

# RISK MANAGEMENT OF EXCHANGE RATES IN INTERNATIONAL CONSTRUCTION

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**ABSTRACT :** International contractors must consider the substantial risks related to unexpected foreign exchange fluctuation incurred by conducting their business and using foreign currencies in foreign countries. Most international contractors attempt to minimize foreign exchange exposure within a manageable range because it may influence the company's fundamental financial structure, reduce market value or profit margins, or disrupt ongoing and future projects. This research provides a qualitative study of existing foreign exchange exposure (transaction, operation, and translation exposure) and current & effective foreign exchange risk management in American and Korean international contractors, as they represent both new and long-time members of the global construction market. Finally, recommendations of techniques for new and existing international contractors to minimize and better manage foreign exchange risk will be offered.

*Key words: International construction, foreign exchange exposure, foreign exchange management*

## 1. INTRODUCTION

International contractors must take into account the substantial risks related to fluctuations in foreign exchange rates that affect their operations in foreign countries, particularly their use of foreign currencies and the need to borrow different currency funds from the lowest-cost sources of capital available. Fluctuations in foreign exchange rates influence a company's foreign exchange exposure (transaction, operation and translation exposure), which may have a significant effect on their fundamental financial structure, reduce market value or profit margins, or disrupt ongoing and future projects [1]. For example, if an international contractor were to provide services or perform operations that incurred U.S. dollar expenses but received payment in a foreign currency, then a 15% drop in the exchange rate would result in a 15% reduction in the value of the contract revenues.

Foreign exchange exposure is often addressed through a company's management policies, intuition, and previous experiences utilizing natural, operational, financial and contractual hedge methods. The natural hedge is generally called "matching currency cash flows", which offset cash inflows and outflows of dominant currencies. Operational and financial hedges employ risk-sharing agreements, netting, leads and lags in payment terms, swaps, and other strategies. Contractual hedges employ forward exchange, money, and option contracts between financial brokers or institutions and international contractors. Excellent foreign exchange management can be a critical source of competitive advantage in the international construction market as it enables the contractor to maintain the cash flows and profit margins expected at the bid stage.

## 2. OBJECTIVE

The objective of this research is to evaluate the priority of foreign exchange exposure for international contractors through qualitative research and to identify financial influences on the contractor's abroad business. The study focuses on how international contractors attempt to minimize their foreign exchange exposure by using natural, operational, financial and contractual hedges for their international construction projects and how this influences their ability to maintain their competitive advantage, stabilize cash flows and maximize profits. Finally, this report recommends effective and valuable methods of foreign exchange risk management widely used by current international contractors for new and existing international contractors to mediate foreign exchange risk efficiently.

The authors chose to examine American and Korean international contractors because American international contractors are perceived as world leaders in international construction and Korean international contractors represent new competitors who have not previously used hard currencies such as the U.S. dollar, euro, and yen in the international construction market.

## 3. INTERNATIONAL CONSTRUCTION MARKET

### 3.1 Size of international construction market

Over the last few years, the world construction market has been shocked or left uncertain by many events such as Asia's economic crises to terrorist attacks and the war on Iraq. Some of this uncertainty began to dissipate in 2003 as pent-up demand began to release delayed projects and the

anticipated rehabilitation of Iraq [2]. Figure 1 shows that the top 225 international contractors' foreign revenues increased from less than US\$110 billion to more than US\$167 billion in three years. Existing and new international contractors might have more opportunities to expand their operation regions and revenues, with potentially high profit margins, as well as potential risks related to international construction. According to Tulacz, the average profitability of the 55 firms conducting international business as listed in the top 400 American contractors was 7.2% compared to 3.2% in the 335 firms conducting domestic business only [3].

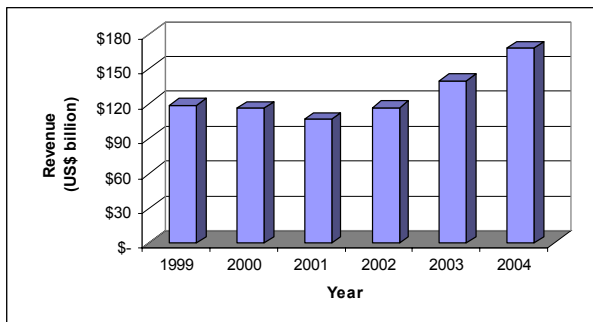


Figure 1. 225 International contractors' foreign revenues [2]

### 3.2 Additional risks associated with international construction

Because of the complex nature of construction, those engaged in international construction projects are exposed to a high degree of risk [4]. An international contractor may have substantial international operations that are conducted through foreign and domestic subsidiaries, as well as through agreements with foreign joint-venture partners. The foreign operations are subject to risks that could adversely affect the business and results of their operations, including:

- Socioeconomic factors (environmental protection, public safety, and economic stability),
- Organization relationships (contractual relationships, attitudes of participants, communication),
- Technological problems (design assumptions, site conditions, and construction procedures) [5].

However, the theory supporting foreign risk management is not yet fully developed in the construction industry, and almost every contractor approaches risk management in terms of intuition, judgment, and experience gained from previous contracts [6].

### 3.3 Fluctuations of foreign exchange rates

Fluctuations in a country's foreign exchange rate depend on its balance of payment (BOP) under a floating exchange rate system. From the U.S. perspective, a surplus in the BOP implies that the demand for the U.S. dollar exceeds the supply, leading to an increase in the value of the U.S. dollar in the market. If the BOP is a deficit, the value of the U.S. dollar decreases. Thus, foreign exchange rates fluctuate over time, and international contractors are vulnerable to exchange exposure because they have to deal and contract with other currencies in international construction projects. If an American international contractor has a contract by U.S. dollar to provide services with payment in Canadian dollars,

then a 10% drop in the U.S. dollar would result in a 10% reduction in the value of the contract revenue. However, under a fixed exchange rate system such as China, where the exchange rate is fixed by the government, international contractors eliminate foreign exchange exposure unless the government changes the exchange rate. Even though the exchange rates in fixed exchange regimes do not fluctuate frequently, the value of currency will occasionally be changed in accordance with each government and economy. For example, the exchange rate between U.S. dollar and Chinese renminbi had been fixed for more than 8 years; however, the value of Chinese renminbi increased 2% on 07/21/05 with few market signs. Predicting this type of change in the exchange rate is difficult. Figure 2 shows the fluctuation of several currencies such as the pound, euro, yen, and Canada dollar against the U.S. dollar compared to the fixed exchange rate of renminbi.

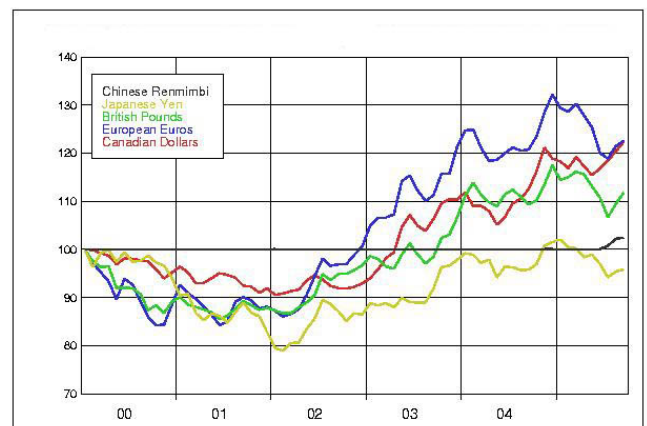


Figure 2. Comparative Daily Exchange Rates: Relative to U.S. dollar (Pacific Currency Exchange, <http://pacific.commerce.ubc.ca/xr>).

## 4. TYPES OF FOREIGN EXCHANGE EXPOSURE

Foreign Exchange Exposure is a measure of the potential for a contractor's profitability, net cash flow, and market value to change because of volatility in exchange rates. Foreign exchange exposure can be divided into three categories: transaction, operation, and translation exposures.

### 4.1 Transaction exposure

Transaction exposure typically measures gains or losses that arise from the settlement of existing financial obligations whose terms are stated in a foreign currency. David, Artbur, and Michael (2004) state that transaction exposure arises from:

- Purchasing or selling services and materials when prices are stated in a foreign currency,
- Borrowing or lending funds when repayment is to be made in a foreign currency,
- Being a party to an unperformed foreign exchange forward contract, and
- Otherwise acquiring assets or incurring liabilities denominated in foreign currencies.

## 4.2 Operation exposure

Operation exposure is the extent to which a firm's future international earning power is affected by long-term changes in exchange rates on future cash flows, prices, contracts, and costs. This is distinct from transaction exposure, which is concerned solely with the effect of exchange rate changes on individual transactions, most of which are short-term [5].

Operation exposure will have a major influence on a company's competitive edge over other international contractors in the long term. Therefore, operation exposure is far more important for the longevity of a business than changes caused by transaction or translation exposure. However, operation exposure is inevitably subjective, because it depends on estimates of future cash flow, price, contract, and cost changes over an arbitrary time horizon. Planning for operation exposure is entirely the responsibility of a company's management because it depends on the interaction of their strategies in finance, marketing, purchasing, and contracting.

## 4.4 Translation exposure

Translation exposure is encountered when financial statements of subsidiaries, branches, or operation offices are combined with the parent office's accounting data to form consolidated financial statements at the end of each accounting period [7]. The process of consolidation requires translating the accounts of each subsidiary, branch, and/or operation office into the parent company's currency denominated balance sheet and income statement. The parent company will then see apparent bookkeeping gains or losses even if these are not actual or realized gains or losses in the company's business. However, translation exposure can increase or decrease the parent company's net worth; and will be reported as net gains or losses caused by a change in the exchange rate since the previous statement.

## 5. FOREIGN EXCHANGE RISK MANAGEMENT

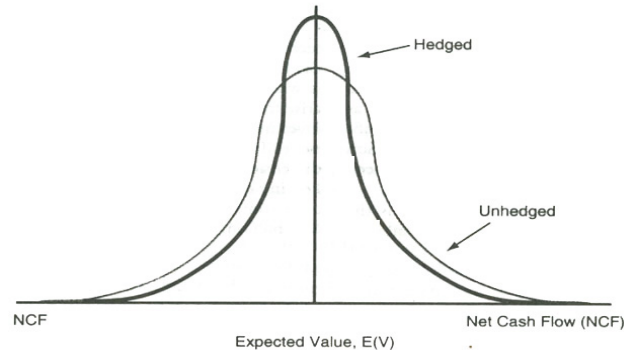
International contractors generally attempt to minimize their foreign exchange exposure in order to stabilize their business. They employ several hedge methods such as natural, operational, financial and contractual hedges to reduce potential foreign exchange exposure resulting from unexpected exchange rate changes. However, some contractors maintain an unhedged position, which means that shareholders must absorb the foreign exchange risks themselves [1].

International contractors hedge in order to reduce their risks in terms of future cash flows (which improves the planning capability of the firm) to help keep the company, cash flow above a necessary minimum; to manage effects of unexpected external shocks, such as an oil crisis or war, more efficiently; and to ensure that the management team has more flexibility to manage currency risks [1]. Figure 3 shows how hedging reduces the variability of expected cash flows about the mean of distribution.

### 5.1 Minimizing Transaction Exposure

Transaction exposure can be managed by using natural, financial, operational and contractual hedges. The term

natural hedge refers to an off-setting of operating cash flow (a payable arising from the conduct of business). Operating and financial hedges employ risk sharing agreements in contracts, netting, leads and lags in payment terms, swaps, and other strategies. Contractual hedging techniques included forward, money market, and option hedges are a type of contract within predefined terms, between the international contractor and a financial institution.



**Figure 3.** Impact of hedging on the expected cash flows of the company [3].

The choice of which transaction hedge to use depends on the individual international contractor's currency risk tolerance, and its expectation of the probable movement of exchange rates over the transaction exposure period [1]. The approach to minimize the transaction exposure in the international contractors identifies its goals with a cost center and profit because of exchange fluctuation. Once the goals are determined by the financial team, the team evaluates each potential general, operational, financial, and contractual hedge method by anticipating the movement of exchange rates and decides on the optimum use of hedging strategies to minimize their transaction exposure.

### 5.2 Minimizing Operation Exposure

Operation exposure management consists of anticipating and influencing the effect of unexpected changes in exchange rates on a contractor's future cash flows and foreign operation, rather than merely hoping for the best. The best way to manage operation exposure is for the international contractor to diversify internationally both its operations and its financing bases [8].

Diversifying operation involves diversifying the location of operations, repeat clients, subcontractors, material suppliers, and key players in the company, such as project managers, superintendents, engineers, etc. For an international contractor that diversifies overseas, it is possible to absorb operation exposure by shifting operation policies. If one segment has struggled because of exchange fluctuations, the management can then focus on other segments to offset the problem areas. Furthermore, there are additional benefits that can be used, such as timely shifts in operation strategy, identifying potential new opportunities, new construction technologies, material, key people, etc., which will provide key competitive advantages over other local contractors.

Diversifying a company's finance base means raising funds in more than one currency and in more than one capital market. An international contractor has the opportunity to minimize operation exposure by lowering their cost of capital and increasing the availability of capital. If an international contractor has difficulty in borrowing funds due to increased interest rates for new and current loans resulting from reasons such as an economic recession in its base country, a international contractor thus has the ability to seek funds from other countries with lower interest rates, not simply to obtain financing, but also to gain an additional competitive advantage.

### 5.3 Minimizing Translation Exposure

The primary technique used to minimize translation exposure is a balance sheet hedge. Some international contractors have attempted to hedge translation exposure in contractual hedges, such as the money market. A balance sheet hedge requires an equal amount of exposed foreign currency assets and liabilities on a contractor's consolidated balance sheet. If this can be achieved for each foreign currency, net translation exposure will be zero. However, this is not realistic in actual company operation. However, any change in exchange rates will change the value of the exposed liabilities an equal amount but in an opposite direction to the change in value of the exposed asset. [1]. It is unrealistic in real company operation to match assets and liabilities denominated same foreign currency.

## 6. METHODOLOGY

Qualitative research strategy is employed in this research. A qualitative method research design provides an in-depth and comprehensive understanding of foreign exchange rate exposure and risk management in international construction [9], and is appropriate for this research topic.

This research is primarily based on extensive interviews to collect data about currently recognized foreign exchange exposure (transaction, operation, and translation exposure) and universal and particular risk management (natural, operational, financial, and contractual) in international construction. Furthermore, collected data from the interviews were supported by three consecutive years of annual reports if the interviewed contractors were publicly owned companies. Annual reports of private international contractors were not available publicly.

American and Korean international contractors were selected for this study because American international contractors are world leaders in international construction, while Korean international contractors represent some of the newest competitors entering the market. The sample of American international contractors was selected from a list of the top 225 international contractors in 2004 ranked by their international revenue in 2003, published by Engineering New Record (ENR). The sample of Korean international contractors came from a list of international contractors provided by the International Contractors Association of Korea, based on their average international revenue from three consecutive years (2002 to 2004).

### 6.1 Interviews

The interviews with foreign financial managers were designed to gain insight regarding international contractors' perceptions of foreign exchange exposure and risk management. The financial managers of five American contractors were interviewed by telephone and email interviews. Seven Korean international contractors were interviewed by face-to-face interviews in their headquarters in the Republic of Korea. They represented ten public international contractors and two private international contractors. The contractors and managers are anonymous because some of the financial managers did not want to reveal their foreign exchange exposure management techniques to their competitors.

The results of the interviews are based on conversations from the following international contractors:

**Table 1.** Interviewed international contractors.

American Contractor	2004 revenue (International)	Korean Contractor	2004 revenue (International)
A - 1	US\$6.6 billion	K - 1	US\$1.1 billion
A - 2	US\$3.9 billion	K - 2	US\$412 million
A - 3	US\$560 million	K - 3	US\$360 million
A - 4	US\$73 million	K - 4	US\$359 million
A - 5	US\$39 million	K - 5	US\$305 million
		K - 6	US\$165 million
		K - 7	US\$63 million

For this project, major international contractors' financial managers were interviewed to gather data regarding:

- Size of international construction - how many foreign subsidiaries and operation offices they have, the company's annual revenue for following three years (2002 - 2004) including international work, and what the company's annual revenue in three fiscal years form 2002 to 2004 was for international work only.
- Currency - What kind of currencies they use in their international contracts, and what the functional currencies are in their subsidiaries or operation offices.
- Foreign exchange exposure - what kind of foreign exposures they have in the course of their business.
  - Transaction exposure
  - Operation exposure
  - Translation exposure
- Foreign exchanges risk management - how effectively and differently they minimize their foreign exchange exposures utilizing natural, operational, financial and contractual hedges.

- Currency matching
- Netting
- Contractual risk-sharing agreements
- Leading and lagging
- Currency swaps
- Contractual hedges
  - Forward exchange market hedge
  - Money market hedge
  - Option market hedge
- Foreign currency management policies – the company’s management policies dealing with fluctuations in the value of foreign currency.
- Other foreign exchange management and general international construction financial issues.

**6.2 Analysis of Annual Reports**

For this project, the interviewed American and Korean contractors’ annual reports were analyzed in order to gather qualitative data regarding their foreign exchange exposure and risk management strategies if the annual reports were available publicly. Two of five American international contractors and all seven Korean contractors were public companies so the author could analyze their annual reports to support their interview with the financial managers which were the primary research methodology of this report. Even though K – 4 in the Republic of Korea was a public company, it had its substantial corporative division whose revenue was more than US\$ 4 billion dollars in 2004, to consolidate financial data both construction and corporation division. Thus, the author withdrew the analysis of K – 4’s annual reports.

**Table 2.** International contractors analyzed their annual reports.

American Contractor	2004 revenue (International)	Korean Contractor	2004 revenue (International)
A – 2	US\$3.9 billion	K – 1	US\$1.1 billion
A – 3	US\$560 million	K – 2	US\$412 million
		K – 3	US\$360 million
		K – 5	US\$305 million
		K – 6	US\$165 million
		K – 7	US\$63 million

**7. RESEARCH FINDINGS**

**7.1 Republic of Korea**

The seven interviews, including six analyses of annual reports, reveal that Korean international contractors recognized foreign exchange exposures such as transaction, translation and, to a lesser extent, operation exposure as a major international construction risk. All have attempted to minimize their foreign exchange exposure as much as possible to avoid losses caused by the fluctuation of foreign exchange rates. The primary goal of foreign exchange risk management is to stabilize a company’s operations, to broaden its operation market, to increase its market value, to match cash flows, and to maximize its profits.

All of the Korean international contractors that were interviewed stated they generally bid and contract in hard

currency (U.S. dollars, the euro and yen), as dominated by overseas projects, even though they occasionally utilize local currencies. They attempt to split the ratio between hard and local currencies based on their anticipated expense structure and negotiations with a client. From the interviews, all of the financial managers said their companies primarily want to contract in U.S. dollars due to the relative stability of its value, the ease of transactions, and familiarity compared to other currencies.

Table 3 shows that all seven Korean international contractors identified transaction exposure as being more significant than other exposures because it directly affects their cash flows and profits. Thus, they usually determine the amount of foreign exchange contingency with which to manage their foreign exchange exposure in their new international contracts based on their bidding criteria. Furthermore, three out of the seven Korean international contractors use their own foreign exchange forecasting systems that are specifically designed to anticipate exchange rate fluctuations closely and accurately.

**Table 3.** Priority of consideration of foreign exchange exposure for Korean Companies (1 = highest priority)

	K - 1	K - 2	K - 3	K - 4	K - 5	K - 6	K - 7
Transaction Expo.	1	1	1	1	1	1	1
Operation Expo.	3	3	3	3	3	3	3
Translation Expo.	2	2	2	2	2	2	2

The analyses of annual reports reveal the six Korean international contractors’ annual revenue, number of operation countries, and number of ongoing projects outside the Republic of Korea. Furthermore, Table 4 shows that all six of the Korean international contractors encountered transaction exposure in overseas operation in foreign countries.

Table 5 shows the volume of transaction exposure divided by international revenue from 2002 to 2004 for six of these companies. The negative (positive) exposure percentage of transaction exposure directly decreased (increased) the contractors’ income, cash flows, and profitability. For example, in 2002, K – 5 Corporation lost more than 4% of their international revenue because of a lack of foreign exchange risk management and unexpected foreign exchange fluctuations. Even though all the Korean international contractors had included some contingencies in their contracts, this was still a significant burden causing negative impacts on their business if the number was negative according to interviews with seven financial managers.

Transaction exposure was primarily managed via natural hedge by all seven of the Korean international contractors. All seven financial managers considered it to be the best

way to minimize transaction exposure in international construction. They also said the company matched their accounts payable, accounts receivable, loan payments (principal and interest) and loans at the same time interval as well as the same denomination of currencies, the contractor could have minimized their transaction exposure without the need for additional hedges. However, because each of these cash flows could occur at different time intervals, in different amounts, in different currencies of denomination and with a different predictability of occurrences, they needed other hedges.

**Table 4.** The volume of foreign exchange exposure for six Korean contractors.

Companies	K - 1	K - 2	K - 3
Countries (2004)	18	12	12
Projects (2004)	56	42	46
Total Revenue US\$ (2004)	\$ 4,056,907,048	\$ 3,535,603,142	\$ 4,174,160,160
International Revenue US\$ (2004)	\$ 1,173,067,385	\$ 361,846,816	\$ 412,173,561
Transaction Gain 2002	\$ 8,221,598	\$ 8,771,397	\$ 15,609,953
Transaction Loss 2002	\$ 7,793,887	\$ 6,720,712	\$ 24,185,539
Transaction Exposure 2002	\$ 427,711	\$ 2,050,685	\$ (8,575,585)
Transaction Gain 2003	\$ 23,426,734	\$ 4,655,007	\$ 10,673,137
Transaction Loss 2003	\$ 13,572,065	\$ 3,946,016	\$ 15,519,882
Transaction Exposure 2003	\$ 9,854,669	\$ 708,991	\$ (4,846,745)
Transaction Gain 2004	\$ 29,572,181	\$ 10,761,974	\$ 10,562,003
Transaction Loss 2004	\$ 14,348,171	\$ 10,125,424	\$ 21,726,561
Transaction Exposure 2004	\$ 15,224,009	\$ 636,550	\$ (11,164,558)
companies	K - 5	K - 6	K - 7
Countries (2004)	5	7	3
Projects (2004)	14	19	15
Total Revenue US\$ (2004)	\$ 3,022,029,521	\$ 1,904,514,877	\$ 2,369,363,171
International Revenue US\$ (2004)	\$ 305,062,887	\$ 165,276,851	\$ 63,333,671
Transaction Gain 2002	\$ 806,551	\$ 2,387,481	\$ -
Transaction Loss 2002	\$ 6,829,024	\$ 1,384,086	\$ 28,793
Transaction Exposure 2002	\$ (6,022,473)	\$ 1,003,395	\$ (28,793)
Transaction Gain 2003	\$ 1,417,710	\$ 2,337,926	\$ 56,216
Transaction Loss 2003	\$ 1,301,941	\$ 1,881,213	\$ 86,421
Transaction Exposure 2003	\$ 115,769	\$ 456,713	\$ (30,206)
Transaction Gain 2004	\$ 2,620,302	\$ 12,801,386	\$ 168,524
Transaction Loss 2004	\$ 5,379,149	\$ 4,496,098	\$ 252,350
Transaction Exposure 2004	\$ (2,758,847)	\$ 8,305,288	\$ (83,826)

**Table 5.** The ratio of transaction exposure to international revenue.

	2002 Exposure	2003 Exposure	2004 Exposure
K - 1	0.03%	0.61%	1.30%
K - 2	0.72%	0.32%	0.18%
K - 3	-2.29%	-0.85%	-2.71%
K - 5	-4.58%	0.06%	-0.90%
K - 6	0.46%	0.30%	5.03%
K - 7	-0.11%	-0.06%	-0.13%

Operation and financial hedges were employed by all seven Korean international contractors using a risk sharing agreement, leads and lags, netting, etc. The Korean international contractors all attempted to implement a foreign exchange risk sharing agreement in their contracts in order to minimize their foreign exchange risks. However, very few of their clients would agree to the sharing agreement because they wanted to transfer the foreign exchange risks to the Korean international contractors. Only K -4 had been successful in convincing a competitive client to agree to risk sharing agreements in a contract on several occasions.

All of the Korean international contractors interviewed indicated that they occasionally reduce their transaction exposure through managing the timing of payables and receivables. In the interviews, every financial manager said careful consideration had to be given to leads and lags in payments due to the effect it has on contractors' cash flows and relationships. Furthermore, Korean international contractors believed they had more ability to manage foreign exchange exposure than any other entities.

Netting was also a very common strategy employed by Korean international contractors, especially the four large contractors (K - 1 to K - 4) who had more than 40 projects going on simultaneously around the world. According to four financial managers, netting was accomplished by central coordination of cash management, which calculates overall cash inflows and outflows in different subsidiaries, branches, and operation offices in dominated currencies. Fundamentally, the netting was coordinated at their financial department of headquarter in the Republic of Korea.

When Korean international contractors were unable to hedge transaction exposure using natural, financial, and operational hedges, they applied contractual hedges such as forward exchange, money and option contracts to minimize their transaction exposure. Table 6 shows that four out of the seven Korean international contractors currently employ the forward exchange contracts and five of them have used forward exchange hedging experience on previous projects. From the interviews, all of the Korean international contractors, except K - 1, have a future plan to employ the forward exchange contracts primarily if they have to adopt contractual hedges for foreign exchange exposure. All financial managers said that the forward exchange contract was much easier than other contractual hedges, functioning as insurance to protect against transaction exposure.

**Table 6.** The position of forward exchange contract.

	K - 1	K - 2	K - 3	K - 4	K - 5	K - 6	K - 7
Previous experience	No	Yes	Yes	Yes	Yes	Yes	No
Current existence	No	Yes	Yes	Yes	Yes	No	No
Future plan	No	Yes	Yes	Yes	Yes	Yes	Yes

However, K - 1, the largest international contractor in the Republic of Korea, has never employed contractual hedges. The Finance Division Manager of K -1 explained the company has the ability to manage their foreign exchange

exposure without the use of contractual hedges due to the size of the overseas divisions; previous experience, and other natural, financial, and operation hedges.

K – 2, the second largest international contractor in the Republic of Korea, employed money and option contracts with a broker or banker several years ago because the company wanted to manage its transaction exposure more actively. According to the manager of their International Financial Team, since K – 2 utilized the money and option market, they could evaluate the three alternatives (forward exchange, money and option contracts) based on their foreign currency expectations and then select the most suitable choice to minimize their transaction exposure and even gain a little profit.

The Manager of the International Financial Team revealed that K – 2 used the option market when the volume of the option contract was large enough and the exchange rate was favorable to them. K – 2 was thus able to reduce their transaction exposure from more than US\$2.05 million in 2002 to US\$0.63 million in 2004. Two other Korean international contractors are planning to employ option contracts to hedge their transaction exposure in the future and are currently studying the concept, procedure, benefits, risks, and costs related to option contracts.

The three smaller Korean international contractors (K – 5 to K – 7) have extensively used the foreign exchange risk insurance provided by the Korea Export Insurance Corporation (a government body) from February, 2002 onward. Four of the other contractors are also interested in adopting the foreign exchange risk insurance for their projects because the terms offered for the insurance are very reasonable for Korean international contractors.

Even though the contract structure is similar to that of a forward contract, foreign exchange risk insurance has several advantages for Korean international contractors.

- It is possible to secure the foreign currency risks for 5 years.
- There are no extra charges, and the premium rate is fixed (currently at 6 months for 0.06%).
- It is possible to pay back earlier than expected with no penalty.

If the Korean international contractor were to buy the foreign exchange risk insurance at the bidding stage, the contractor would be able to eliminate transaction exposure for the whole project period. Once the contractor buys foreign exchange insurance at the guaranteed exchange rate, with a defined premium rate from the Korea Export Insurance Corporation, the KEIC secures the guaranteed exchange rate until the project is complete. If the settlement exchange rate is below the guaranteed exchange rate, the KEIC makes up for the difference between the settlement and guaranteed exchange rate. However, if the settlement exchange rate is above the guaranteed exchange rate, the contractor has to pay the net amount (settlement exchange rate – guaranteed exchange rate) to the KEIC.

All seven Korean international contractors can be categorized as self-sustaining foreign entities that operate in the local economic environment independent of the parent company. Consequently, Korean international contractors' subsidiaries maintain their accounting records in their local currency or other hard currency, especially the U.S. dollar, euro and yen. Korean international contractors have to convert their subsidiaries' assets and liabilities denominated by other currencies into the Korean won, with the effect of the foreign currency translation exposure reflected in other accumulated comprehensive gains or losses, a component of shareholders' equity - in accordance with the Korean Financial Supervisory Service. Table 7 shows the actual translation exposure for six Korean international contractors from 2002 to 2004 fiscal year. All of the Korean international contractors interviewed realized translation exposure as the second most important foreign exchange exposure after transaction exposure and spent various efforts to minimize it.

**Table 7.** Translation exposure for six Korean international contractors from 2002 to 2004

Companies	K - 1	K - 2	K - 3
Translation Gain 2002	\$ 944,207	\$ 686,228	\$ 13,390,110
Translation Loss 2002	\$ 2,170,376	\$ 10,415,784	\$ 41,187,129
Translation Exposure 2002	\$ (1,226,170)	\$ (9,729,556)	\$ (27,797,019)
Translation Gain 2003	\$ 374,623	\$ 182,911	\$ 8,333,500
Translation Loss 2003	\$ 988,922	\$ 1,372,673	\$ 20,382,691
Translation Exposure 2003	\$ (614,299)	\$ (1,189,762)	\$ (12,049,191)
Translation Gain 2004	\$ 1,738,747	\$ 12,218,442	\$ 24,550,307
Translation Loss 2004	\$ 1,078,940	\$ 4,958,803	\$ 41,830,827
Translation Exposure 2004	\$ 659,808	\$ 7,259,639	\$ (17,280,520)
Companies	K - 5	K - 6	K - 7
Translation Gain 2002	\$ 169,597	\$ 492,214	\$ 67,983
Translation Loss 2002	\$ 6,046,671	\$ 13,887,990	\$ 61,585
Translation Exposure 2002	\$ (5,877,074)	\$ (13,395,776)	\$ 6,398
Translation Gain 2003	\$ 3,984,014	\$ 585,263	\$ 209,761
Translation Loss 2003	\$ 2,571,676	\$ 1,498,115	\$ 50,343
Translation Exposure 2003	\$ 1,412,338	\$ (912,852)	\$ 159,418
Translation Gain 2004	\$ 2,954,149	\$ 20,705,861	\$ 56,757
Translation Loss 2004	\$ 12,450,247	\$ 25,958,831	\$ 228,774
Translation Exposure 2004	\$ (9,496,097)	\$ (5,252,970)	\$ (172,017)

The seven Korean international contractors employ balance sheet hedges that require an equal amount of exposed foreign currency assets and liabilities on a contractor's consolidated balance sheet. If the exposed foreign currency assets and liabilities are matched, translation exposure will be zero for the Korean international contractors. However, four out of the seven Korean international contractors were not heavily interested in minimizing translation exposure because it only affected the bookkeeping incomes or losses, a component of shareholders' equity. The other three Korean international contractors actively managed translation exposure because the amounts of bookkeeping gains (losses) were substantial. Thus, the contractors employed a balance sheet hedge

partially when the hedging costs are less than minimizing translation exposure.

All seven Korean international contractors acknowledged that they focused less on operation exposure, even though they agreed it was the most important factor in maintaining their competitive advantage in the international market. They need to diversify their projects, contractual currencies, and financing base with different currencies so that contractors' long-term competitive advantages are not severely affected by adverse changes in exchange rates.

From the interviews, operation exposure was considered the least of their foreign exchange exposures among the seven Korean international contractors. However, they recognized that the operation exposure had an effect on the company's long-run competitive advantage in future prices, contracts, and costs.

## 7.2 United States of America

Five American international contractors were interviewed for this study and two of them, public contractors, were analyzed in order to support additional data about foreign exchange exposure and risk management. Based on the interviews and analyzing annual reports, all recognized foreign exchange exposure such as transaction, operation, and translation exposure, as major foreign exchange risks. Table 8 shows how American international contractors realized the priority of consideration of foreign exchange exposure. All aim to minimize the foreign exchange exposure caused by foreign exchange fluctuations because they desire to stabilize their operations and maintain their competitive advantages over other international competitors.

**Table 8.** Priority of consideration of foreign exchange exposure for American Companies.

	A -1	A -2	A -3	A -4	A -5
Transaction Exposure	1	1	1	1	1
Operation Exposure	2	3	3	2	2
Translation Exposure	3	2	2	3	3

This study examined foreign transaction exposure because most international contractors seek to reduce their transaction exposure first according to table 8. All of the American international contractors interviewed noted they generally attempt to denominate their international contracts in U.S. dollars because the majority of their transactions are in U.S. dollars. If the contractor matches the same currency cash inflows and outflows (loan payments and loans) from their operations, the contractor automatically minimizes their transaction exposure. Even though it is not always possible to match inflows and outflows in this way, it is still possible to reduce the associated risks dramatically.

However, from time to time American international contractors enter into international contracts denominated in a foreign currency. This practice subjects American international contractors to foreign transaction exposure, in particular to the extent that the contract revenue is denominated in a currency different than the contract costs.

In this situation, they seek to hedge foreign transaction exposure using several hedge methods, such as currency matching, netting, leads and lags, and contractual hedges such as forward exchange, money, and option contracts.

All of the American international contractors interviewed primarily aim to reduce their transaction exposure by currency matching as mentioned above. Netting is used extensively by three large American international contractors because they have many ongoing projects utilizing the same currencies. Leads and lags are not significantly utilized because American international contractors believe that they can manage transaction exposure better than subcontractors, suppliers and clients. Furthermore, the companies occasionally attempt to insert foreign exchange risk sharing agreements in international contracts, although this is not always successful because of the client's reluctance to assume transaction exposure. The two largest contractors out of the five interviewed have previous experience in implementing currency swaps with a broker, although they do not normally use it. However, under certain limited circumstances, the three largest contractors interviewed consider hedging transaction exposure by mainly forward exchange, money or option contracts. The two medium/small contractors (A - 4 and A - 5) absorbed the possibility of gains and losses because they did not have previous experience using forward exchange, money or option contracts. Also, the volume of medium/small international contracts usually was not large enough to justify the use of contractual hedges, whose costs are substantial for the two medium contractors.

Table 9 shows that the three large contractors extensively use forward exchange contracts to hedge foreign currency transaction such as anticipated purchases and/or revenues. According to the financial managers interviewed, the primary reasons for using a forward exchange contract are that it is much simpler than other contractual hedges and they could anticipate the future exchange rate from the forward exchange rate. They normally contract with a broker to buy (sell) forward exchange contracts. The two large contractors (A - 1 and A - 2) occasionally utilize money and option contracts, because they have more opportunities to compare a wider range of alternatives to hedge methods in order to minimize and better manage foreign transaction exposure.

**Table 9.** The position of forward exchange contract.

	A - 1	A - 2	A - 3	A - 4	A - 5
Previous experience	Yes	Yes	Yes	No	No
Current existence	Yes	Yes	Yes	No	No
Future plan	Yes	Yes	Yes	Yes	Yes

Furthermore, the three American international contractors that use contractual hedges must follow the U.S. Government's Statement of Financial Accounting Standards



Number (SFAS) No. 133, "Accounting for Derivative Instruments and Hedging Activities," as amended (SFAS 133). Also, American international contractors regulated by the companies' policies are not allowed to engage in speculation situations while hedging for foreign exchange exposure because it may lead the contractor to assume inappropriate and substantial financial risks.

All American international contractors' subsidiaries primarily maintain their accounting records in their local currency such as British pounds, the European euro, Australian, Canadian and Singapore dollars. At the end of each accounting period, all of the assets and liabilities of these subsidiaries are converted into U.S. dollars with the effect of the foreign currency translation reflected in accumulated other comprehensive income (loss), a component of shareholders' equity, in accordance with SFAS No. 52, "Foreign Currency Translation," and SFAS No. 130, "Reporting Comprehensive Income." Foreign currency transaction gains or losses are credited or charged income. As a result, American international contractors are located in the middle of the range of translation exposure. Table 10 shows the comprehensive income (loss), a component of shareholder (owner) equity in the two American international contractors' annual reports from 2002 to 2004 analyzed for this study.

**Table 10.** Translation exposure for two public American international contractors from 2002 to 2004

Companies	A - 2	A - 3
Translation exposure (2002)	\$ 2,538,000	\$ (2,633,000)
Translation exposure (2003)	\$ 38,650,000	\$ 2,546,000
Translation exposure (2004)	\$ 42,103,000	\$ 3,938,000

The two public American international contractors (A – 2 and A – 3) attempted to minimize their translation exposure extensively by using mostly balance sheet hedges, along with some natural, operational, financial and contractual hedges which required an equal amount of exposed foreign currency assets and liabilities on a contractors' consolidated balance sheet. However, the three private contractors' management teams did not have to worry about translation which exposure results in bookkeeping gains (losses) or comprehensive income (loss) - a component of shareholders' equity.

All five American international contractors recognized that the relative strength and weakness of the U.S. dollar to foreign currencies impacts their efforts to obtain new international contracts and future cash flows. Three private American international contractors significantly recognized and hedged operation exposure as more important than translation exposure because it may extensively affect their future competitive power in the market. Three public American international contractors attempted to diversify their operation and financing base worldwide but the effort of managing operating exposure was not as high a priority as translation and transaction exposure.

## 8. CONCLUSION

The qualitative data from both the interviews and the financial analyses offers compelling evidence of the Korean international contractors' perspective on exchange rate risk. The data gathered from U.S. international firms was consistent, and on many facets confirms the perspective of their Korean counterparts. This suggests that the Korean companies, as relatively new players in the international construction market, have been quick to adapt to risk management strategies that are currently in use by U.S. companies who collectively have been active in the global construction market for much longer. This concurrence in strategies across the span of tenure in these markets suggests that current and future international constructors can utilize this data to confirm or improve their own risk management plans.

Based on the objectives of this research, priorities in exchange risk were identified and evaluated. The research findings clearly show that transaction exposure is the primary concern related to exchange rate risk. However, the next most important priority varies between U.S. and Korean firms. Korean firms largely believe that translation exposure is the next highest priority, indicating that the balance sheet over multiple corporate operating units is of high importance, while U.S. firms are split between translation exposure and operation exposure. Whether this is due to U.S. firms' higher concern of diversification or rather a different perspective on conglomerate balance sheets could not be determined. These influences may suggest that differences in risk priority are largely socio-cultural, and warrant further research.

In identifying preferred methods of exchange risk management, the data indicates that international contractors focus on minimizing their transaction exposure by (1) attempting to denominate contracts in hard currency, especially U.S. dollars, (2) implementing experimental contingencies in contracts, (3) matching roughly the same in magnitude and timing between cash inflows and outflows from operating and financing, and (4) using contractual hedges, especially forward exchange contracts. International contractors on occasion utilize leads and lags managing the timing of payables and receivables, foreign exchange risk sharing agreement, currency swap, and money and option contracts. Many prefer to utilize forward exchange contracts if they required contractual hedges to reduce transaction risks from foreign exchange rate fluctuations. Some occasionally use option contracts to manage transaction exposure more aggressively and maximize the upside potential of gains while limiting the downside risk to a known amount when they analyze the foreign exchange rate favorably.

In contrast to their American counterparts, Korean international contractors are interested in buying foreign exchange risk insurance provided by the Korean Export Insurance Corporation. Insured projects help minimize transaction exposure from the bidding to finishing phase at a guaranteed exchange rate with a defined premium rate. Korean international contractors were profoundly interested

in foreign exchange exposure because they contract international projects predominately using U.S. dollars, which need to be converted into the Korean won. However, this option is not universally available, and should be considered an anomaly in assessing the global market.

From the qualitative data collected from both new and experienced competitors in the international construction marketplace, the authors make recommendations to confirm and improve exchange risk management strategies: Foremost, set up clear foreign exchange risk management policies before entering international construction market. This is critical to minimize wavering response to risk that could be based on emotion or misdirected intuition. Relative to specific strategies, hedge as much transaction exposure as possible. This is not only the purest form of mitigation of exchange risk, but it is also widely accepted by subcontractors and suppliers worldwide. Benchmark other competitive international contractors and other fully developed industries, and monitor foreign exchange rate data from banks or brokers. Analysis of trends is helpful in maintaining credible policy and appropriate risk management strategy.

Putting reasonable contingency in estimating and contracts and contracting primarily in hard predictable currency is also critical in sound hedging policy. Consideration of timing between cash inflows and outflows from operating and financing through netting can also be advantageous, and works best if the contractor has a number of projects at the same time.

Finally, forward exchange contracts can be effective if negotiated carefully, along with other specific types of transaction “insurance.”

The development of a sound plan to hedge exchange rate risk is critical for those in the international construction market. Without appropriate attention to this facet of global

business, participants will likely find themselves faced with significant potential for losses.

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