

Risk Management System and Project Staff Education Program for Overseas Construction Project using the Expert System

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Abstract: The turnover of the Japanese contractors and the consulting firms has kept the same level since 1983, 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. This study aims at building risk management system and developing education program that can be applied to reinforcing the ability, based on the author's experience.

Risk is defined as "uncertain factors which will occur as the project is progressed". And risk management is defined as "Project Risk Management is to convert the uncertain factors occurring as the project is executed to definite factors."

Process of risk management is to identify uncertain factors, qualify them, quantify them and respond to them. The author proposed a list to identify the uncertain factors in the initial stage of a construction project with his experience.

Size of risk is expressed in the following formula;

$RL = PB \times IP$ PB: Probability of occurrence. IP: Size of impact to the project.

Management Ability Level (ML) of a member of the project team is evaluated in the following formula;

$ML = KL \times \sqrt{PE + CE}$

KL: Knowledge of the project. PE: Experience of Projects.

CE: Experience of International Contract such as FIDIC.

Risk Response Ability (RA) of a project member is evaluated as $RA = ML/RL$.

RA of the project team shall lead to a proper selection of the ways to respond to a risk.

To manage the risks properly, the Project Manager and the staff are required to have minimum knowledge of the other disciplines than the civil engineering. To fill various roles required for the Project Manager, the ability of management should be gained through experience and education. The author proposes the education program to meet such requirement.

1. Introduction

The turnover of the Japanese contractors and the consulting firms has never exceeded the level of Yen 1 trillion and Yen 100 billion respectively from 1983 to 2005, 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. This study aims at building risk management system and developing education program that can be applied to reinforcing the ability, based on the author's experience

2. Risk Management System

2.1. Definition

Any business is attended with uncertain factors. Risk is defined as "uncertain factors which will bring the corporate and/or the project opportunities to pursue profit or threats to decrease it." In a project, it will occur as the project is progressed. To realize the objectives of the project, such uncertain factors must be identified and an effective measure to convert them to definite ones must be developed.

Project Risk Management is defined as "the process to convert the uncertain factors occurring as the project progresses to definite factors."

2.2. Process of Risk Management

2.2.1 Risk Identification

It is required to identify characteristic of each objective risk such as probability and magnitude before start to handle the risk. Risks are identified through Qualitative analysis and Quantitative analysis.

2.2.2. 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, low, large or small.

2.2.3. Risk Quantification Analysis

This process is to analyze numerically the probability of each risk and its consequence on the project objective. In a project, the probability to achieve the project objectives is quantified and required cost to respond to the risk is estimated. Size of risk is estimated by following formula;

$$R = PB \times IP$$

R: Size of risk. PB: Probability. IP: Risk Impact.

2.2.4. Risk Response

Risk Response is to develop options and determine actions to enhance opportunities and reduce threats to the organization or project activities. There are 5 options as follows¹⁾;

- (1) Acceptance: This option is to accept consequence of a risk occurrence as it is. The most usual risk acceptance is to establish a contingency allowance or reserve for known-unknown risks.
- (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. It may involve changing conditions so that probability of the risk occurring could be reduced.
- (3) Allocation: Allocation is to allocate the consequence of some specified risks to a third party together with the ownership of the response.
- (4) Transfer: Risk transfer is to hedge the consequence of a risk to a third party together with ownership of the response. This is most effective in dealing with financial risk exposure. Typical example is insurance. Contracts can be used to transfer liability for specified risks to another 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 is to decline to participate in the tender because of too big risk.

2.3. Identification of the Overseas Project Risk

This process consists of identifying all the possible risks that may significantly impact the success of the project. Risk identification should address both internal and external risks. Internal risks are things that the organization can control or influence such as assignment of project manager. External risks are things beyond the control or influence such as market shifts or government action.

2.3.1. 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 2-1 shows a part of the main risk items identified in the stage of preparing for the tender from the viewpoint of the contractor. This table was made based upon the experience of the author.

Table 2-1 Risk items in the stage of tender Preparation

Code No.			Investigation Items
01	00	00	Outline of Project
	10	00	Outline of Project
	40	00	Topography, geology and climatic conditions
	50	00	Site conditions
	60	00	Regulations for construction works
02	00	00	Type, conditions of contract
03	00	00	General situation of country
	30	00	Public security conditions
04	00	00	Transport to the site, import, custom clearance
05	00	00	Taxation, financial and accounting consideration
	40	00	Insurance
06	00	00	Living conditions
07	00	00	Work resources, working conditions
08	00	00	Local contractors
09	00	00	Local procurement of plant and equipment
10	00	00	Local procurement of materials and products

This table is abstract of the main items. The table contains 210 items on the level 2 and more than 1,100 items on the level 3.

2.4. Risk Management

Risk management is to choose the most proper way to respond to a risk event. For that purpose, risk level shall be analyzed by following formula;

$$RL = PB \times IP$$

RL: Risk Level PB: Probability IP: Impact

If Risk Level of an item is high, another way to respond to the risk shall be sought.

The RL will show the required ability of the project manager and the project team. Risk Management Ability will be discussed in section 2.5.2.

2.4.1. Contingency Plan

As a response to accept a risk, contingency plan is developed.

A way to classify risks is to describe uncertainties in terms of following 3 categories²⁾;

- 1) Known
- 2) Known-unknown
- 3) Unknown-unknown

A known is an item or situation containing no uncertainty. A known – unknown is an identifiable uncertainty, but we do not know how it will affect us. Unknown – unknown is an item we do not know if it happens nor the impact if it happens.

Contingency plan is developed for known –

unknown items.

Pro-active and proper approach to set contingency is a careful assessment based on the sum total of the probability and consequences of the various risk items identified.

Depending upon the project size and location, but usually percentage of contingency will be not more than 15% of the project cost. And, contingency will be allocated in following way;

1. Physical Contingency: To prepare for the modification of the conditions.
2. Price (Escalation) Contingency.
3. Special Risk Contingency: In a project to consider a special risk.

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

2.5.1. Required staff of the contractor.

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

- Project Manager, Assistant Project Manager
- Supervisor, Superintendent, General Superintendent
- Technical Engineer, Office Engineer, Cost Controller, Quality Controller
- Purchasing Manager, Plant & Equipment Controller, Accounting Manager
- Personal Section Manager, Public Relation Manager
- Project Execution Div. Manager, Project Control Div. Manager, Administration Div. Manager

2.5.2 Measurement of Basic Ability in the Contractor.

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

Table 2-2 Check items to measure the basic ability

Check Item	Abbreviation	Level	
Knowledge about Task	KL	Very Low	1
		Low	2
		Intermediate	3
		Well	4
		Very Well	5
Experience of the Overseas Projects	PE	New	1
		Less than 2	2
		2 to 5	3
		5 to 10	4
		More than 10	5
Experience & Knowledge of the International construction Contract	CE	New	1
		Less than 2	2
		2 to 5	3
		5 to 10	4
		More than 10	5

Note: 1) KL1: He has basic knowledge to manage

one item of project management.

KL2: He has basic knowledge to manage 3 items of project management.

KL3: He has basic knowledge to manage one section of project management.

KL4: He has basic knowledge to manage 1 department of project management.

KL5: He has basic knowledge to manage the project as a whole.

- 2) Number of project is counted only if he is engaged or directly involved in the management of a project for 6 months or more.

- 3) International construction contract means FIDIC or its equivalent.

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. Considering such conditions, Management ability shall be measured in following formula;

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

2.5.3. Application of Management Level to Risk Management

Management Ability of the project manager or team must be equal to or bigger than the Risk Level. If ML of the project manager on a specific risk item is smaller than its Risk Level, some means such as adding a staff whose ML on the risk item is high enough shall be taken.

2.5.4. Evaluation of Risk Response Ability

Risk Response Ability is evaluated from the evaluation of the management level of personnel. Formula of the evaluation is as follows;

$$\text{RA} = \text{ML}/\text{RL}$$

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

RL, ML and RA can be evaluated utilizing the risk management items prepared for the tender. Taking example of a project manager with KL level 3, PE level 3 and CE level 2, using the actual abstract of the Bill of Quantities of a road project, RA is calculated as per the following table.

Table2-3 Example of Risk Response Ability

Category of works	Risk Level	Management Level			Risk Response Ability
		KL	$\sqrt{\text{PE} + \text{CE}}$	ML	RA

Earth Works	16	3	2.236	6.71	0.419
Road Pavement	6	3	2.236	6.71	1.118
Culverts	6	3	2.236	6.71	1.118
Overpass	12	3	2.236	6.71	0.559

It is observed that the Project Manager is weak in the Earth Works and Overpass. 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 \geq 0.80 Acceptance
- 0.80 > RA \geq 0.65 Mitigation
- 0.65 > RA \geq 0.35 Allocation or Transfer
- 0.35 > RA Avoidance

Mitigation can be made by increasing the number of staff to the project manager.

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

The above figures to select risk response have been proposed based on the author's experience.

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 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.

2.6. Effectiveness of the Risk Management System

Effectiveness of the Risk Management System 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 new road, many underground facilities not included in the drawings were found. 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 Contractor claimed for the delay of the works caused by the insufficient drawings. Assessment of the claim as well as the approval of the design and sub-contract amount was the duty of the project manager of the Engineer. At this stage his Risk Management Ability was evaluated as follows;

Knowledge Level: Generally 4, Underground Facilities 3.

Project Experience (PE): 3

International Construction Contract (CE):3.

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 2-4.

Table2-4 Risk Response Ability to deal with underground facilities

Investigation Items	Risk Level	Person	Management Ability				RA
			KL	PE	CE	ML	
Underground Structures	16	P.M.	4	3	3	10	0.61
	16	Staff	4	4	3	11	0.66
		S.T.				20	1.27
Related to Claims	20	P.M.	4	3	1	8	0.40
	20	Staff	5	5	5	16	0.79
		S.T.				24	1.19

The table shows that to deal with underground facilities, RA of the project manager required mitigation and that to deal with the claims, RA of the project manager requires allocation. Therefore, a facilities engineer was mobilized and a Contract Engineer was employed. By this way, the problems were solved.

2. Change of the Project Manager of the Engineer

In a project to construct a new road under Yen Credit, the Client requested the Engineer's firm to change the Project Manager for the reason that they were afraid that the Project Manager's assessment of the Claims from the Contractor was rather favorable to the Contractor.

To find the successor, the author assessed 2 candidates from the viewpoint of the Project Experience and assessment of claims as the table 2-5 shows.

Table 2-5 Assessment of Candidates for the Project Manager

Investigation Items	Risk Level	Person	Management Ability				RA
			KL	PE	CE	ML	
Related to Claims	12	Existing P.M.	4	3	3	10	0.817
		Candidate A	4	3	2	9	0.745
		Candidate B	4	3	3	10	0.817

As the table shows, RA of candidate A did not reach the level of acceptance. So, candidate B was recommended and was approved by the Client. This fact shows that the Client proved the effectiveness of the proposed risk management system.

3. Change of the Project Manager of the Contractor

In a project to construct a new road on the soft ground, 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 assessed his management ability from his curriculum vitae as follows;

- 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 table 2-6;

Table2-6 Risk Response Ability of the Project Manager

Investigation Items	Risk Level	Person	Management Ability				RA
			KL	PE	CE	ML	
Earth Moving	9	Existing P.M.	3	3	2	6.7	0.75
		Substitute	3	3	3	7.3	0.82

From this table, it was proved that ability of the Project Manager needed some assistant to mitigate the risk. Therefore, the Engineer requested the Contractor to change the Project Manager with acceptable level of ability or to dispatch an engineer experienced in earth moving works. The Contractor dispatched an engineer who 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) R. Max Wideman, Editor: Project & Program Risk Management, pIII-2, PMI, 1992

3. Education Program for the Project Staff

3.1. The Roles of the Project Manager

Every project staff has a possibility to become the project manager after years of experience and education. Therefore, education of project staff should aim that for the Project Manager.

The typical Project Manager may have been successful in a specific discipline. But, Project Manager's works are not limited to those in his discipline. He must fill several roles in the completion of a project.

- (1) Role of 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.

- (2) Role of Communicator: The Project Manager must be a communicator to upper management, to the project team, and to the stakeholders outside the project team.
- (3) 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) 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) Role of an atmosphere builder: He must create a bright atmosphere so that the team members could work together comfortably.

3.2. Requirements for the Project Manager

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

- Personnel (staffing and evaluations)
- Labor Relations
- Law
- Accounting
- Economics and Financing
- Statistics
- Contracting and Procurement
- Organization Theory
- Environment Protection
- Computer Applications

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

- Project evaluation
- Schedule planning
- 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

3.3. Risk Management Items

In the overseas construction project, there are more items to manage from the viewpoint of the risk than those in the domestic project. Risk Management Items are figured out compared with domestic project as follows:

Items of Risk Management	Overseas Project	Domestic Project
Preparation of Tender		
a) Bid Bond	○	X
b) Assign P.M. & Key staff	○	△ P.M. can be changed by the Employer.
c) Cost Estimation - Mobilization plan - Procurement plan - Site Conditions - 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 - Procurement - Transport - Temporary Works - Construction Method - Local Climate, weather	○	X Source of procurement, mobilization and climate are well known.
e) Quality - Availability of materials - Availability of local engineers/labor	○	X There is enough data of sources.
Contract		
a) Performance Bond	Conditions for effectiveness of contract.	X Guarantee system
b) Insurance	Sometimes condition for effectiveness of contract.	X
Execution of the Works		
a) Communication	Starts with submission of program	X Program does not bind party.
b) Import of Equipment &	○	X

Materials - Transport of goods - Foreign Exchange		
c) Price Fluctuation	○	△ In case construction period exceeds 12 months.
d) Security - Burglars - Riot	○	X
e) Site conditions	○	○
f) Contractual Risks - Procurement of local goods and labor - Sub-contracting	○	X
g) Payment in local currency	○ delay of payment	X
h) Climate and weather - rainy season - winter	○ Start of rainy season or winter often changes by year.	X
i) Team Development	○ Any key staff can be rejected by the Engineer.	△ The Employer can request for correction of the improper performance of the staff or labor.
j) Natural Disasters	○	○
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	○ Delay will cost banking charges.	X

Figure 3-1 Difference of Risk Management Items

As above, once a person experiences an overseas project, he can learn about many items on the job.

3.4. Education Program of the Project Manager

3.4.1 Proposition

As having been stated, the role of the project manager covers wide range and requirements are so many. The author proposes the educational program for the project manager and staff who have been just transferred to the overseas project.

3.4.2 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.
- (2) Items to educate the Project Manager and staff are proposed hereunder taking into consideration of the items of risk management.

Table 3-1 Education Items

Education Items	Descriptions
Project Evaluation 1) Reading statistics 2) DCF method, FIRR and EIRR	Analyzing statistics and applying DCF method are key points of the project evaluation.
Scope Management 1) To develop WBS 2) Accounting code of the organization.	The lowest level of WBS should be in accordance with the accounting code of the organization.
Scheduling 1) Gantt Chart, Arrow Diagram, PERT/CPM 2) Software of Schedule Control	To control schedule along with the Critical Path, learning Arrow Diagram Network is necessary.
Cost Estimate and Control 1) Resource histogram 2) Principles of accounting and cost control of the organization. 3) Earned Value analysis	Cost control should keep to the rule of the Organization. Earned Value Analysis is one of the most effective ways of reporting the progress.
Quality Management 1) ISO9000 2) Policy of the organization 3) Tools such as Control chart, Cause-and-effect diagram	The project manager should understand that ISO9000 requires commitment of the top management to the quality control.
Human Resource Development 1) Policy of the organization 2) Performance appraisal system of the organization. 3) Motivation Theory such as Mc Gregor's Theory X and Theory Y.	1) The project manager is responsible for the team building and development. 2) Motivation theory will be effective for the team development.

Communications Management 1) Listening skills 2) How to write to the stakeholders. 3) Theory of conflict management	The managers receive little training of listening, which requires understanding, analyzing and decision. Thus, training how to listen is required for the managers.
Risk Management 1) Principles of financial management. 2) General guidance of insurance.	1) The project manager should know at least how to make cash flow and forward contract of foreign exchange. 2) The general managers should have general knowledge of insurance.
Procurement Management 1) Evaluation criteria of the organization to evaluate supplier and sub-contractor. 2) Payment and Surety bonds system of the organization. 3) General guide on export and import.	1) Minimum knowledge to analyze B/S and P/L statement is required. 3) General knowledge of export and import is required for cost estimate and sub-contract.
Contract Administration 1) Type of contract, e.g. lump sum, unit price etc. 2) General provisions of contract, including FIDIC. 3) How to claim.	1) The project manager should know advantage/disadvantage of types of contract to make sub-contract or purchase. 2) Contract administration falls in responsibility of the project manager. FIDIC is prevailing contract in the overseas market. 3) Claim is a most important role of the project manager.
Moral	Code of conduct or ethics shall be reminded to avoid any corruption.

Notes:

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

EIRR: Economic Internal Rate of Return. IRR is such an interest rate as shall make a 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.

Mc Gregor's Theory X, Theory Y: Theory X is that human nature is supposed to dislike their work and tries to avoid it, and that managers based on this assumption tend to control strictly and severely. The 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 subordinates¹⁾.

(3) Texts and Program

Text books and program are proposed in table 3-2. Text books available in English have been specified. Text books providing basic knowledge shall be selected in each country.

Table 3-2 Texts and program

Education Items	Texts	Duration
Project Evaluation	Guidelines for Project Evaluation, by United Nations Industrial Development Organization.	2 days
Scope Management	1) A guide to the Project Management Body of Knowledge (PMBOK) by Project Management Institute (PMI). 2) Accounting code	1) half day 2) half day by accounting dept.
Scheduling	1) PMBOK 2) Text book on PERT/CPM	One day in total
Cost Estimate and Control	1) PMBOK 2) Company's rule of accounting	One day
Quality Management	1) ISO9000s 2) Text book on quality control 3) Policy of Organization	One day
Human Resource	1) Company's system of	One day

Development	performance appraisal 2) Human Resource Skills for the Project Manager, by Vijay K. Verma, PMI 3) Text book on team management	
Communications Management	1) PMBOK 2) Human Resource Skills for the Project Manager, by Vijay K. Verma, PMI 3) Principles of Project Management, John R. Adams, PMI	1) Regarding Listening and writing, a special lecturer shall be invited for one day practice each. Other lectures in one day.
Risk Management	1) PMBOK 2) Text book on risk management. 3) Company's principles of financial Management 4) Company's policy of insurance.	2 days
Procurement Management	1) Company's policy. 2) Text book on analyzing financial statement.	One day
Contract Administration	1) PMBOK 2) FIDIC	1) Guidance on FIDIC will take one day. 2) How to claim shall be lectured by an expert at least a

		day.
Moral	1) Code of ethics of the company. 2) The OECD Convention Against Bribery of Foreign Public Officials in International Business Transactions.	Half day

Texts have been selected to give a minimum concept of the management. 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.

Important thing is that expertise, know-how and experts inside the organization should be made best use for education of the overseas project staff.

3.5. 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) 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. CPC registered

with PMI as the Education Service Provider to educate its 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. The author gave following lectures so that 6 participants could understand the overseas projects;

- (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.

A member with a short experience of overseas project passed the exam in second try. The another with no experience of overseas project passed the exam in his third try.

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

