

# 철도차량 Software 지적 재산권 분쟁 해결을 위한 Escrow Account 적용 절차에 대한 연구

## Study on Procedure for Escrow Account to Resolve Controversy of Intellectual Property Right of Software for Rolling Stock

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### ABSTRACT

This paper shows the result of study on the detailed applicable procedure of software Escrow account applied for rolling stock. The customer as end-user requires software source code, related critical technical documents etc. about software based system of train for maintenance purpose through software modification and enhancement after completion of warranty period. Otherwise, it is not easy to keep up with the customer's requirement of demanding supplier's exclusive information because it is considered as intellectual property rights of supplier as software developer. Therefore, the main contractor (normally called as Car-builder) need to introduce software Escrow service in order to coordinate the different a standpoint between software developer and end-user. Software Escrow is a legal arrangement in which an software Escrow packages (software source code, software development tool, build process, proprietary information, copyright and etc.) is deposited into and Escrow account under the trust of a reliable third party (Escrow agent) depending on mutual agreement on Escrow contract condition as signing off Escrow agreement document. This paper deals with the study on the detailed procedure about the following general category of Escrow procedure and purpose to apply this specific procedure of Escrow into the future project onward.

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### 국문요약

본 논문은 철도차량분야에 적용할 소프트웨어 Escrow의 상세 적용 절차에 대하여 논의하고자 한다. 철도차량 발주자는 차량의 소프트웨어 포함 장치에 대한 하자보증 기간(warranty period) 이후의 소프트웨어 변경 및 유지보수성 확보를 위하여 소스코드, 핵심적인 기술 원천정보 등을 요구하고 있다. 한편, 소프트웨어 개발 업체는 소스코드 등이 업체의 지적 재산권에 해당하는 사안이기 때문에 시행청의 요구사항을 만족하기 어려운 실정이다. 그러므로, 주 계약자인 철도차량 제작자는 소프트웨어 개발자와 사용자 간의 다른 입장을 조율하기 위하여, 소프트웨어 Escrow 서비스 제도를 도입해야 할 필요성이 있다. 소프트웨어 Escrow는 소프트웨어 Escrow 패키지(소프트웨어 소스코드, 소프트웨어 개발 툴, 빌드 프로세스, 독점권을 가진 정보, 저작권 등)의 거래 시, Escrow 계약 문서에 대한 서명을 통한 Escrow 계약 조건을 상호 합의한 후 신뢰성 있는 제3의 기관에 관련 기술 자료 등을 예치해 두는 양자 간 상생협력을 위한 제도이다. 본 논문에서는 다음의 Escrow 진행 절차에 대한 상세 내역을 연구하고, 향후 프로젝트 적용 방안을 제안하고자 한다.

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## 1. INTRODUCTION

There have been an opposing opinion between end-user of railway vehicle and supplier of software containing subsystem. In this situation, Escrow is on the rise as a key to the settlement of a dispute.

Escrow is a legal arrangement in which an asset (such as cash, real property or other tangible assets) is deposited into safekeeping (e.g. a bank account) under the trust of a neutral third party (Escrow agent) pending satisfaction of contractual contingency or condition. Once the condition has been met, the Escrow agent will deliver the asset to the party prescribed by contract. This is general concept of Escrow about various filed. This paper presents detail procedure of software Escrow agreement.

The software Escrow agreement is a tool to protect the rights of software end-user and the proprietary technology of the software developer. A physical copy of the source code of the software is held by Escrow agent and released under the conditional terms of a software Escrow agreement, executed by all parties. The Escrow agreement defines the deposit materials and the terms upon which the source code can be released to the licensee.

The software Escrow activities comprise of a number of discrete steps:

- 1) agree the third party keeper (agent) of the Escrow material
- 2) agree the conditions of the Escrow between the customer, supplier and each sub-supplier
- 3) prepare the Escrow activity plan
- 4) identify the software components to be placed in Escrow. This includes all items necessary to enable subsequent maintenance and / or replication of the software, such as compilers, linkers, source code, documentation, application and configuration data etc.
- 5) verify that the list of software components is correct and complete
- 6) verify that the list of executables agrees with the software actually installed on site
- 7) create Escrow deliverables
- 8) verify Escrow deliverables and
- 9) deposit Escrow deliverables

## 2. DETAIL PROCEDURE FOR SOFTWARE Escrow ACCOUNT

### 2.1 Software Escrow Activities & Procedures

#### 2.1.1 Agree the Escrow Agent

This is an issue to be agreed between customer(end-user) and each sub-supplier. This is because the Escrow agreement should release the Escrow material directly to the customer. There are several reputable Escrow available in Europe - in particular NCC based in the UK and Escrow Europe based in the Netherlands. The Korea Software Copyright Committee is reputable software Escrow agent in Korea.

#### 2.1.2 Agree the Escrow Contract

Once the Escrow agent has been agreed then the details of the Escrow contract need to be finalized between customer, supplier and each sub-supplier. Contained within the Escrow agreement are such things as:

- 1) the length of the Escrow agreement including any 'early termination' clauses;
- 2) the process for making a claim;
- 3) the arbitration process;
- 4) the conditions under which the package is released to customer;

- 5) the frequency that the software media is updated;
- 6) the process for the purchaser to confirm and re-verify software media updates; and
- 7) the annual costs and responsibility for payment

In theory the Escrow agreement should be the same for each supplier with only the list of Escrow material being different. However, in some cases there may be specific clause that are not applicable to certain suppliers and may need to be amended or removed.

It is highly recommended that all parties have the Escrow contract reviewed by their own legal advisers as the agreement is a legally binding document.

### 2.1.3 Prepare Escrow Activity Plan

Each sub-supplier shall produce an Escrow Activity Plan. This shall identify resources and allocate time schedules for the:

- 1) effort required by the supplier in producing steps 2.1.4 and 2.1.6 below; and
- 2) the process to be used for verification. This shall include the method to be used by customer/supplier to exact the current version number of each item of Escrow material and the method to be used to verify that the build of the source application matches that installed on site.

There needs to be agreement between all parties that the Escrow activity plan is achievable and satisfies all the requirements.

### 2.1.4 Identify the Escrow components

Each supplier should produce Version Description Document (VDD) which is a list (inventory) of all the software components (executables) installed on the system. The VDD should identify whether the software is COTS, Proprietary or Developed.

For COTS software, the list shall include (but not be limited by) the COTS software version number and any update patches required.

For each executable identified in the VDD as a Proprietary executable (i.e. the software to be placed under Escrow) the sub-supplier shall provide an Escrow material list. This shall include (but not be limited by):

- 1) the software executable
- 2) the software source modules, scripts, data files, graphic files etc. and their version number of all the components that comprise that executable;
- 3) the command files necessary to build the executable;
- 4) any configuration files necessary for the application;
- 5) the compiler and linker necessary to build the executable and details of configuration setting necessary for the compiler and linker;
- 6) the tools necessary to create the EPROM/PROM etc. if applicable;
- 7) the design documentation necessary to modify the software (software requirements, functional design, system design, software design, O&M manual etc.)
- 8) details of the software programming language, design notations and tools used in the development;
- 9) software application libraries necessary to necessary to build the executable;
- 10) instructions on how to generate the executables;
- 11) instructions on how to install the software on the target system;
- 12) any license necessary to use the compile, linker or any other included COTS product etc.;
- 13) details of the hardware environment that the software is designed to be executed on; and
- 14) identification of all COTS products needed to support the software in its operating environment (such as

operating system, communications software, middleware etc.)

#### 2.1.5 Verify the Components Version Numbers against Site Installation

Customer/supplier should compare information recorded in the VDD with the delivery notes of the latest versions of the software supplied to supplier and with the software actually installed on site. Any discrepancies shall be notified to the sub-supplier.

It is important that the software identified is consistent with that defined in the VDD. Therefore, a copy of the actual on-site executables should be sent to the sub-supplier to allow the sub-supplier to verify that the Escrow discs generate the software actually installed on site. This will save considerable time during the witnessing activities. The second copy should be retained by supplier and used during the verification process.

#### 2.1.6 Create Escrow Deliverables

The sub-supplier shall assemble the Escrow deliverables. The software shall be loaded onto a suitable media such as CDROM.

#### 2.1.7 Verify Escrow Deliverables

The contents of the deliverable media shall be verified by customer/supplier/main contractor according to the Escrow activity plan. The purpose is to show that the software generated by step 2.1.6 matches that actually installed on site. The sub-supplier shall be responsible for the provision of all equipment necessary to perform the verification. The process shall:

- 1) start with a 'clean' computer on which to perform the software build process;
- 2) use the target Escrow disc provided by the sub-supplier;
- 3) follow the documented instructions to create the executables; and
- 4) verify the operation of the generated components (by the conduct of a representative sample of functional tests) or do suitable comparison of the generated files (for example comparing file sizes and file contents of the escrow installation with the actual installation).

It may be agreed beforehand that a system containing pre-loaded COTS software is used. In this case, the verification exercise shall ensure that all other computer directories are removed from the system. Hand annotation of the instructions shall be acceptable if agreed by all parties present.

If required by customer's requirement, the concerned party(sub-supplier(Licensors), Customer(Licensee), Main Contractor(Coordinator)) need to put signature into the " Certificate of Escrow Demonstration(Refer to Appendix)" as a token of successful escrow verification testing.

#### 2.1.8 Deposit Escrow Deliverables

The Escrow deliverables shall be packaged up and sealed in front of the witnesses. The appropriate Escrow delivery paperwork shall be completed and the package sent by courier to the agreed Escrow agent. Copies of the delivery documentation shall be retained by the supplier, customer and supplier.

### **2.2 Contents of Escrow Related Documentation**

#### 2.2.1 Contents of VDD

For the purposes of the Escrow processes, each sub-supplier should provide a VDD. The document should be updated whenever new software is delivered (and can from of the software delivery note). The contents of which should be:

1. Title Page

Contains all necessary approvals, document identity etc.

2. Document Revision History

Provides a complete history of the document

3. Section 1 - Introduction

Describe the scope, product supplied, location etc.

4. Section 2 - Identify the Software Supplied

Typically this can take the form of a table thus:

- 1) Equipment Description: An entry should be made for each item of equipment provided by that supplier
- 2) Identify each executable piece of software on that equipment
- 3) Type (COTS, Proprietary, Developed): State if that piece of software is COTS, Proprietary or Developed
- 4) Sub-supplier: Identifier the supplier of that piece of software
- 5) Label (if appropriate): Some software may be identified via a label.
- 6) Checksum (if appropriate): Some software may identify a checksum.
- 7) Comments: Add any appropriate comments

Table 1. The form of VDD

1	2	3	4	5	6	7
<b>Equipment Description</b>	<b>Software Identity</b>	<b>Type (COTS, Proprietary, Developed)</b>	<b>Supplier</b>	<b>Label (if appropriate)</b>	<b>Checksum (if appropriate)</b>	<b>Comments</b>

2.2.2 Contents of Escrow Material List

The Escrow material list should identify all the components to be stored under the Escrow agreement. The contents of which should be:

- 1) Title Page: Contains all necessary approvals, document identity etc.
- 2) Document Revision History: Provides a complete history of the document
- 3) Section 1 - Introduction: Describe the scope, product supplied, location etc.
- 4) Section 2 - Identify the Escrow Components

Typically this can take the form of a list of components. The list should identify:

- i) the design documentation necessary to modify the software (software requirements, functional design, system design, software design, O&M Manual etc);
- ii) any licences necessary to use the compile, linker or any other included COTS product etc;
- iii) the compiler and linker necessary to build all the executables and details of configuration settings necessary for the compiler and linker;
- iv) details of the programming language, design notations any tools used in the development of the software
- v) for each software executable:
  - the software source modules, scripts, data files, graphic files etc and their version number of all the components that comprise that executable
  - the command files necessary to build that executable (compile and link)
  - software application libraries necessary to necessary to build the executable
  - instructions on how to generate the executable;
- vi) the tools necessary to create the EPROM/PROM etc if applicable;

- vii) instructions on how to install the software on the target system; and
- viii) any configuration files necessary for the system
- ix) details of the hardware environment that the software is designed to be installed on
- x) identification of all COTS and other software products necessary for the operation of the software in its target environment (such as Operating System, communications, middleware etc)

### 2.2.3 Contents of Escrow Activity Plan

The Escrow Activity Plan should identify the activities required by the supplier to provide the information required of the Escrow agreement. The contents of the plan should include:

- 1) where the verification is to take place
- 2) the personnel required
- 3) the expected duration of the verification exercise. Time must be included to verify the Escrow deliverables match the items identified in the Escrow Materials List
- 4) the procedures to be used to build the software (on of the items required in the Escrow Material List). These procedures will be followed to create the executables
- 5) the method to be used to verify that the information assembled (step 3.6 of the Escrow Guidelines) results in the software executables identified in the VDD. This will depend on the software supplied and may be:
  - a comparison of checksums and program size and/or
  - execution of a defined set of tests to prove correct operation of the software and/or
  - execution of a 'file compare' program or equivalent.

### 2.3 Experience of Escrow Service

Hyundai Rotem Company as main contractor has experienced on the following overseas project applying escrow service instead of direct submission of source code and proprietary information of sub-supplier:

- HongKong MTRC TKE Project
- Attiko Metro Series II Rolling Stock Project
- SEPTA Silverliner V Project
- SCRRRA Metrolink Multi-Level Commuter Rail Cars Project
- MBTA Bi Level Commuter Coach

### 3. CONCLUSION

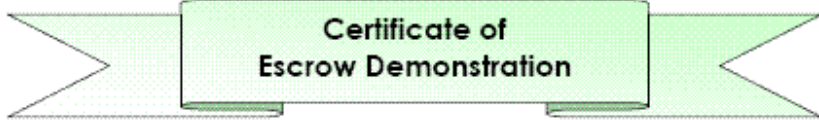
This paper introduced the detail and substantial procedure for software Escrow for railway vehicle. Although the Escrow Account require extra costs incurred for escrow agent fees, it enables customer to guarantee maintenance for operation of microprocessor driven system in case of bankrupt of sub-supplier. For future project of domestic and overseas rolling stock project, the process of software escrow service and related document form which is presented in this paper will be applied in order to resolve controversy of intellectual property right of software between sub-supplier and customer(end-user).

### Reference

1. Chang Wing Kin (2006), 'Escrow Guideline', Kowloon-Canton Railway Corporation
2. Lee, Seong-Geun (2000), 'Study on Introduction of Escrow Agreement', The Graduate School of Public Administration Kyung Hee University.

**APPENDIX**

If verification testing of the Components Version Numbers against Site Installation is successful, the concerned party(sub-supplier(Licensor), Customer(Licensee), Main Contractor(Coordinator)) issue the Certificate of Escrow Demonstration such as following form.



**Certificate of Escrow Demonstration**

The purpose of escrow verification testing is to demonstrate that the software object code generated by the Licensor from the deposited source code exactly matches that actually installed in the train-set on site.

The Contractor hereby certifies that the following escrow verification testing has been successfully performed without any problems, defects, or inconsistencies occurring during the demonstration. The Contractor also certifies that the escrow package is ready to deposit with the escrow agent in compliance with the signed escrow agreement document.

1. The deposited media is readable and complete and has been tested to verify that the source code files contained in the deposited media are identical to the files the Contractor warrants are included in the deposit.
2. The deposited software source code will convert into software object code and that the complete, deposited source code files are an exact copy of the master version files retained and managed by the Licensor and/or the Contractor.
3. The software object code, when generated from the deposited software source code, will be the same as and will process data exactly the same as the licensed program that is actually installed in the train-set on site.

**Witnessed by :**

Name of Company			
Name of responsible personnel			
Signature			
Date			

Date :  
Venue of escrow verification testing :