mutual discussion or petition. Here, there is no negotiation in a true sense. It often happens that the contractor is obliged to accept an unfavorable condition.

On the other hand, FIDIC contains and aims at "controlling domains of mutual distrust".

All requests are made as the exercises of the contractor's right. The Project Manager

must submit the requests with justifying and persuasive grounds to start negotiation with the Engineer first, because the Engineer scrutinize and evaluate the request. They are equal partners, but not based on mutual reliance or good faith. And, to avoid misunderstanding each other and a barren controversy over "you said" or " I did not say", all notice, consent, approval, certificate or determination shall be in writing. Actually, each party does not take any action until a party receives the letter on an issue from the other party. This may be one of the fundamental differences of the way of thinking. In Japan, the pronounced words are thought to have spirit of the teller, but in overseas, spoken words are thought to be cancelled anytime until they are confirmed in writing.

The project manager should learn how to integrate the project team into an effective unit in a short period, and to develop the members if the duration of the team is long enough.

In the overseas construction project, all above factors are included. Therefore, if the project manager has not even minimum knowledge, he may have to spend a lot of time to understand the contents of the contract in the initiating stage. But if he has some experience of a similar project, it will be easy to understand the contract and make up his management policy. The contract proves to be educative in such way.

5.2.2 Execution of a Construction Project by 2 parties and that by 3 parties

As having been discussed in section 2.3, in Japan a construction project is executed by 2 parties, the project owner and the contractor, while in overseas a consulting engineer participates in the project, forming 3 parties.

This difference decreases the opportunity of practices of the techniques of project management or of obtaining skills of management.

(1) In the design stage, a consulting engineer must keep to design guidelines. So, design is made sometimes without considering construction method or construction plan. Sometimes, a design of a bridge is made without confirming underground conditions of site relying upon the site data given by the project owner. This way decreases the chance to learn construction planning and cost estimates.

(2) In procurement stage, the bidding system does not require the bidder for the detailed construction plan nor breakdown of the prices. A construction plan or breakdown of the prices is required to submit before the contract, but they do not bind the parties. Therefore, construction plan or breakdown of the prices is not so detailed as that required in overseas project. This system deprives a contractor of the chance to make a detailed execution plan or cost estimate breaking down into Bills of Quantity (BOQ).

(3) The contract is made applying the standard terms and conditions. There is no room for negotiation. Here, a chance to get skill of negotiation is lost.

(4) The contract amount is lump sum. Payment is made only twice, the advance payment and completion payment. Thus, there is no incentive for the project manager to calculate the progress amount of every month. It will lead to decrease of efforts to save the cost even by penny, if the cost incurred remains within the budget imposed to him by the organization he belongs.

(5) There is no chance to claim for the increased works from the expected ones. In soil works, it frequently happens that the treated volume exceeds the volume described in the BOQ or that unexpected rocks must be treated during cut works of the slope. In BOQ contract, such increased volume or new item can be claimed for payment. The consulting engineer evaluates such claims and if approved, he issues certificate for the payment for approval of the project owner. Such claim is main obligations of the project manager and he shall be required to equip with knowledge of it. In this sense, the Japanese system deprives project manager or resident engineer of the chance to scrutinize the BOQ and contract conditions.

(6) In Japan, daily check of the progress or quality is not made. Inspector of the project owner comes to the site for inspection from time to time, however, it is often reported that the inspector comes once a several months. It causes moral hazard of quality control to the contractor. It is often reported that there were some corner-cutting. It is unlucky for the project manager or quality manager to miss a chance to get acquainted with tools and technique of quality control. It is completely different matter from fulfilling the formats required in ISO 9000 series.

(7) The construction period is limited to one fiscal year, in principle. To meet this constraint, unit of order is very small. In case of the express way, the order is made for the construction of 2km to 4km. This deprives the project manager of a chance to plan well the mobilization. In overseas, construction period is not limited but sometimes it lasts for several years. So, mobilization schedule must be submitted for the evaluation by the consulting engineer and approval of the project owner. Actually in international constriction market, mobilization schedule is one of key elements of the evaluation for award of the contract.

(8) As the period is so short, if he integrates the team in the mobilizing stage, needs to think of the team development are very small. In this sense he does not have enough chance to get skills of personnel management or training. In overseas, the same member works together for a long time, the project manager must take care of the career of his members. Thus, he is obliged to learn about personnel

management to keep unity of the team and train his members on the job. In overseas, if behavior of the key personnel including the project manager of the contractor is bad, the project owner and/or the consulting engineer can request change of such personnel. In this sense, personnel management is imperative for the project manager.

(9) In Japan, as the period is short, schedule once submitted to the project owner when contract is awarded is not so often reviewed, because schedule does not bind the parties. In overseas, as the period is long, schedule is often reviewed in the course of progress, and sometimes the consulting engineer requests for additional input of resources in case the works are delayed. The schedule submitted in the tender forms a part of contract documents and binds the parties. In this sense, the project manager is required to know of the scheduling including the computer software.

(10) In Japan, from the viewpoint of risk management, the project manager has not enough chance to learn about risk management. For example, if he takes care of the safety of the site and prevent accident, it will be sufficient. There is no risk of burglar. Procurement of materials is very easy. Pre-mixed concrete will be delivered to the site in time by a phone call. There is no fluctuation of prices in a short period.

Difference of the risk management items are figured out as follows:

Figure 5-1 Difference of Items of Risk Management

Items of Risk Management	Overseas Project	Domestic Project
Preparation of tender		
a) Bid Bond	○	×
b) Assignment of Project Manager & key staff	○	△ P.M. can be changed by the Employer.
c) Cost Estimation - Mobilization Plan - Procurement plan - Site Conditions incl. soil - Transport plan - Price Fluctuation - Foreign Exchange - Site Facilities - Site Security - Banking charges on surety	○	△ Importance of procurement, transport, price fluctuation and mobilization is less.
d) Scheduling - Mobilization Schedule	○	× Source of procurement,

- Procurement Schedule - Transport Schedule - Temporary Works - Construction Method - Local Climate, Weather		mobilization and climate are well known.
e) Quality -Availability of materials -Availability of local engineers/labors	○	× There is enough data of sources.
Contract		
a) Performance Bond	○ Submission of Performance Bond is a condition for effectiveness of the contract.	× There is a guarantee system.
b) Insurance	○ Insurances on works and third party liabilities are sometimes conditions for effectiveness of contract. It happens that local insurance is not available or accepted.	× Insurance is not a condition for effectiveness.
Execution of the works		
a) Communication	○ At the receipt of Letter of Acceptance, communication starts with submission of program.	× Program is submitted on the contract, but it does not bind the party.
b) Import of Equipment & materials - Transport of goods - Foreign Exchange	○	×
c) Price Fluctuation	○	△ In case construction period exceeds 12 months, same risk occurs.
d) Security - Burglars - riot	○	×
e) Site conditions including soil - underground facilities	○	○
f) Contractual Risks - Procurement of local goods and labors	○	× Procurement is easy.

- Sub-contracting		Sub-contractors are well known.
g) Payment in local currency	○In a developing country, it happens that payment of local currency portion is much delayed due to fiscal constraint.	×
h) Climate and weather - rainy season - winter	○ Start of rainy season or winter often changes by year. It influence on schedule.	×
i) Team Development	○Any key staff can be rejected by the Engineer for reasons of misconduct or bad performance. In this sense team development and unity is a big risk item.	△ The project owner can request for necessary action against the improper performance of the staff or labors. It does not always mean the rejection.
j) Natural Disasters	○To be insured if possible.	○To be insured if possible.
k) Change of Laws and Regulations	○To be consulted.	△ There is no stipulation, but to be consulted.
Close out of Contract		
a) Release of Performance Bond	○If release of performance bond is delayed, banking charges are continued to be levied.	×

Above items shall give impacts on cost, quality and schedule at the same time. Therefore, the author did not itemize by the category of cost, quality and schedule.

As above, difference of the executing system leads to the difference of training opportunities.

5.3. Education Program of the Project Manager

5.3.1 Preposition

In a consulting engineer and a general contractor, the project manager is assigned

after the experience in a domestic project or experience in overseas projects as a team member. He may have stepped up from a site inspector or superintendent, site engineer and/or resident engineer. In overseas project, there is a job of quantity surveyor. His job is to measure the quantity of the works progressed and to claim for the progress payment. It is his job to find some mistakes of the drawing or new items not specified in the drawings or specifications and claim for the increase of the contract amount. There is not such an engineer in Japan, because BOQ submitted with the contract does not bind the parties and because daily measurement of the progress is not made. The quantity surveyor is sometimes promoted to the project manager because he knows well the contractual matters. Or he has been assigned to the overseas project manager from the domestic project manager or from the line manager of the administrative department.

The role of the project manager covers wide range and requirements are so many. The author would like to propose the education program for the project manager who has been just transferred to the overseas project.

5.3.2. Education Program

(1) English: Capability to write, read and speak English is indispensable. Writing can be helped by a staff if he can convey his intention properly. So, reading and speaking are more important. But, English should be improved by self-learning. What the organization can do is to encourage the staff to make efforts continuously. Some companies pay subsidiary for going to English School or for correspondence course of English for 1 year or half an year. Some companies pay some allowance if an employee passes STEP (The Society for Testing English Proficiency, Inc. A well known testing organization of English) First Grade or Pre-First Grade. The company to which the author belongs once employed a native English speaker with rich experience of reporting to correct the English report written by the staff. This was very effective in improving the writing skills.

(2) Items to educate the project manager is proposed hereunder taking into consideration of the items of risk management;

Table 5-2 Education items

Education items	Descriptions
Project Evaluation 1) Reading Statistics. Meaning of	1) Analyzing statistics and making use of them is an indispensable technique for the project

GDP. 2) DCF method and Meaning of FIRR and EIRR.	evaluation. 2) DCF method and how to evaluate benefits of a project, especially in calculating EIRR, is one of the key points of the project evaluation.
Scope Management 1) To develop WBS. 2) Accounting code used in the organization.	1)To understand the scope of a project, knowledge how to develop WBS is indispensable especially if the work is complicated like a plant construction. 2)The lowest level of WBS should be in accordance with the accounting code of the organization, so that the WBS could be utilized for cost control.
Scheduling 1) Gantt Chart, Arrow Diagram, PERT/CPM. 2) Handling the software of schedule control (as knowledge).	1)Gantt Chart (Bar Chart) does not show relations or dependency of the works.[2)] 2)To control schedule along with the Critical Path, learning about Arrow Diagram Network is necessary. 3) Work resources control must be taken into account. 4)To estimate duration of the work, concept of PERT should be most helpful.
Cost Estimate and Control 1) To develop resource histogram. 2) To estimate cost utilizing WBS. 3) Principles of accounting and cost control of the Organization. 4) Software of cost estimation (as knowledge). 5) Calculating progress amount. 6) How to report the progress, Earned Value Analysis.	1) Cost estimate of the project should be made based upon BOQ deprived of WBS and construction schedule which includes mobilization of resources. 2) Cost control should be made keeping to the rules of the Organization. 3) Earned Value Analysis is one of the most effective ways of reporting the progress of the project. The Project Manager should know such technique, not only making a progress curve.
Quality Management 1) Philosophy of ISO9000. 2) Policy of the organization. 3)Tools such as Control chart, Cause-and-effect diagram, Pareto diagram.	1) The project manager should understand that ISO 9000s requires commitment of the top management to the quality control. 2) In a project, as the responsibility of quality control falls in that of the project manager, he is required to understand such philosophy. 3) It will be effective in the solution of the troubles with the quality to have knowledge of the above mentioned tools.
Human Resource Development 1) Policy of the organization. 2) Performance appraisal system of the	1) The project manager is responsible for the team building and development. 2) He should know well about the policy and

organization. 3) Theory on the character of human beings, such as Mc Gregor's theory X and theory Y. 4) Organizational theories (as knowledge).	appraisal system of the Organization. 3) It will be effective for the team development to learn motivation theories such as Theory X and Theory Y.
Communications management 1) Listening skills. 2) How to write to the stakeholders. 3) Theory of conflict management.	1) It is observed that problems are caused by the Project Manager's attitude that he does not well communicate his staff, contractor or the client. The managers receive little training of listening, which requires understanding, analyzing and decision. Thus, training how to listen is required for the managers including the Project Manager. 2) Writing skills are required to get the stakeholders understood of the situation and requests for them to protect the interests of the project. 3) It will be most helpful if the project manager knows the theory of the conflict management, because he always faces the conflict with his staff, the client, sub-contractors or his organization. For example, Win-Win solution is the best, but it will be easier for him to reach the solution if he knows such concept.
Risk Management 1) Technique to sum probability and that of simulation, e.g. Monte Carlo simulation, decision tree. 2) Principles of financial management including technique to avoid foreign exchange risk. 3) General guidance of insurance.	(1) As quantification of the risk is important in the risk management, the Project Manager should have knowledge of tools to sum up probability of risk events. (2) The project Manager should know at least how to make cash flow. In case foreign currencies are involved, he should have knowledge of forward contract of the foreign currency. (3) In the construction project, many kinds of insurance are required, sometimes by the contract. Thus, the Project Manager should have general knowledge of insurance.
Procurement management 1) Evaluation criteria of the organization, including how to analyze the Balance Sheet and Profit & Loss Statement to evaluate supplier or sub-contractor. 2) Payment and Surety bonds system of the organization.	. 1) To evaluate a sub-contractor, minimum knowledge to analyze the balance sheet and the profit and loss statement is required. 2) Payment conditions and surety system shall be in accordance with the organization's policy. 4) General knowledge of export and import is

3) General guide on export and import. 4) Closing account of the project	required for cost estimate and sub-contract. For example, he should know difference between FOB price and CIF price. 5) Closing account shall be in accordance with the rule of the Organization, but he can not close the account without knowing how to count the residual value of the equipment.
Contract Administration 1) Type of contract, e.g. lump sum, cost plus fee, unit price, or turn-key etc. 2) General Provisions of the contract, including FIDIC. 3) How to claim.	1) The Project Manager will have responsibility to make contracts with sub-contractors or vendors. So, he should have knowledge of contract, advantage and disadvantage of types of contract. 2) The Project Manager should have enough knowledge of the general provisions of the contract not only for making a contract but also for the contract management. As FIDIC is prevailing in the overseas construction project, he should learn how each article is interpreted and applied. 3) Claim for the additional payment and get it paid from the contingency is a most important role of the Project Manager. He should learn how to write a claim letter from the archives.
Moral	1) Code of conduct or ethics shall be reminded. 2) The Project Manager is always tempted to corrupt the client or to be corrupted by a sub-contractor. To avoid any corruption, code of conduct or rules of compliance shall be reminded.

Notes :

GDP : Gross Domestic Product. It is total amount of the added value produced in a country in a period.

DCF : Discount Cash Flow. Future cost and benefit is discounted by an interest rate (it is called discount rate. normally 10% is adopted.) to convert into the present value.

EIRR : Economic Internal Rate of Return. Internal Rate of Return is such an interest rate as shall make the present value of a project zero. In EIRR, benefit of a project is calculated based on the economic assumption.

FIRR : Financial Internal Rate of Return. In FIRR, benefit of a project is financial revenue.

FOB : Free on Board. Delivery is completed when goods are on board.

CIF : Cost, Insurance and Freight. Delivery is made at the site where freight covers.

Mc Gregor's Theory X, Theory Y : Simply speaking, Theory X is that human nature is supposed to dislike their work and try to avoid it, and that managers based on this assumption tend to control strictly and severely. Theory Y is that as human nature is industrious and creative, they will work hard to meet the expectations if properly motivated. Managers based on this assumption tend to impose less control and provide more freedom and heighten the motivation of their subordinates.

The above items are classified as follows according to the category of management;

Table 5-2-1 Classification of Education Items

Category of Management	**Education Item**
Project Mission Management	Project Evaluation, F/S
	Risk Evaluation & Management
	Cost Estimate & Budgeting
	Procurement Management
Project Execution Management	Scope Management
	Schedule Control
	Cost Control
	Quality Management
	Contract Administration
	Personnel Control
	Human Resource Development
	Communication Management

Category of management will be discussed in Section 6.4.

(3) Texts and program

Education Items	Texts	Duration
Project Evaluation 1) Reading Statistics. Meaning of GDP. 2) DCF method and Meaning of FIRR and EIRR.	1. New Theory and Practice of F/S by Masamitsu Toriyama. Japan Development Service co. ltd. (in Japanese) 2. Guidelines for Project Evaluation, United Nations Industrial Development Organization	1. one day 2. one day
Scope Management 1) To develop WBS. 2) Accounting code used in the organization.	1) A guide to the Project Management Body of Knowledge(PMBOK) by Project Management	1) half day 2) half day by a staff of accounting dept.

	Institute(PMI) (Japanese translation) 2) accounting code	
Scheduling 1) Gantt Chart, Arrow Diagram, PERT/CPM.. 2) Handling the software of schedule control(as knowledge).	1) PMBOK 2) PERT・CPM, Tomoharu Sekine, Nikkagiren (in Japanese) 3) Microsoft Project Standard Version	1) 2) One day in total 3) half day
Cost Estimate and Control 1) To develop resource histogram. 2) To estimate cost utilizing WBS. 3) Principles of accounting and cost control of the Organization. 4) Software of cost estimation (as knowledge). 5) Calculating progress amount. 6) How to report the progress, Earned Value Analysis.	1) PMBOK 2) Company's rule of accounting.	One day
Quality Management 1) Philosophy of ISO9000. 2) Policy of the organization. 3)Tools such as Control chart, Cause-and-effect diagram, Pareto diagram.	1) JIS ISO 9000s 2) Global Standard ISO Management, Tomosaburo Yano, Nikkagiren (in Japanese) 3) Visual Basic of Quality Management, Osamu Uchida, Nihon keizai Shinbunsha, (in Japanese) 4) Policy of Organization	In total one day
Human Resource Development 1) Policy of the organization. 2) Performance appraisal system of the organization. 3)Theory on the character of human beings, such as Mc Gregor's theory X and theory Y. 4) Organizational theories (as knowledge).	1) Mechanism of Project Management, Ayatomo Kanno, Nikkagiren (in Japanese) 2) Company's system of performance appraisal. 3) Team Management, Hisataka Furukawa, Nihon Keizai Shinbun 4) Human Resource Skills for the Project Manager, Vijay K. Verma, PMI 5) Management Organization, Toshihiro Kanai, Nihon Keizai	In total one day

	Shinbun	
Communications Management 1) Listening skills. 2) How to write to the stakeholders. 3) Theory of conflict management	1) PMBOK 2) Human Resource Skills for the Project Manager, Vijay K. Verma, PMI 3) Principles of Project Management, John R. Adams, PMI	1) Regarding listening and writing, a special lecturer should be invited for one day practice each. 2) Other theory can be lectured in one day.
Risk Management 1) Technique to sum probability and that of simulation, e.g. Monte Carlo simulation, decision tree. 2) Principles of financial management including technique to avoid foreign exchange risk. 3) General guidance of insurance	1) PMBOK 2) Guide to Risk Management, Tomohiro Takanashi, Nihon Keizai Shinbun(in Japanese) 3) Company's principles of financial management. 4) Company's policy of insurance.	Total 2 days
Procurement Management 1) Evaluation criteria of the organization, including how to analyze the Balance Sheet and Profit & Loss Statement to evaluate supplier or sub-contractor. 2) Payment and Surety bonds system of the organization. 3) General guide on export and import. 4) Closing account of the project	1) How to analyze financial statement, Nihon Keizai Shinbun (in Japanese) 2) Guide to International Trade, Kouji Tsubaki, Nihon Keizai Shinbun 3) Company's policy	One day
Contract Administration 1) Type of contract, e.g. lump sum, cost plus fee, unit price, or turn-key etc. 2) General Provisions of the contract, including FIDIC. 3) How to claim.	1) PMBOK 2) FIDIC	1) Guidance on FIDIC will take one day. 2) How to claim shall be lectured by an expert at least half a day.
Moral	1) Code of ethics of the company 2) The OECD Convention Against Bribery of Foreign Public Officials in	Half day

	International Business Transactions	

Texts have been selected to give a minimum concept of the management among the books the author has read. Duration was estimated considering the author's experience as the attendant and as the lecturer. One day is composed of 4 periods of 90 minutes. Total duration is 14 days.

As the supplementary text book to the PMBOK, "Project Management Basics" by Robert L. Kimmons, Marcel Dekker, Inc. is recommended.

5.4. Effectiveness of the Education Program of the Project Manager

(1) OCAJI-The Overseas Construction Association of Japan, Inc. held training seminar for 20 candidates of the Project Manager of the overseas projects in October, 2005. The program of this seminar was as follows;

a) Check points before bidding: Contract documents and estimation of cost.
b) Problems in the stage of preparation and mobilization: Site possession, preparing site office, procurement of equipment and materials, construction schedule, Performance Bond, Insurance on works and advance payment.
c) Matters in the construction stage: local customs, procurement including transport and foreign trade, schedule management, labour management, safety control, negotiation, claim and how to deal with the Engineer.

All of the above items are included in the proposed program. It proves that the proposed syllabus meets to the needs and effective.

(2) JBIC is planning to establish an extension course titled "International Contract Management Course" collaborating with a university to develop persons for government, international organization, consultants, private enterprises and Dispute Adjudication Board etc. Idea of syllabus of the course is as follows;

(a) Contract Management and Procurement in the Overseas Projects.
(b) Concept of International Standard Conditions of Contract (FIDIC etc)
(c) Case study of JBIC, World Bank, ADB etc.
(d) Negotiation & Communication.
(e) Solution of Conflicts.
(f) How to deal with corruption.
(g) Developing organization and personnel.

Almost all of this syllabus is included in the proposed program, which will be side proof of the effectiveness of it in the field of the contract management.

(3) The proposed program has not been evaluated directly applying to the project manager, however, in Construction Project Consultants, Inc. (CPC) to which the

author belongs, there is an example that will prove the effectiveness of the program.

When so called "Law to promote PFI" was executed and Tokyo Chapter of the Project Management Institute (PMI) was established, some members tried to get certificate of PMP- Project Management Professional. The Author passed the examination 5 years ago. CPC registered with PMI as the Education Service Provider to educate other employees who wants to pass the examination of PMP.

Most of them had not experience of the overseas project, but have been engaged in domestic services. They have no chance to read English papers or document.

The examination is conducted in principle in English, and Japanese translation of the questions is in so poor Japanese that an examinee has much handicap.

Education was provided in Japanese. Text book was first the Japanese edition of " Project Management Body of Knowledge" (PMBOK), then proceeded to sample exams translated by the author.

To reply to the sample questions, knowledge of management in the above listed categories was required. So, the author gave following lectures meeting to the request of 6 participants;

(a) Project environment
(b) Actual application of Matrix organization
(c) Theory on human nature, such as Mc Gregor's Theory X and Y, Maslow's hierarchy.
(d) Sample of BOQ
(e) Concept of PERT and CPM.
(f) Concept of DCF and how to calculate benefit and IRR.
(g) Type of contract and its advantage and dis-advantage.
(h) Actual sample of tender evaluation.
(i) Actual sample of claim letter and its evaluation.
(j) Actual sample of Earned Value curve.
(k) Basic knowledge of import and export.
(l) Code of conduct of PMI

Finally, the author recommended them to memorize key words in English.

5 members tried the exam and all of them failed.

3 members tried for the second time 3 months later, and one of them passed. He had short period of experience of overseas project and could read English to a certain degree.

The author repeated the explanation to remaining two members about project environment where all actions are under constraints of time, cost and human resources.

6 months later, one of them passed the exam. He is the first case who passed the exam

without overseas experience and without chance to read English.

This case may be a little bit different from the education of the project manager, but the above mentioned lectures, which are a part of the proposed program, were effective to understand the project management.

References

1) Vijay K. Verma : Human Resource Skills for the Project Manager, ,PMI, 1996

2) John R. Adams : Principles of Project Management, PMI, 1997

6. Education of Project Management in the University

6.1. Change of contents of education

Project Management is educated in the civil engineering department of some universities. Since around 10 years ago, almost all universities with science and engineering departments have changed " Civil Engineering " dept. to " Social Infrastructure", "Geo-Engineering" or "Construction System", because they had a sense of crisis that the name of " Civil Engineering" could not attract the students. In this background, there was a widely prevailed reputation of the construction industry that construction works represent 3K (Kitanai – dirty, Kitsui – hard , Kiken – dangerous) industry for what the young workers want to avoid to work. This word appeared in the midst of bubble economy in 1980s when the financial entities such as banks, securities firms and insurance companies were longed for. In the construction companies, many young employees wanted to move to the planning and developing section from the conventional construction sections. Even after the end of bubble economy in 1992, the restructuring of the financial entities was progressed, the reputation of construction industry as 3K has not changed. One of the reasons is that the restructuring of the construction companies has been processed at the same time

On the other hand, the public works have been criticized that much amount of budget has been wasted in the unnecessary works or non-urgent works. For example, in relation with the Japan Highway Authority (JH), necessity of construction of the express highway was officially discussed and privatization of JH was decided. However, construction of 9,000 km of express highway will be continued as the direct works of the MLIT. Even the participants in the discussion including a professor of civil engineering could not justify the construction of such long distance of express highway. The government or civil engineers seem to have failed in persuading the nation that the criticized public works have been necessary for the country and to protect or improve the comfortable life of the people. They have lost of the confidence of the people.

It should be reminded that the word "civil engineering" is said to have been born in 18th century to distinguish from "military engineering" to express the works to construct

peaceful environment of life[1]. It included buildings. It means when this word was born, all people understood the necessity and accomplishment of the civil works including buildings as subdivision of structures.

Change of the name of "Civil Engineering" dept. may express the intention of the universities that they are trying to recover the confidence of the people with changing education items.

The author would like to discuss on the education of the project management as the comprehensive subject of the civil engineering.

6.2. Definition of Civil Engineering

Civil engineering has following three roles;

1) Function to develop the basic idea and policy of improving social infrastructure. The word was born to express the works for peaceful life.
2) Function to develop the technology to construct a needed structure.
3) Function to integrate the mission/policy into development technology. This is management itself.

The Japanese civil engineers have played their role to fulfill the second function to develop the technology to construct a structure including high-rise building. The first and third functions were not put with much importance, mainly because a big variety of infrastructure had to be re-constructed and improved rapidly after the World War II. The people were happy to drive a Corolla on the paved roads. Now once basic infrastructure has been developed, the first function has become rather remarkable than before, and accordingly third function has been required to the civil engineers to explain clearly to the people the necessity and importance of a new infrastructure. Now, civil engineering should have meaning of construction management. And civil engineers should play 3 functions to the full capacity.

6.3. Academic status of construction management

In the education of the civil engineering in Japan, the field of construction management or project management is not well recognized.

For example, JABEE(Japan Accreditation Board of Engineering Education) stipulates the knowledge and abilities to be acquired as follows in the Program Criteria for Civil Engineering[2];

(3) Knowledge in a minimum of three recognized major areas of construction materials and basic mechanics, structural engineering and earthquake engineering, geotechnical engineering, hydraulics and hydraulic engineering, traffic engineering and national planning, and environmental systems for civil engineering.

(7) Ability to understand at least one of the following professional practical issues and to

respond to them appropriately.

a) Knowledge and ability to encourage the view of environment and support sustainable development.
b) Design of an accountable project in consideration of regional characteristics and significance of culture and civilization.
c) Management of a construction project with an integrated consideration of underlying cost, time, quality, safety and procurement.
d) Professional practice of issues relating to civil engineering.

The construction management or the project management is not included in the "recognized major areas", but included in the areas to understand.

The author has received a comment from a professor of engineering department that project evaluation is not technological. He does not understand the project evaluation requires basic knowledge of engineering. For example, in a road construction project, change of alignment of the road directly affects the cost and the schedule of the project. Project evaluation is one of the subdivisions of the construction management which connects time factor and cost factor to the engineering technology.

The reasons for such lack of understanding in the construction management are considered to come from the difference of "recognition of academic study".

There are two kinds of approaches of studies for engineering study. One is "the study pursuing depth", another is "the study emphasizing on area" which combines freely truth dotted in the wide range of scopes and tries to find the solutions.

The Japanese civil engineers have focused on the study to pursue depth. They recognize the study as "to research a new truth or technology by piling up phenomenon in the specific field according to a process, addressing the range of target of accomplishment based on a hypothesis." They put importance on hypothesis and target, and process and logic to attain the target. What is uncertain with the range of target and process to attain it can not be object of the study. If they set a clear range of target and a process, uncertain factor or process is cut off and factors are simplified. In this sense, the object of the construction management is not clear cut, because this study belongs to that emphasizing on area[3)] .

Civil engineering's first function is to explain the mission and function of infrastructure with axis of cost, time and quality. With the abovementioned style of study, such function can not be expected. Education system shall be changed so that the civil engineers could play their expected roles in 3 functions.

6.4. Frame of education program of construction management

(1) Position of Construction Management

Newly developed technology can be put into practice only when it is connected with

time factor and cost factor. Construction Management is a field of study to seek the connection between the construction technology and the real society as Figure 6-1 shows.

It is a platform of cost and time in the civil engineering.

Each technology can enlarge its field with a new idea connected with this platform. Or, a technology can connect with another technology through the platform and create a new field of technology.

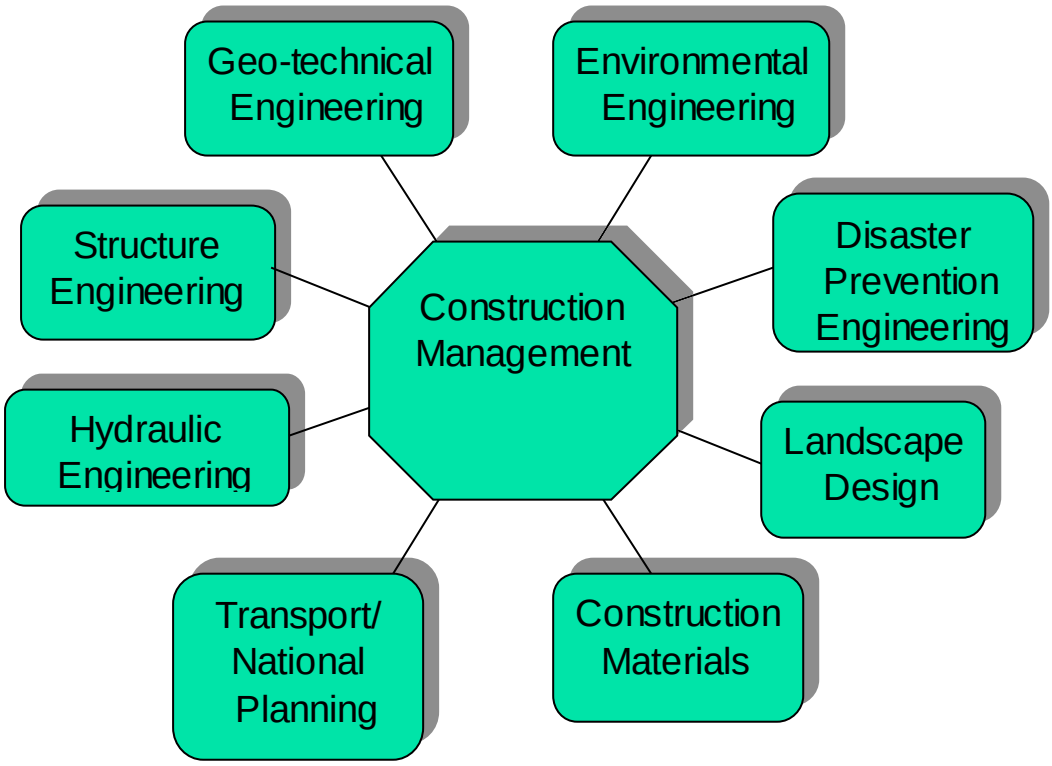


Figure 6-1 Position of Construction Management
Platform of cost and time in Civil Engineering

(2) Basic Frame of education program

Firstly, definition of construction management shall be made once again.

Recently, in the advanced countries of Europe and America, such type of contract as Project Management Contract with the core of management technology and Construction Management Contract in addition to the conventional Re-measurement Contract and Lump-sum Contract is prevailing. Scope of the Project Management Contract is the whole management of the project covering from the planning, execution and operation. Scope the Construction Management Contract is management of the project in the execution stage. It can be observed that construction management is

grasped as a part of the project management and is defined as the nearly execution management. This definition is made to look over "the whole" considering "a part". Construction Management is to manage all stages related with the construction industry, and composition of the education program shall be as follows;

Education program of Construction Management

(1) Project Planning & assessment
Technology on the planning of social infrastructure
(2) Project Mission Management
Technology on administration of the project
(3) Project execution management
Technology to execute the project
(effective utilization of required management sources)
(4) Project field management
Technology to supervise the execution of the works.
(5) Project operation & maintenance
Technology required for maintenance of the project.

Based on this composition, detailed items of the education program are shown in Table 6-1.

Table 6-1 Frame of Education Program of Construction Project

1. Planning & assessment of Infrastructure development			
1.1.	**世界の社会資本整備** Infrastructure development in the world	**社会資本整備**	Infrastructure Development
		国際建設市場	International Construction Industry
		国際化動向．制度･規格	Globalization. regulations , standards
1.2.	**日本の社会資本整備** Infrastructure development in Japan	**社会資本整備事業の実態**	Infrastructure Development in Japan
		建設産業の実態	Situation of Construction industry
		建設産業の役割	Mission of Construction Industry
1.3.	**社会資本整備事業** Planning & Assessment of Infrastructure development	**社会資本整備の意義と政策**	Mission & Ppolicy
		国家総合計画	Grand Deign & Master Planning
		地域整備計画	District & Regional planning
		事業化適性調査	F/S; Feasibility Studies
1.4.	**環境ﾏﾈｼﾞﾒﾝﾄ** Environment management	**環境保全･維持**	Environment issue
		環境調査	Environment assessment
1.5.	**建設技術者** Role of Civil engineers	**建設技術者の使命**	Engineer's Mission
		技術者の倫理	Engineer's Ethics
2. Project mission management			

2.1.	ﾌﾟﾛｼﾞｪｸﾄ執行関連法 Law& Regulations related project execution	建設業法･会計法	Construction Law, Audit
		環境関連法規	Environmental law& regulations
		事業化関連法規･法令, 他	Other related Law & Regulations
2.2.	建設契約標準約款 Standard conditions of construction contract	日本の建設契約標準約款	Standard conditions of contract
		国際建設契約標準約款	Int. standard conditions of contract
		ＣＭ契約標準約款	CM standard conditions of contract
2.3.	事業性調査現況検証 Feasibility Study Project Appraisal	リスク管理, 調査･分析	Risk evaluation & management
		詳細環境検証	Detail Environment assessment
		事業性再検証	Feasibility study assessment
2.4.	ﾌﾟﾛｼﾞｪｸﾄ実施計画 Project mission planning	ﾌﾟﾛｼﾞｪｸﾄ執行形態	Project formation
		基本設計･施工計画	Basic design & Construction plan
		必要予算算定	Estimation & Budgeting
		ﾌﾟﾛｼﾞｪｸﾄ資金調達方式	Financial planning
2.5.	ﾌﾟﾛｼﾞｪｸﾄ調達 Procurement & Contract	ﾌﾟﾛｼﾞｪｸﾄ執行組織形態	Project mission Organization
		契約形態	Contract formation
		入札方式, 査定･契約	Tendering, evaluation & contract
3. Project execution management			
3.1.	P.J.ｱﾄﾞﾐﾆｽﾄﾚｰｼｮﾝ Project administration	安全、治安、総務	Security, External affaires
		税務･会計	Tax & accounting
		ﾌﾟﾛｼﾞｪｸﾄ資源調達	Financial control
		労務･人材育成	Personnel control
3.2.	ﾌﾟﾛｼﾞｪｸﾄﾏﾈｼﾞﾒﾝﾄ Project management	スケジュール管理	Schedule control
		コスト管理	Cost control
		契約管理	Contract administration
		品質ﾏﾈｼﾞﾒﾝﾄ	Quality management
4.Project field management			
4.1.	施工計画 Field work execution plan	本工事	Permanent works
		仮設工事	Temporally facilities
		施工機械計画	Construction equipment
		資材計画	Material
4.2.	施工管理 Field Control	安全管理	Safety control
		品質管理	Quality control
		生産性管理	Productivity improvement
5. Project Operation & Maintenance			
5.1.	ﾌﾟﾛｼﾞｪｸﾄ運営 Project Operation	事業形態, 組織	Operation organization
		資金調達, 資金管理	Financial control
5.2.	ﾌﾟﾛｼﾞｪｸﾄ維持･管理 Project Maintenance	調査･点検	Monitoring & investigation
		維持, 修繕, 更新	Maintenance, Repair & renewal
5.3.	ﾌﾟﾛｼﾞｪｸﾄ評価	社会貢献度	Social impacts

	Project assessment	発生問題分析, 他	Problems Isolation

Kochi University of Technology has applied the above framework to the Construction Management program, and its backbone is the risk management.

6.5. Actual Situation of the education of construction management in Japan

Kochi University of Technology made a research how many universities and colleges in Japan have specialized program of construction management about 209 departments of science and engineering, 6 colleges of civil engineering and 30 technical colleges.

Only 30 university departments employ teacher(s) majoring in the construction management or project management. KUT obtained the syllabus of these 30 departments, which is shown in Annex B.

It has been observed

(1) Civil engineering teachers who lecture on construction management are not so many. Some of them give lectures on part time basis.

(2) Planning & assessment of infrastructure development is taught in 15 universities, but project field management is taught only in 5 universities. This may come from the fact that number of teachers with site experience is limited.

(3) Project Management in the narrow sense (item 3.2 in Table 6-1) is taught in 10 departments, but the full contents of it, i.e. schedule, cost, quality and contract are taught only in 4 departments. Schedule, cost and quality are inter-related each other and these items are in the relation of trade off. How they teach schedule control without teaching quality management and cost control？

From the above, it can be said that Japanese universities who changed the name of Civil Engineering Department have not yet caught up the change of social requirements to explain about the civil works, especially public works, from the planning stage to operating stage how the cost and time were spent to keep the needed quality of the works.

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7. Conclusion

It can be said that the products of the construction industry are basically order made. It varies depending upon the intention of client, conditions of the construction site, climatic, geological and topographical conditions, schedule, design and specifications etc. In this sense, the product of the construction industry is different from other industries product. And the period to deliver the product is defined in the contract. In this sense, production is activities for a definite period. Therefore, to separate from daily operation, such job is called a project. It is normal that a contractor gets a project with the contract by the tender.

On the other hand, a project to construct infrastructure facilities, especially overseas, contains many uncertainties in the stage of the tender. Such uncertain issues should be identified and qualified as much as possible in the stage of tender preparation, because such uncertain issues will be risks for the project to give impact on the cost and schedule of the project. And when some uncertain phenomena appear as reality, prepared response must be taken. Thus, especially in overseas project, risk management is a key factor to complete the project without cost overrun or delay. In this study, the author presented the way to identify and quantify the risk and prepare the contingency in the stage of tender making. He set up the investigation items that are needed for making the tender preparation based on the Author's experience and recommendations given by his advisor and applied those items for identification and quantification of the risks. The author also used investigation items for making the system that can be applied for identification and quantification of the risk management ability of the personnel to be engaged in the overseas construction projects. Based on the analysis of the risk management ability and risk level, a formula to decide the response to the risk was proposed. This process was proposed as the risk management system and its effectiveness was proven. The proposed risk management system will contribute to improve risk management ability and competitiveness by applying it to the corporate strategy through BSC.

In this process, know-how of the organization piled up through the past experience shall be made the best use. Experts from the functional department such as accounting, finance and legal shall be involved. Further, considering that the role of the Project Manager of an overseas project is fatal to the success of the project, a program to educate the Project Manager was proposed. The proposed risk management system indicates the required disciplines for the education. The proposed education program was proven to be effective by the 2 days seminar of OCAJI where 20 candidate of the project manager received the lectures of similar syllabus in October,2005.

Taking this opportunity actual situation of education of project management in Japanese universities and colleges was reviewed. As assignment of the project manager

is a big risk factor for the executing organization, to decrease such risk, education of the project manager shall be well organized. To execute the proposed program, the functional department such as personnel affairs, accounting, financing, legal departments shall be involved as having been proposed. Or depending upon the theme, an expert from outside shall be invited.

Under the situation that the turnover of the overseas construction project of the general contractors is increasing, the proposed risk management and evaluation of risk management ability system and education program of the project manager will contribute to improve the competitiveness of the related firms and to develop the project managers and key personnel of the project.

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Annex A: Risk Investigation and Analysis System

Annex B: Syllabus of Construction Management in Japanese Universities