

Self-Assessment of Compliance with
the Core Principles for Systemically Important Payment Systems:
The Bank of Korea Financial Wire Network(BOK-Wire)

August 2004

Payment Systems & Treasury Service Department

Introduction

BOK-Wire(The Bank of Korea Financial Wire Network), owned and operated by the Bank of Korea, is a real-time gross settlement(RTGS) system that enables participants including commercial banks, securities companies, and insurance companies to make final payments in central bank money. BOK-Wire is the only large-value transfer system in Korea and is one of the channels through which the Bank implements monetary policy.

According to the revised Bank of Korea Act, effective from January 1, 2004, the Bank of Korea adopted the Core Principles for Systemically Important Payment Systems as one of the oversight policies on payment systems. As a first step, the Bank conducted an assessment of BOK-Wire in the first half of 2004. This paper is the results of the assessment of BOK-Wire.

Brief on BOK-Wire Operation

The main service provided thorough BOK-Wire is domestic currency funds transfer. In addition, foreign currency funds transfer, government and public bonds transfer, the Bank's loan and discount, and Treasury transfer are also carried out through other sub-systems of BOK-Wire.

BOK-Wire operates from 9:30 a.m. to 5:00 p.m.(in local time), Monday through Friday, excluding designated holidays. The operating hours can be extended under the provisons of the Working Rules on the Operation and Management of Payment Systems.

To minimize unexpected liquidity shortage of participants, BOK has introduced a queuing arrangement with a by-pass FiFo(First-in, First-Out) solution and optimization routine. In addition, the Bank makes available to participants fully collateralized intraday overdraft facilities. BOK-Wire transactions are charged only to the originating institution(debit side). Fees range from ₩ 100 to ₩ 300 per transaction.

BOK-Wire processed an average of 6,532 payments per day in the first half of 2004, totaling about ₩ 106.5 trillion each day. And 126 financial institutions were participants in BOK-Wire at the end of June 2004.

1. Core Principle I : The system should have a well founded legal basis under all relevant jurisdiction.

Assessment of Compliance

Korea law provides a comprehensive and well-established legal framework for funds transfer over BOK-Wire. BOK-Wire complies with Core Principle I .

The Bank of Korea Act and related materials

The Bank of Korea Act, Article 81 allows the Bank to operate payment systems and to establish regulations for its own payment system.¹⁾ Issued under the Act, the Regulation on Operation and Management of Payment Systems and related rules²⁾(hereinafter referred to as the Regulations) provide a comprehensive set of rules for funds transfer over BOK-Wire, including the following areas:

- Membership of BOK-Wire
- Exchange of payment messages
- Rights and obligation of participants
- Timing of acceptance of payment orders
- Rejection of payment orders
- Liability of erroneous payment orders
- Other miscellaneous issues

The agreement for participation in BOK-Wire (a contract between the Bank and an institution) is in accordance with *the Civil Law*.

Other applicable Laws

There might be a conflict between transactions settled through BOK-Wire and the provisions of *The Bankruptcy Act* in a bankruptcy situation because settlement finality is not expressly provided for by law in Korea. However, BOK-Wire is a real-time gross settlement system where evidence of the time of transaction is automatically acquired. Therefore transaction settled through

1) Article 81 provides that for the purpose of promoting the safety and efficiency of the payment system as a whole, the Bank of Korea may determine all necessary matters concerning the payment systems that it operates.

2) The regulation and its related Working Rules are available on the Bank's web site.

BOK-Wire can be protected through a court ruling.

Under the Article on security interest of *Bankruptcy Act*, the Bank's right to liquidate security provided by an insolvent BOK-Wire participant is also protected.

The provisions concerning payment message are consistent with The *Electronic Transaction Act*, which provides that the parties to a transaction may make an agreement on the method of exchange of message. Immunity provisions also comply with *the Commercial Law and the Act for Fair Agreement*³⁾.

Recommendation

Even though transactions settled through BOK-Wire are rarely affected by the *Bankruptcy Act*, and especially exempted from the application of "Zero Hour Rule", it is advisable to expressly provide for settlement finality to protect BOK-Wire against any possible legal challenges.⁴⁾

3) Article 32 of the Regulation stipulates that the Bank in the absence of wilful intent or significant error shall not be responsible for any loss arising from a malfunction of message delivery, delay in business processing, or delivery of manipulated or erroneous messages by participants or users and the Bank shall not be responsible for any loss that takes place as a result of violation by any Participants or Users of this Regulation, the Working Rules of this Regulation, or the Bank's other relevant regulations or directives.

4) This could be achieved by revising the *Bankruptcy Act*.

2. Core Principle II : The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.

Assessment of Compliance

The Regulations on operation and management of BOK-Wire are clear and permit participants to understand the financial risks resulting from participation in the system. These Regulations fully define the rights and obligation of all involved parties and are available to the public. BOK-Wire complies with Core Principle II.

Disclosure and Documentation

The Bank provides participants with these materials which describe the basic framework of BOK-Wire, risk management, processes of payment orders.⁵⁾

- The Regulation on the Operation and Management of Payment Systems
- Working Rules on the Operation and Management of Payment Systems
- BOK-Wire's detailed operational procedures

All changes to the Regulations are documented and immediately appear on the Bank's web site. The Bank seeks, where necessary, comments from participants. The Bank also runs consultative committees of participants to maintain the transparency of payment system policy.⁶⁾

Obligations of participants and the Bank

Participants are required to:

- maintain adequate funds in their settlement account and monitor their balances through the day;
- settle queued payment orders within one hour; and
- post funds to beneficiary's account promptly, etc.

5) They are available at the Bank's web site.

6) The committee is made up of 15 representatives(10 are from banks, 3 are from securities companies, and 2 are from other participants.) And, the Bank often use survey to reflect participants' demand.

The Bank is required to:

- monitor the status of funds transfer over BOK-Wire; and
- stipulate designated times for settlement of net obligations arising from KFTC⁷⁾ managed clearing systems.

The Regulations also establish BOK-Wire's operating hours and BOK's ability to extend these hours under exceptional circumstances(e.g., because of disruptions to operations) and set restrictions on participants' access to BOK-Wire. In addition, the Bank provides participants with "Business Continuity Plan for BOK-Wire".

Recommendation

If the changes to the Regulations place a considerable burden on participants, it is advisable for the Bank to be required to seek comments from participants.

7) Korea Financial Telecommunication & Clearing Institute

3. Core Principle III : The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.

Assessment of Compliance

Credit and liquidity risks to BOK-Wire participants are managed through immediate finality and the provision of intraday credit. In addition, through monitoring and full collateral requirements, the Bank offers incentive for the management of those financial risks to participants. BOK-Wire complies with Core Principle III.

Risk management

Participants are provided with information on the status of payment orders, and balance of their current account, etc. The Bank also monitors the status of funds transfers over BOK-Wire.

To effect smooth operation of BOK-Wire, the Bank provides fully collateralized intraday credit in the form of overdraft facilities for participants (banks only).⁸⁾ A participant's maximum intraday overdraft is two times its average overnight settlement account balance for the preceding two months. If an institution is unable to repay the Bank by the end of the day, the overdraft is automatically converted into an emergency liquidity loan.⁹⁾

Queue arrangement

To minimize unexpected liquidity shortages of participants, the Bank has introduced a queuing arrangement operated on a by-pass FiFo basis. The Regulations, however, require that queued payment order be settled within one hour of being placed in the queue. Participants that do not comply with this requirement cannot use BOK-Wire's central processing services for a period of time, depending on how frequently this requirement is breached.

8) Under the Bank of Korea Act, the Bank's loan is restricted to banks.

9) In the case of emergency liquidity loans, the participant pays a penalty of an interest rate of 2 percentage points plus the target call rate set by Monetary Policy Committee.

Fee discrimination

To smooth fund flow through the day, the Bank has implemented differentiated fees. However, the concentration of payment orders around closing time(16:00~ cutoff time) still continues.¹⁰⁾

< Distribution of payment orders during the day in 2003 >

(%)

	Volume	Value
9:30~10:00	1.5	0.8
10:00~11:00	2.7	1.5
11:00~12:00	3.0	1.7
12:00~13:00	0.5	0.3
13:00~14:00	4.7	4.2
14:00~15:00	11.2	18.1
15:00~16:00	21.8	20.2
16:00~17:00	54.6	53.2
Total	100.0	100.0

10) For the BOK-Wire fee schedule, refer to Core Principle VIII.

4. Core Principle IV : The system should provide prompt final settlement on the day value, preferably during the day and at a minimum at the end of the day.

Assessment of Compliance

BOK-Wire provides real-time, immediate finality. BOK-Wire complies with Core Principle IV.

Finality of Settlement

Payment orders are processed immediately following the Bank's receipt of a transfer message. And the Regulations stipulate that once a payment order is processed, it is unconditional and irrevocable.

Cancellation and Rejection of Payment Orders

Participants may cancel following payment orders:

- queued payment order; or
- pre-arranged payment order which doesn't pass the deadline.

The Bank may also reject following payment orders:

- payment orders that do not meet security procedures;
- payment orders that are still in the queue by cutoff time; or
- pre-arranged payment orders not processed at the designated time.

Error Handling

The Regulations have provisions to handle errors on the part of participants or the Bank. A participating institution which receives a misdirected payment transfer is required to send a payment order to straighten it out.¹¹⁾

In case of BOK-Wire's operational disruption because of disaster or other reasons, participants are obliged to make sure that transactions are correct and to inform the Bank of it if they find anything erroneous in them.¹²⁾

11) If a participant does not follow the rule, it will be subject to sanctions.

12) Participants are responsible for vindicating their claims.

Operating Hours

BOK-Wire operates from 9:30 a.m. to 5:00 p.m., Monday through Friday, apart from public holidays as specified in the Regulation on Holidays of Public Offices and Labor Day.¹³⁾ In the case of operational disruption of BOK-Wire or participant's problems in completing processing, cutoff time may be extended.

Sanctions

To ensure smooth and timely operation of BOK-Wire, the Bank can apply sanctions against participating institutions that violate the Regulations. Sanctions include giving warnings, requiring corrective measures, imposing restriction on or suspension from the use of BOK-Wire, or cancellation of the relevant agreement.

13) Payment orders for repaying intraday overdrafts are allowed until 17:30.

5. Core Principle V : A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.

Because BOK-Wire operates on an RTGS basis, Core Principle V is not applicable.

6. Core Principle VI : Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk and little or no liquidity risk.

Assessment of Compliance

Payment transfers over BOK-Wire are settled in central bank money. BOK-Wire complies with Core Principle VI.

7. Core Principle VII : The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.

Assessment of Compliance

BOK-Wire maintains a high degree of security and operational reliability. BOK-Wire complies with Core Principle VII.

Security

The Bank has established a security policy and has put in place a number of security facilities. Payment messages are encrypted and transferred over dedicated communication lines.¹⁴⁾ Only users registered at the Bank are allowed to access BOK-Wire terminal and user's access is restricted to pre-authorized services. Other security tools such as Log-on ID, password, and chip cards are also used. All transactions, log-ons, and changes to software are recorded and reviewed. The effectiveness of system operation and development are also reviewed regularly by the Bank's Internal Auditors' Office.

Capacity Maintenance

The Bank has established a capacity plan considering volumes at peak times and expected volumes increase in the future. Unexpected increases are managed by clustering method. A separate system built to replicate the actual system is prepared for emergencies.

Manuals and Staff

The Bank has comprehensive and detailed manuals for reliable operation of BOK-Wire. The manuals cover all possible situations. Day-to-day operational procedures are described in detail and kept up to date.

All staff satisfy all requirements set by the Bank. To ensure that BOK-Wire has adequate numbers of well trained, competent and trustworthy staff, the Bank has job descriptions for BOK-Wire calling for a required level of knowledge, technical licenses, etc.

14) Stand-by PSTN(Public Switched Telephone Network) lines are prepared for emergencies.

Business Continuity

The Bank has a number of procedures in place to ensure the resilience of BOK-Wire. All aspects of the procedures are clearly documented and their effectiveness is tested regularly. Operation of the system is continuously monitored to detect any problem at the earliest possible stage.

The Bank also maintains out-of-region back-up facilities¹⁵⁾ with which BOK-Wire is able to resume within at least two hours. The back-up site has the same system configuration as the primary site, and data are mirrored almost in real time.

Service Availability

BOK-Wire has achieved 99.9% service availability in 2004. There has been no funds major outage except on April 2, 2004. On that day, payment transfers were suspended for three hours owing to a software glitch. Besides this, most extensions of operating hours were due to RP transactions or minor problems.

Recommendation

To ensure the timely resumption of BOK-Wire, it is advisable for external specialists to audit BOK-Wire, in particular on software.

15) It is about 140km away from the primary site.

8. Core Principle VIII : The system should provide a means of making payments which is practical for its users and efficient for the economy.

Assessment of Compliance

BOK-Wire operates efficiently and the Bank regularly seeks user feedback concerning services and systems to ensure efficiency and practicality. BOK-Wire broadly complies with Core Principle VIII.

Fee Pricing

BOK-Wire transaction fees are set to cover the cost involved in development and maintenance of BOK-Wire. Fees range from ₩ 100 to ₩ 300 per transaction and transactions are charged only to the originating party. As noted Core Principle III, the Bank has introduced fee differentiation to smooth funds flow through the day and to encourage participants to use the DVP(Delivery versus Payment) system.

< BOK-Wire Fee Schedule >

In Korean won per transaction

Services	Fees ^{a)}	
	Until 16:00	After 16:00
Funds transfer in domestic currency	150	300
Delivery versus payment	100	150
Funds transfer in foreign currency	150	300
Government and public bond transactions ¹⁶⁾	150	300
Cancellation of request	500	500

Note : a) Fees are charged based on the time when the transfer of funds is completed, except in the cases of government or public bond transactions and other services.

Other costs

Participants bear the maintenance cost of the communication line connecting their terminals to BOK-Wire. Other facilities such as terminals, and modems are also at the cost of participants.

16) Issuance and redemption of MSBs(Monetary Stabilization Bonds) and government bonds, and government or public bond transactions.

Practicality

There is no limit on the minimum value of payment but payment orders on behalf of customers must have a value of at least one billion won.

BOK-Wire's terminals may not be convenient to use.¹⁷⁾ BOK-Wire is, however, undergoing a process that will make it user-friendly.¹⁸⁾ It is expected that this migration will be completed by October 2004.

Recommendation

BOK-Wire's fee schedule is made public, but its pricing policy is not. It is advisable that pricing policy for BOK-Wire be publicly disclosed.

17) The operating software for terminals is still DOS.

18) The operating software will be changed from DOS on a text user interface to Windows on a graphic user interface. With this action, users will be able to access BOK-Wire service via a web browser. In addition, the protocol linking the systems and peripherals of BOK-Wire with users terminals will be migrated from X.25 to TCP/IP.

9. Core Principle IX : The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.

Assessment of Compliance

Criteria for BOK-Wire access are clearly defined and publicly disclosed. BOK-Wire complies with Core Principle IX.

Access Criteria

To access BOK-Wire, an institution must enter into a BOK-Wire participation agreement.¹⁹⁾ The Bank sets access criteria for BOK-Wire considering the ratio of management guidance designated by a supervisory institution on the concerned party, the expected frequency of use of BOK-Wire and relevance to the services provided by the Bank.²⁰⁾

<Participating institutions^{a)}>

		Number
bank	Local Banks	19
	Foreign Banks	37
Non-bank	Securities Companies	50
	Merchant Banking Corporations	2
	Insurance Companies	10
	Others ^{b)}	8
Total		126

Note : a) At the end of June 2004

b) Korea Securities Exchange, Korea Securities Depository, Korea Deposit Insurance Corporation, etc.

Exit Criteria

Participants are free to exit from BOK-Wire without any financial burden. The Bank may also demand that a participant that no longer meet access criteria withdraw from BOK-Wire or terminate agreement of a participating institution against whom sanctions have been applied seven or more times.²¹⁾

19) Before participating in BOK-Wire, an institution must have a current account at the Bank.

20) Access criteria are available on the Bank's web site.

21) A participant intending to withdraw from BOK-Wire must submit an application for withdrawal to the Bank

10. Core Principle X : The system's governance arrangements should be effective, accountable and transparent.

Assessment of Compliance

The governance arrangements of the BOK-Wire are effective and accountable, with relevant information publicly disclosed.

Governance Arrangement of the Bank

The Governor is responsible for the effective operation of BOK-Wire, while ultimate responsibility rests with the Monetary Policy Committee. And, the Internal Auditor's Office conducts audits of the Bank's overall business including the operation of BOK-Wire²²). The National Assembly and the Board of Audit and Inspection also examine the Bank.

Consultative committee of participants

As noted above, the Bank hosts consultative committees of participants on both policy and business issues and on day-to-day operation of BOK-Wire. The committees deal with operational process, standardization, transaction fees, etc.

Disclosure of relevant information

The Bank produces the Annual Report of the Bank describing the Bank's policies and business operations. Moreover, it publishes *Report on the Operation and Management of Payment Systems* annually.

22) The Internal Auditor's Office is independent from the management of the Bank.

Concluding Remarks

The amended Bank of Korea Act mandates that the Bank of Korea will oversee payment systems in Korea. As part of its oversight activity, the Bank set up an assessment program that checks the compliance of all SIPSs in Korea with the Core Principles or Recommendations. This was the first step of such assessment program, following the IMF/World Bank's assessment conducted as part of the Korean FSAP in 2001-02 that concluded BOK-Wire fully complies with the Core Principles.²³⁾

The Bank endeavored to apply the Core Principles to BOK-Wire strictly to find BOK-Wire safer and more efficient than it was at the time of the IMF/World Bank's assessment. Although some minor weaknesses still exist, the Bank does not believe such weaknesses will affect the safety and efficiency of BOK-Wire. Moreover, the Bank has already set up, and started to implement plans for series of measures to address the weaknesses found in this self-assessment, such as stronger Business Continuity Plan and external audit on software.

BOK-Wire is assessed on an annual basis as it is a vehicle for the Bank's monetary policy and it is the only large-value transfer system in Korea. The second self-assessment will be conducted next year, focusing on weak points found in this assessment, operational changes to BOK-Wire and responsibilities of the central bank in applying the Core Principles.

23) Only recommendation at that time was that the Bank's payment system role and objective should be explicitly set out in legislation and the Bank's oversight role should, at a minimum, include a responsibility for ensuring the smooth operation and promoting the efficiency of the Korean payment system. This recommendation was achieved by amending the Bank of Korea Act.