

A STUDY OF EFFECTIVE UTILIZATION OF INFORMATION ON FOREIGN CONSTRUCTION MATERIALS

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ABSTRACT

The construction cost consists of labor fee, materials cost and machinery cost. In these three items, construction materials cost has a share of nearly 45% in Japan. So it is often said “reducing the all expenses of construction cost should be done by cutting down the cost of the materials.”

According to our researches it is clear that not so much foreign construction materials are used in Japan, and there is little information on foreign construction materials. So we studied what kind of foreign construction materials information should be requested in construction industries. And then we proposed to make a new website on foreign construction materials to improve these conditions.

We have studied to make basic website for foreign construction materials it will be used not only for Japan but also East Asia countries. Such a useful website & database will help Japanese companies to increase the imports of foreign construction materials. And also the website will be applied to overseas, not only East Asia countries but also to the world.

KEY WORDS

foreign construction materials. technical standards. website. information. construction cost.

1 INTRODUCTION

This study provides the ideal way of “Information System to Use Foreign Construction Materials effectively”. It searches the measures and actual condition of using the Foreign Construction Materials (FCMs) effectively, the causes why the FCMs are not used positively and the countermeasures for them and also, describes the desirable methods of supplying information relating to those. Finally, this study proposes the mutually effective method of using information on the FCMs in the world.

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1.1 ADVANTAGE OF USING THE FCMS IN JAPAN

It was pointed out that the construction cost of Japan was higher than it in USA at the official discussion US-Japan construction problems in 1993. The construction cost consists of labor fee, materials cost and machinery cost. The cost of construction materials included in the construction cost in Japan amounts to a little over 45% of total construction work cost. In order to reduce the construction cost, it needs to decrease the cost of construction materials as the first condition. There are some low-cost and high-quality FCMS, and if these materials will be distributed without any trouble in Japan, it may support the reduction of construction cost in Japan.

1.2 MEASURES OF USING THE FCMS EFFECTIVELY

In Japan, the reduction of construction cost in the public work is proceeded as a domestic and basic policy, so that a variety of plans have been carried out since 1994. The contents of them are introduced in brief as follows:

(1) In December of 1994, “Practical Plan for Reduction of Construction Cost in Public Work” was presented at the Cabinet council. This plan included the positive use of FCMS as one of measures.

(2) In April of 1997, “Practical Policy for Countermeasures to Reduce Public Work Cost” was determined at the Cabinet council, and as the concrete measures, it reviewed the promotion of applying the FCMS and the standardization or uniformity of terms and specifications.

There is the “Foreign Construction Materials Quality Examination and Certification (FMQC) ” system as a part of all systems. This system is explained below in brief.

In Japan, “Industrial Standardization Law” specifies that the construction materials to be supplied by the Japanese Government and local self-governing organizations should observe the Japanese Industrial Standards (JIS). As for the buildings, “Building Standards Law” specifies that the materials to be used should be applicable to the JIS and the Japanese Agricultural Standards (JAS). The Japanese Government recommends the application of “FMQC” system in consideration of difficulty that is supposed when the FCMS directly satisfy the JIS and others. In addition, the Japanese Government gives facility so that the FCMS that passed the “FMQC” system will be used frequently in the domestic construction work.

(3) The execution of model work using the FCMS and the measures of supplying information on the FCMS were fully conducted on the basis of “New Practical Policy for Countermeasures to Reduce Public Work Cost” settled in September of 2000.

There are the contact points to obtain information on the housing materials given by The Japan External Trade Organization (JETRO) and information on the foreign civil engineering materials by Japan Construction Information Center (JACIC) on the detailed websites, which can be viewed through the Internet work system, to provide information on the FCMS.

(4) According to “Public Work Cost and Reconstruction Programs” settled in September of 2003, The Tohoku and Hokuriku Regional Bureaus, Ministry of Land, Infrastructure and Transport (MLIT), make a practical application of FCMS at present.

1.3 ACTUAL CONDITION OF USING THE FCMS

A few FCMS are applied actually regardless of many measures to use them effectively. Thus, we investigated the change of import quantity of general iron and steel, cement and ballast as the main materials by reference to the statistical data in some past years.

(1) General iron and steel.

The iron and steel of approx. 10,000,000 tons were imported until around 1995 when the Japanese economics was maintained active, but after that, the sluggishness of Japanese economics made the import quantity decrease and the export quantity increase, respectively. Since the average production of iron, steel and crude steel in Japan is some 100,000,000 tons, the activated Japanese economics will tend to reduce the export quantity and boost the import quantity basically. In the case of production of crude steel, the highest export and import quantity are 32.9% in 2002 and 10.9% in 1995, respectively.

(2) Cement.

In the Japanese cement market, the decrease of construction investment from 1994 brought also the decrease of cement production that was reduced by about 25% in 2003. The import quantity was also decreased after 2000 with the quantity peak of 1,300,000 tons. The occupancy rate of foreign cement is about 1.0% in the Japanese cement market.

(3) Ballast.

The domestic production of ballast was about 700,000,000 tons in 2002, which was reduced by 17% from 1994. The import ratio is extremely low: 0.03% - 0.04%.

As abovementioned, the import ratio of main materials is low.

2. CAUSES WHY THE FCMS ARE NOT USED POSITIVELY AND THE COUNTERMEASURES FOR THEM

The Japanese Government makes many measures to promote positively the effective use of FCMS, but there are a few materials being used effectively even other than the main materials. Hereby, we will examine the causes and countermeasures.

2.1 PROBLEMS OF THE FMQC SYSTEM IN QUALITY REQUIRED FOR THE CONSTRUCTION MATERIALS TO BE USED IN JAPAN

The Japanese Government recommends that the foreign materials maker adopts the FMQC system instead of the examination of the JIS and others. We confirmed the actual condition of the FMQC acquired by the makers(2003).

(a). Only 18 FCMS in civil engineering field have the FMQC. Among them, the authorized 5 materials include the normal Portland cement.

(b). The FCMS in harbor engineering work authorized are also very few in number: 4.

(c). The FMQC for building and facility materials is 63. The number of building materials in the construction work field, including the facility materials, is 63 beyond that in the civil engineering field. It shows feature that especially, there are many facility materials containing a lot of products manufactured by the Japanese companies in their overseas plants.

2.2 RESULT OF SEARCH FOR PROPRIETY OF THE “FMQC” SYSTEM

As for “FMQC” system, we conducted the questionnaire on 30 companies with “FMQC” and then, received the answers from half the number of companies.

As a result, the majority of them had the same opinion that this system was considered to be inconvenient for them.

The opinions expressed as the reasons are described in order:

- (a). An inspection and test agency is specified in the inconvenient method.
- (b). The valid period of FMQC was 1 year before 1996 and has been set to 3 years since 1996, but it is extremely short.
- (c). The quality examination cost has been reduced since 1996. Even so, we desire to make the cost lower.

2.3 OPINIONS OF OVERSEAS TRADING COMPANIES AND MAKERS ON FCMs

We asked questionnaires to the overseas trading companies and makers on what serious obstacle they have when supplying the FCMs into the Japanese market. As a result, their answers were ranked as follows:

- (a). There are many Japanese persons who have no recognition of the FCMs because the designers and clients have not used those.
- (b). In order to ask the Japanese customers to use the FCMs, the overseas trading companies and makers have to obtain the JIS or the FMQC before using those in Japan.
- (c). There is a difference in the business custom that the very sensitive marketing services are required as the Japanese business custom with which the overseas trading companies and makers are not familiar.
- (d). There is a demerit that a large quantity of materials cannot be brought into the construction site at a time.
- (e). Price competition power
- (f). There is a great trade barrier that the Japanese users have the business custom to give the superiority of existing domestic construction materials over the foreign ones.

It was pointed out that the Japanese customers have no recognition of the FCMs as abovementioned and in other words, their ignorance of those is a great trade barrier.

2.4 PROBLEMS OF INFORMATION DISCLOSURE

We searched the condition of information disclosure by reference to the indication that the Japanese customers have no recognition of the FCMs.

The media of showing the effective use of FCMs as of 2004 were the total 2 types: the websites through Internet work system and the magazines.

(1) Websites

- (a). Available websites “FCOM” and “Construction NAVI”

The Japan Construction Information Center (JACIC) has set up the Contact Point for Foreign Construction Materials (“FCOM”) since 1995. “FCOM” was established to cope vitally and positively with any advice and supply of information on the FCMs from the beginning.

The main objectives of “FCOM” activities are to provide up-to-date information relating to FCMs and to promote the more use of FCMs. The website provides the individual information on the FCMs for seller and buyer, but they hardly refer to it.

On the contrary, “Construction NAVI” is the website managed by the Construction Research Institute. This website is often used since it supplies the price of construction materials announced by the information disclosure agency. Among them, information on the FCMS that are limited to the import materials is displayed on the website and it can be also searched by the item of construction materials. This section of website is little used because the short time passed after it was disclosed in May of 2004.

(b). Websites of information on the housing materials

Information on the housing materials was given by the import housing materials center of JETRO, but it was abolished in October of 2005. In addition, the Customs Association established the International Building Materials Information Contact Point (IBIC) in 1995, but it does not provide information at present.

In the nongovernmental field, however, the information disclosure agency such as “dbNET” prepared by the Watanabe Research Room of Waseda University and other many import-housing distributors open their independent websites. In addition to such an action of many nongovernmental information disclosures, the import housing distributors complete their websites since the public information of company will directly affect the actual results of sales.

The information disclosure for sales of housing materials and building materials in such a nongovernmental field makes up the society of competition, so that the amount of information to be supplied is also becoming larger.

(2) Magazines

There are main two magazines for the construction materials, which are published in Japan. One of them is “Construction Price” and also, “Import Materials Handbook” has been published every other year since 1995.

The other magazine “Integrating Material” does not describe especially the FCMS.

2.5 WHAT IS AN IMPORTANT COUNTERMEASURE TO USE THE FCMS MUCH MORE IN JAPAN?

As various problems are described above, the first serious problem can be said that the FCMS are not used actually and then, these materials are not used since the customers have hesitation in using them with no information provided. The second problem is that the FCMS are not recognized to be equal to the domestic ones from the JIS, or the FMQC cannot be authorized.

In order to conquer such a condition to increase the application of FCMS, it is first expected that we should issue much information. Next, it is expected as an important matter that we should compare the JIS with the other relating counties’ technical standard and then, set the normal technical standard in future.

From the abovementioned viewpoint, we conducted a study of how to disclose information.

3. DESIRABLE METHOD OF DISCLOSING INFORMATION

We describe the desirable method of disclosing information to supply actively information on the FCMS in Japan.

3.1 ESTABLISHMENT OF A NEW INFORMATION SUPPLYING AGENCY

It is easily presumed from the actual results of searching the websites that if not only “FCOM” based on the public work cost improvement program and “Construction NAVI” to provide information on the price of construction materials but also the Economic Investigation Committee’s “Construction PLAZA” that is not open to the public at present supply information more positively in competition, it will be a countermeasure for activation. If possible, it is desired to allow the nongovernmental competitor to enter as a provider of information.

From the results of searching the websites, it is found that (a) information on FMQC (b) instruction manual for FCMs and (c) industrial standards are needed to open. In addition, it seems that (d) protection of environment, (e) quality and (f) normal standards are desirable to supply as information according to the opinions of neighboring countries, China and Korea, at hearing.

The website was planned as a medium to supply a variety of information abovementioned.

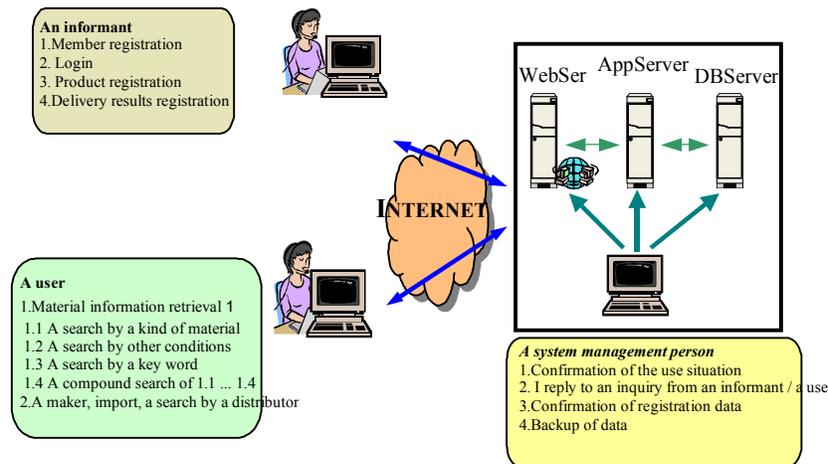


Figure 1: Construction of Website

(1) Study of information collecting and supplying method

In order to collect and use data, it is important to enter data into which media. The interesting data is displayed on the successful website. It is important that the latest information is added daily to the website and the existing information is correct. And also, the website must be visited by many persons.

The simple mechanism to collect and supply information is shown in *Figure 1*.

The information disclosure on the general website as shown and the electronic business using the database can be carried out at the same time.

The website taken up in this study is limited to the opened website shown at *Figure 1*. This opened website consists of the registration screen, database search screen and search result screen.

Table 1 Structure of overseas construction material database

XML Tag	Explanation of an item	A use code and an input method
Supplier		
SupplierCode	A code of an offering supplier	A code, an automatic departure from pair
SupplierClass	Classification of an offering supplier	A supplier class code, choice
Language	A use language	A language code, choice
SupplierAddress		(1)
Name	A name of an offering supplier	A name, the native language input
Explanation	Explanation of an offering supplier	A name, the native language input
LocationCountry	Location country of an offering supplier	A country code, choice
Address	An address of an offering supplier	A name, the native language input
DepartmentName	Department name of the person in charge	A name, the native language input
Charge	A person in charge name	A name, the native language input
Tel	A phone number	Number or -, input
Fax	A FAX number	Number or -, input
MailAddress	An email address of the person in charge	Alphanumeric character or @, input
UserName	An offering person input user name	Alphanumeric character
RegistrationDay	Registration day	The date
Maker		
Address	An address	(with 1) the same item
Factory		
Name	A name of a production factory	A name, the native language input
Address	An address of a production factory	A name, the native language input
Importer		
ImporterAddress	An address	(with 1) the same item
Distributor		
DistributorAddress	An address	(with 1) the same item
DeliveryResults		
ConstructionName	A name of construction	A name, the native language input
ExecutionName	A name of the chief mourner	A name, the native language input
Execution P eriod	An execution period	Start end time, choice
Product		
MaterialCode	A material code	Material code for construction
Specifications	Specifications	Material code for construction
Name	A product name	A name, the native language input
ProductExplanation	Product explanation	A name, the native language input
ProcessingRange	Range of processing in a factory	A code, choice
AmountUnit	A unit of amount	A code, choice
LoadFigure	A kind of a load figure	A code, choice
AppointedDate	A kind of the appointed date of delivery	A code, choice
UnitPrice	A kind of the appointed date of delivery	Numerical value, the input
QualityProof		
Class	A kind of quality proof	A code, choice
Number	A number of quality proof	Numerical value, the input
AttachedFigure		
FileName	An attached figure or a list	
Transportation	A transportation method	A code, choice
Storage	A storage method	A code, choice
LoadFerry	Load ferry place	A code, choice
Settlement	A settlement method	A code, choice
PublicationTimelimit	A publication time limit of a product	The date, choice
RegistrationDay	Registration day of a product	The date, choice

(2) Method of collecting information

The main suppliers of information on the FCMs are the foreigners of makers, trading companies and diplomatic offices in Japan. As it seems to be same in which country, their mother language used to enter data is the most comfortable and causes a few errors.

Therefore, this website allows the user to select the language to be used from four ones: Japanese, Chinese, Korean and English.

The suppliers of information are first the makers and trading companies that register their recognition of standards for the construction materials in Japan and second various makers that manufacture the construction materials in the foreign countries. When supplying information, they shall access this website to download the XML-type data input format and enter data into

the format.

The suppliers of information are placed in the registration system and then, the reliability of the given information is checked timely and secured while obtaining cooperation from the users. *Table 1* shows the database structure.

(3) Method of using information

A motley of people use information on the FCMs. There are, for example, the designer, contractor and client who are directly related to the construction job and the mere users of information such as the common people and the businessmen in the mass communication field.

Since the users of information need information opened in their mother languages, the entered foreign languages must be translated into Japanese by use of the codes, which is controlled by the database station. In addition, we completed the search function on the website and considered the image searching method.

The users are free to access the website to allow many persons to do it.

3.2 METHOD OF SUPPLYING INFORMATION IN PLOTTING MODE ON WEBSITE

A new website is set up to open information on the FCMs. The structure of this website is shown in *Figure 1*. Here, it needs the following procedures:

(a). The web server asks the application server to comply with the request from a user who visits this web site through the Internet work system and then, sends the result of request to the user.

(b). The application server follows instructions from the web server and then, asks the database server to take out or enter data if necessary.

(c). The data server follows instructions from the application server to take out or enter data. As abovementioned, it is required to divide the servers according to the functions, scatter the load at the time of concentrated web access, and prepare to install more the necessary server only for an increase in the number of web accesses.

3.3 FEATURES OF NEW WEBSITE

(a). Supply of information available for electronic business

The new website provides information on not only the FCMs but also the price, quality,

shipping method and storing method.

(b). Website usable for supplier of information on construction materials

In the case of using the website, there seem two groups: the suppliers of information on the construction materials and the users of information. As for the suppliers of information on the construction materials, the website displays the screen designed to make it easy to enter data by selecting the codes and to take as less time as possible for data input. In addition, the supplier certification function is introduced to prevent information from being altered illegally.

(c). Website usable for user of information on FCMs

As for the users of information on the FCMs, the easy searching method is used with the simplified search items so that they can find the necessary information on the FCMs as soon as possible.

4. MUTUALLY EFFECTIVE METHOD OF USING INFORMATION ON THE FCMS IN THE EAST ASIA

This study started to promote the more use of FCMs in Japan. In the process of study, we examined whether the JIS of construction materials should be uniformed with the foreign ones, or the standard conversion method should be used, which brought the result that we can reduce the long hours and cost required for the standard examination. In order to confirm the normal standards of construction materials in the foreign countries, we heard the opinions of persons relating to the construction job in Korea and China.

As a result, the opinion of the Korean and Chinese persons was that the construction materials should be used effectively to protect the natural resources. There was an opinion that the study of normal standards is important to enable it and also, the common information open system should be set up. Thus, we prepared the plotting mode on the website through the Internet work system.

This website is a prototype designed and managed in Japan and is contrived to allow the East Asian countries to use in common. The present applicable languages are Japanese, English, Korean and Chinese and in future, other languages including Indonesian are planned to use. We consider that the expansion of such a database will formulate the information open system that can be used in common by not only East Asian countries but also in the world and also, the FCMs will be used actively.

5. CONCLUSIONS

The plans to promote more development of the result of this study are described as follows:

(1) We propose the preparation of website for the FCMs. As the foundation of website, it is necessary to establish "FCMs Information Center" to collect and check the technical information, industrial standard information and business information on the FCMs that can be obtained widely from the diplomatic offices in Japan and the foreign companies in order to supply information on the FCMs to the Japanese government and municipal offices, the special consultants and the construction companies and also, present the result of investigations. This center should aim to supply information to both supplier and user of

construction materials, provide guidance or hold a consultation individually, and conduct the search and study of construction industry with the world field of vision.

(2) As a part of the services of center abovementioned, it should collect information on the FCMs from the overseas resident attaches of The MLIT and inform the Japan's measures of using the construction materials to the foreign countries.

(3) The "FMQC Agency" should announce publicly the details of certification application procedures and make the system to allow the certification period, certification fee and certification method to be realized easily.

(4) If the domestic nongovernmental certification agency has the specified technical terms, it may be regarded as the representative.

(5) The foreign entrusted certification agency is examined to use for the JIS that is managed by the Japan's Ministry of Economy, Trade and Industry. A certain system is introduced so that not only Japan but also the foreign countries can obtain the same quality certification. This system will also contribute to the respect for the World Trade Organization and Technical Barriers to Trade agreement.

(6) This investigation found out that the Chinese and Korean universities' persons have the same opinion that it is desirable to open information on the construction materials and to study the Asian standards of them. Finally, we consider that the basis of joint research should be formed for the future Asian standards of construction materials.

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REFERENCES

- Japanese Industrial Standards Committee: "Final Plan of Cooperation Program for ASEAN Standards Certification", December 2002.
- Japanese Industrial Standards Committee: "Report of Special Committee of Examining How to Determine Standards and Certification System in New Era", June 2003.
- Japan Society of Steel Construction: "Proceeding of the 6th Japan-China-Korea Symposium on Structural Steel Construction", 27 – 28 November 2003, Tokyo
- Japanese Standards Association: "Common Sense in International Standards Viewed from Europe", Japanese Standards Association, March 2003.
- JETRO: "Research Report of Actual Condition of Access to Japan", September 1998.
- Ministry of Economy, Trade and Industry: "Actual condition of China Iron and Steel Industry", July 2004.
- Ministry of Economy, Trade and Industry: "Reports of Special Committee of Examining Standardization and Subject for the 21st century (1 – 3)", May 2000.
- MLIT: "Import Materials Handbook – 2000", 2000.
- UL Apex Co., Ltd.: "All China Compulsory Certification Acquisition", Japan Management Association, September 2003.