Japanese General Contractors' Perspective about Overseas Expansion of Infrastructure Projects

Yasuyuki WATANABE[1], Kiichiro HATOYAMA[2], Kazushi SANO[3] and Yoko MATSUDA[4]

[1]Master student, Dept. of Civil and Environmental Eng. Nagaoka University of Technology
(1603-1, Kamitomiokamachi, Nagaoka-shi, Niigata, 940-2188, Japan)
E-mail: s141106@stn.nagaokaut.ac.jp
[2]Member of JSCE, Specially Appointed Associate Professor for Academia-Industry Fusion, Top Runner Incubation Center for Academia-Industry Fusion (TRI), Nagaoka University of Technology
(1603-1, Kamitomiokamachi, Nagaoka-shi, Niigata, 940-2188, Japan)
E-mail: kii@vos.nagaokaut.ac.jp
[3]Member of JSCE, Professor, Dept. of Civil and Environmental Eng. Nagaoka University of Technology
(1603-1, Kamitomiokamachi, Nagaoka-shi, Niigata, 940-2188, Japan)
E-mail:sano@nagaokaut.ac.jp
[4]Member of JSCE, Associate Professor, Dept. of Civil and Environmental Eng. Nagaoka University of Technology
(1603-1, Kamitomiokamachi, Nagaoka-shi, Niigata, 940-2188, Japan)
E-mail: ymatsuda@vos.nagaokaut.ac.jp

Japan has been contributing to overseas construction projects for more than 60 years and there are a huge number of construction results in various infrastructure. Recently, The Government of Japan is actively trying to work on overseas expansion high-quality infrastructure construction, which is one of the important policies. On the other hand, it has been pointed out that there is a tough situation for companies to forcibly promote overseas construction. In this study we aim to suggest strategies and measurements that The Government of Japan should take to support the companies. We conducted an interview survey for Japanese general contractors and a construction consultant to understand their perspective about overseas infrastructure projects. As a result, we found that some firms expect a stable domestic construction market and some others think that demand for infrastructure development in developing countries increases significantly in the future. They pointed out that there are major problems in finding a new target country, continuous management in the target country, in collecting funds from the client countries and in training human resources who can manage overseas projects. As future tasks, questionnaire survey to understand companies' opinion distribution and comparison with other countries' strategies are necessary.

Key Words : *Infrastructure Construction, ODA, Overseas Expansion, Japan's Perspective*

1. INTRODUCTION

In October 1954, Japan acceded to the "Colombo Plan" which was an international organization for assisting developing countries. With the conclusion of the "Japan-Burma Peace Treaty and Agreement on Reparations and Economic Cooperation" in November of the same year, post-war compensation projects were started in Asia-Pacific countries. Thus, the history of Japan's official development assistance (ODA) projects began. Since then, many overseas infrastructure construction projects have been conducted.

In recent years, as shown in **Fig.1**, it can be seen that the number of overseas construction contracts (OCC) by Japanese general contractors were increasing except during periods of global economic crisis such as the Asian currency crisis and the Lehman shock.

The Government of Japan has set an economic strategy[1)] to increase new annual contracts in the construction industry to over two trillion yen by 2020 by capturing the huge demand for infrastructure construction around the world. The Government of Japan hopes to promote the overseas expansion of infrastructure construction projects.

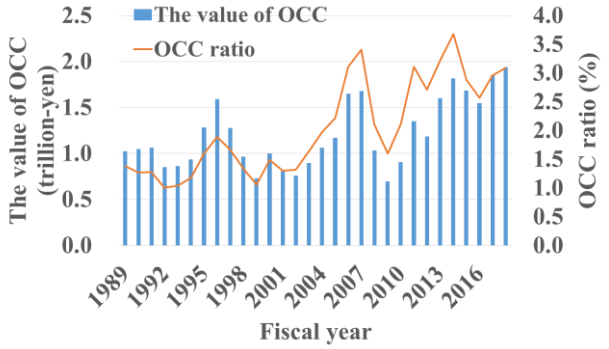

Fig.1 Change in overseas construction contracts of Japan (from FY1989 to FY2018) [2)]

Table 1 Top global contractors [3)]

RANK	FIRM	COUNTRY
1	CHINA STATE CONSTRUCTION ENGINEERING CORP. LTD.	China
2	CHINA RAILWAY GROUP LTD.	China
3	CHINA RAILWAY CONSTRUCTION CORP. LTD.	China
4	CHINA COMMUNICATIONS CONSTRUCTION GROUP LTD.	China
5	POWER CONSTRUCTION CORP. OF CHINA	China
6	VINCI	France
7	ACS, ACTIVIDADES DE CONSTRUCCION Y SERVICIOS SA	Spain
8	CHINA METALLURGICAL GROUP CORP.	China
9	SHANGHAI CONSTRUCTION GROUP CO. LTD.	China
10	BOUYGUES	France
15	OBAYASHI CORP.	Japan
19	KAJIMA CORP.	Japan
25	TAISEI CORP.	Japan
26	SHIMIZU CORP.	Japan

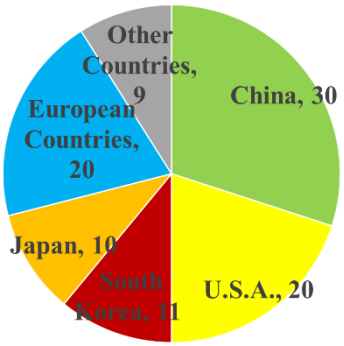

Fig.2 Composition of the top 100 global contractors [3)]

On the other hand, according to "2019 Top 250 Global Contractors"[3)] published by the Engineer News Record, Chinese and Western firms occupy the top of the total sales ranking of general contractors as shown in **Table 1** and **Fig.2**. It can be inferred that Japanese general contractors are in a severe situation in intensive international competition. Based on this situation, it would be cases where the efforts of each company cannot deal separately.

Therefore, this study aims to analyze the construction market and to grasp issues that companies have in overseas expansion of infrastructure constructions so as to suggest measurements that the Government of Japan should take to support the companies.

2. PRESENT SITUATION OF CONSTRUCTION INDUSTRY IN JAPAN

(1) Analysis of the Domestic Construction Market

To consider the overseas expansion of the construction projects, we have first analyzed the construction market.

In analyzing the domestic construction market, we assumed that changes in construction investment were related to economic fluctuations.

As a result of regression analysis with domestic construction investment using GDP deflator (1a) representing price index as an indicator of the economy, it confirmed that there was a correlation between these values. It was also found that the strongest correlation between construction investment and GDP deflator was two years after the investment, as shown in **Table 2**. The values up to FY2015 were fixed, and the values FY2016 and 2017 were estimated.

As shown in **Fig.3** and **Table 2**, construction investment precedes the price index. It can be inferred that there is a high possibility for continuous existence of a stable construction market in Japan as long as the government is trying to achieve economic growth. While there is a high possibility that the domestic construction market is performing well, it might be worthwhile to investigate whether there are positive incentives for general contractors to expand overseas construction projects, or not.

$$GDP_{deflator} = \frac{GDP_{Nominal}}{GDP_{Real}} \times 100 \qquad (1a)$$

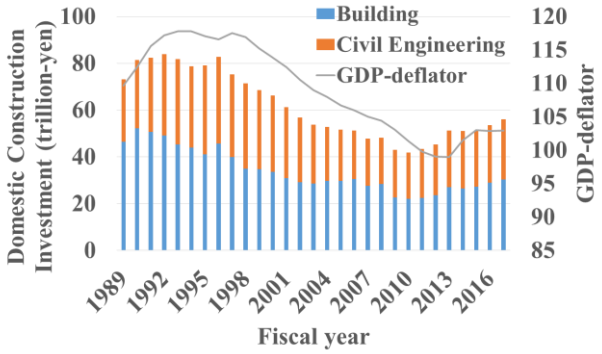

Fig.3 Change in domestic construction investment and GDP-deflator (from FY1989 to FY 2017) [4), 5)]

Table 2 Correlation between domestic construction investment and GDP-deflator

	-1 year	Base year	+1 year	+2 year	+3 year
Correlation coefficient	0.625	0.787	0.934	0.969	0.906

(2) Japan's ODA Activities

In order to understand overseas construction projects, we focused on ODA projects, which are the mainstay of Japan's overseas infrastructure construction projects. Japan's ODA gross disbursements in 2016 has a large share of 10.7% within the member countries of Development Assistance Committee (DAC), Organization for Economic Cooperation and Development (OECD)[5].

However, as shown in **Fig.4**, Japan has dropped its rankings by two within a decade from 2007 to 2016. Thus, keeping the presence in the international community is a vast challenge for Japan.

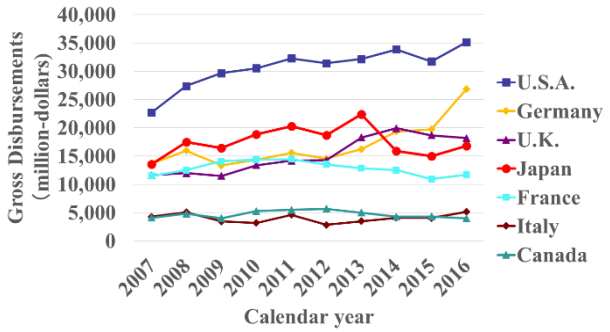

Fig.4 Trends in the ODA of major DAC countries (from 2007 to 2016) [6]

We checked Japan International Cooperation Agency (JICA) project reports that lists every ODA projects and tried to understand the issues in conducting overseas projects, such as; delays in construction period or causes for increased construction costs. However, this report mainly mentions the upstream side which JICA was involved, and it is not possible to find what the issues are for general contractors, or how they can conduct overseas construction projects smoothly. Therefore, it is necessary to directly ask general contractors about the actual situation of overseas projects.

(3) Current Status of Overseas Expansion

We investigated and analyzed about the countries and regions where Japanese general contractors have business expansions. **Table 3** shows the status of the member companies of Overseas Construction Association of Japan, Inc. (OCAJI) that are expanding overseas.

Cluster analysis was conducted on the 44 firms which were expanding overseas, using the data on GDP of contracting country, the distance from Japan to the expanding country and the number of contracting countries by region. In order to get the value of the average distance to the contracting country, the average distance to each company's contracting country was calculated as follows ((2a) and (2b)).

$$\bar{d} = \frac{\sum_{k=1}^{n} d_k}{n} \quad (2a)$$

$$d_k = r * cos^{-1}\{sin\, y_0 * sin\, y + cos\, y_0 * cos\, y * cos(x - x_0)\} \quad (2b)$$

$\bar{d}$: Average distance between Capitals (km/firm)
n: Number of countries the objective firm is contracting
d_k: Distance between Capitals (km)
r: Equatorial radius (6371 km)
x: Longitude of the target country's capital (radian)
y: Latitude of the target country's capital (radian)
x_0: Longitude of Tokyo (radian)
y_0: Latitude of Tokyo (radian)

As a result, we confirmed three clusters as shown in **Table 4**. Hereinafter, each cluster is called "GC-1, GC-2, and GC-3".

Table 3 Current status of overseas expansion of Japanese general contractors [7]

Region	Number of Countries	Number of General Contractors
Asia	27	44
Middle East / North Africa	10	16
Sub-Saharan Africa	22	19
North America	2	9
Central / South America	18	8
West Europe	7	7
East Europe	6	5
Oceania	11	16
Total	103	44

Table 4 Cluster analysis results for general contractors

		GC-1	GC-2	GC-3
Number of Firms		8	30	6
Average Number of Contracting Countries by Region	Asia	7.9	6.0	4.8
	Middle East / North Africa	1.0	0.4	0.8
	Sub-Saharan Africa	0.4	0.4	4.8
	North America	1.1	0.0	0.3
	Central / South America	0.3	0.1	4.5
	West Europe	1.9	0.0	0.0
	East Europe	1.1	0.0	0.2
	Oceania	0.6	0.4	1.5
Average Distance (km)		6616.4	5213.5	9821.1
Standard Deviation of Average Distance (km)		2872.4	1953.3	4076.2
Average GDP[8] (US billion-dollars)		3408.1	638.3	249.6
Standard Deviation of Average GDP[8] (US billion-dollars)		5652.9	973.7	748.6

Summarized in a) to c) are the characteristics that considered to be of the overseas expansion of general contractors classified into each cluster. In addition, examples of overseas expansion by contractors that have been classified as GC-1 to GC-3 are shown in **Fig.5** to **Fig.7**, respectively.

a) GC-1

Business expansion mainly in Europe and countries with higher GDP

b) GC-2

Business expansion mainly in countries close distance to Japan and countries with lower GDP

c) GC-3

Business expansion mainly in countries far from Japan and countries with lower GDP

Fig.5 An example of overseas expansion by a company in GC-1

Fig.6 An example of overseas expansion by a company in GC-2

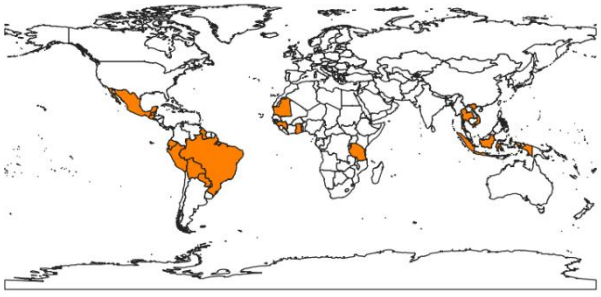

Fig.7 An example of overseas expansion by a company in GC-3

As a result of checking the characteristics of the companies classified into each cluster in detail, it was found that there were differences in the area of expansion depending on the business scale and specialty field of each company. For instance, major general contractors were classified as GC-1.

The status of overseas expansion investigated in this section was used as a reference for selecting target companies in interview surveys.

3. INTERVIEW SURVEY

The outline of the interview survey conducted with general contractors and a development consulting firm. The results are shown below. Comments from general contractors classified in each cluster are marked as [GC-1], [GC-2] and [GC-3], and comments from a development consultant company are marked as [DC].

In this interview survey, since we mainly asked the opinions of companies, some respondents' personal opinions are also included.

Table 5 Outline of the Interview Survey

Target	General contractors (9 firms) Development consulting firm (1 firm)
Period	January, February and June 2019
Contents	(1) Current status and future trends in the construction market (2) Significance and reason for overseas expansion (3) Issues in conducting overseas construction (4) Opinions on the overseas expansion strategy set by the Government of Japan

(1) Current status and perspective in the construction market

a) Domestic construction project

- A stable construction market can be expected for a while after the Tokyo Olympics. [GC-2]
- They expect that the market size will gradually decrease over time. [GC-2]
- The construction market is strongly influenced by domestic economy and political strategy. [GC-2, GC-3]
- In the case of civil engineering work, there is a limit to conduct the projects because the tax to invest is limited. [DC]

b) Overseas construction project

- Overseas expansion is also necessary from the standpoint by general contractor. [GC-2, GC-3]
- Demand for infrastructure development in developing countries is expected to increase significantly in the future. [GC-2]
- Expand overseas mainly in countries with construction experience so far. [GC-2, GC-3]

- Because domestic construction is performing well, they cannot afford to allocate a lot of human resources to overseas projects. [GC-2]
- In the future overseas expansion, we expect that not all companies will expand to the same direction, but segregation will proceed. [GC-1]

c) ODA project

- We want to perform ODA projects actively because there is merit that can reduce the risk of overseas projects. [GC-2]
- ODA projects can be used as a key to finding a new target country. [GC-2]
- We would like to increase the number of contracts in business forms other than ODA in order to break through the current situation of depending on ODA. [GC-1, GC-2, GC-3]

(2) Significance and reasons for overseas expansion

- The demand for infrastructure construction is much higher than that of Japan, and we can show the growth of company by capturing overseas construction demand. [GC-2]
- Take a strategy of reimporting new technologies that have been tried overseas to Japan. [GC-2]
- To respond to requests from local governments and companies. [GC-2]
- Some general contractors may have situations where they have to perform overseas projects for various reasons. [GC-2, DC]

(3) Issues in conducting overseas construction

- Finding a new target country [GC-1, GC-2, GC-3]
- Stable and continuous management in the target country [GC-2]
- Troubles when collecting funds from the clients [GC-2]
- Treatment against ambiguous contract matters [GC-2, GC-3]
- Securing and training human resources who can manage overseas projects [GC-2, GC-3]

(4) Opinions on overseas expansion strategies set forth by the Government of Japan

- The response by the Government of Japan has improved in recent years, and we think they are making efforts in various ways [GC-2, DC]
- Negotiation at the national level is more important at the time of collecting funds than at the time of project formation.[GC-2]
- Getting know-how for performing overseas projects or matching with companies that can be partners in the target country are not provided by the government but are made effort by each company. [GC-1]
- They don't want the Government to order the same kind of construction project at the same time. [GC-3]
- They want JICA to improve the estimated amount of grants. [DC]

4. CONCLUSION AND FUTURE TASKS

In this study, we first briefly analyzed the situation of Japanese construction industry and found that there are three categories of general contractors that expand their business overseas: firms targeting Europe and high-income countries, firms targeting low-income countries with close distance, and firms targeting also low-income countries far from Japan.

Secondly, we conducted an interview survey to grasp issues that companies have in overseas expansion of infrastructure constructions. As a result, we found that some firms expect a stable domestic construction market and have difficulty in human resource allocation to overseas projects. On the other hand, some other firms think that demand for infrastructure development in developing countries increases significantly in the future and use the opportunity effectively to reimport their new technologies from overseas to Japan. Furthermore, there are some problems in finding a new target country, stable and continuous management in the target country, in collecting funds from the client countries and in concluding ambiguous contract and in training human resources who can manage overseas projects.

There was an opinion that the support of the government of Japan is getting better in recent years. However, it cannot be said that the government has fully reflected the opinions of companies, so that appropriate support by the government is still expected for expansion of overseas construction.

Regarding the contents of the interview survey conducted in Chapter 3, it is also important to ask opinions from more contractors and investigate trends in the industry as a whole. Therefore, we set three future tasks as follows.

a) Questionnaire Survey

The purpose is to confirm the distribution of opinions regarding overseas construction projects and to understand the differences in trends depending on the scale of business or field of expertise of each contractors.

b) Interview Survey

Conduct the interview survey with The Government of Japan to compare perspectives about the overseas expansion of infrastructure construction projects by both contractors and the government.

c) Comparison with Other Countries

Compare with competing countries' overseas expansion strategies, and consider what measures the government of Japan should take in the future.

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