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# A Study on the Construction Plan of Machinery Public Platform through the Survey of the Construction Machinery Rental Market

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***Abstract***

*In the construction machinery rental market, there are frequent cases of sublease through large-scale rental companies or rental through mediation organizations without legal grounds. In addition, institutional improvement of the construction machine safety management system has been required due to concerns over the internalization of legal inspections due to the lack of type approval data and construction machine history management during the construction machine inspection process. The government is responsible for securing safety of construction machinery and promoting mechanization of construction machinery by efficiently managing the construction machinery market by setting safety management such as type approval, registration, and inspection of construction machinery. In order to efficiently implement this, it is required to establish a platform for renting construction machinery and collecting safety management information. We presented a plan to build a public platform for construction machinery to secure the soundness of the construction machinery rental market and to improve safety management.*

***Keywords:*** *Construction Machinery, Public Platform, Rental Market, Safety Management*

## 1. Introduction

### 1.1 Background and Objectives of Our Study

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(As of September 2022, there were a total of 542,000 registered construction machines, categorized into 27 different types, with 268,000 units designated for commercial use, constituting a significant portion of 50% of the total.) [1].

(There are a total of 14,749 registered construction machinery rental companies. However, over 71% of these companies either operate as individual rental businesses with four machines or fewer or are part of general rental companies and subcontract their services.) [2] Additionally, the information sharing between rental companies and clients in the leasing market is inadequate, leading to cases where unregulated intermediary agencies are used without legal basis for leasing. Furthermore, during the intermediation process, unfair practices such as non-payment, subletting, and unfair contracts are widespread. Approximately 26% of fatalities in the construction industry are linked to construction machinery and equipment, with equipment defects being a prevalent cause in such incidents. The current information-sharing system for construction machinery is insufficient, posing challenges for inspection agencies in gathering essential data in advance. In the case of tower cranes, inspection agencies often depend on lessors for data, resulting in frequent instances of subpar inspections.

In some large construction sites, equipment regulations require the use of machinery manufactured within 5 years or 3 years, posing a threat to small construction machinery rental companies. The government is responsible for promoting mechanization of construction work by efficiently managing construction machinery and securing safety of construction machinery by setting matters related to construction machine type approval (reporting), registration, inspection, construction machine business, and construction machine pilot license.

To efficiently fulfill the government's responsibilities, it is necessary to establish a platform for collecting information related to construction machinery rental and safety management. Through this research, we aim to propose a method for building a public platform Internet Service Provider(ISP) to ensure the integrity of the construction machinery rental market and enhance safety management.

### 1.2 Research Methodology

In this study, we conducted an examination of the current status of the construction machinery rental market through investigations into contract procedures and payment processes between rental companies and construction firms, contract document preparation practices, and case studies involving intermediaries in equipment rentals. We conducted an investigation into the safety management status of construction machinery throughout its lifecycle by assessing safety management practices at various stages, including formal approval (reporting), registration, inspection, and disposal.

Furthermore, to assess the requirements for a construction machinery ISP, we gathered input and opinions from construction machinery rental businesses, construction firms, safety inspection agencies, private experts, and other stakeholders regarding the issues and potential solutions related to the construction machinery rental market and safety management.

Finally, by presenting the basic design of the public brokerage platform and the data management method related to construction machinery, we intend to present a plan to establish a construction machine information network.

## 2. A Survey on the Construction Machinery Rental Market

### 2.1 Current Status of the Construction Machinery Rental Market

The construction machinery rental market is predominantly comprised of individual operators who own four or fewer construction machines, accounting for 71% of the market. Furthermore, a significant portion of these operators also serve as equipment operators themselves. Individual operators often find it difficult to individually identify construction machinery demand, and potential clients face challenges in obtaining information about these rental operators. In various regions, individual operators (owning four machines or fewer) are affiliated with either general operators or grouped intermediary agencies for equipment rentals, and this affiliation often involves deductions for intermediary fees.

Lease agreements can be facilitated without the involvement of intermediaries, where individual operators negotiate contracts directly with the clients. However, there are cases where intermediaries act as agents, representing individual operators and negotiating contracts between them and the clients.

In construction machinery rental contracts, agreements are made with specialized construction companies rather than engaging in direct contracts with the construction project clients. However, in small-scale construction sites, there are instances where instead of entering into direct contracts with specialized construction companies, day-to-day verbal contracts (daily rental agreements) are made with work teams for specific tasks. These agreements are established on a daily basis whenever there is a demand for construction machinery, and the machinery is deployed to the site accordingly.

In some construction sites, there are instances of unfair trading or cases like rental fee defaults occurring within the supply chain structure of construction subcontracting contracts. Furthermore, in most cases, construction machinery involves direct contracts between lessors and lessees. However, it has been confirmed that there are intermediary agencies, particularly for certain equipment like dump trucks and excavators, that facilitate introductions and agreements between the parties involved.

The real estate agencies have been known to collect intermediary fees in advance, either in cash or through other means, which, when transactions are conducted in cash, may create a gray area in terms of proper taxation due to the absence of official tax invoices.

### 2.2 Status of Use of Standard Contracts

Most of the construction machinery lease contracts are mutually sealed and stored by the lessor and the lessee in the construction machinery lease standard contract, but in the case of construction sites, the tenant became a subcontractor and there was no contractual relationship with the original contractor or the person placing an order.

Construction machinery rental operators can be individual lessees, and it's not uncommon for the owner and the equipment operator to be separate individuals. For instance, in some cases, the construction site may be located in Seoul, while the registered location of the construction machinery is in Gyeongsangbuk-do Province. The latter scenario is observed in various instances, and it's a situation that, in practice, is unlikely to occur without the involvement of intermediaries. Furthermore, in most of the construction machinery we surveyed, the owners were also operators who had registered their businesses as operators for the respective machinery, and they operated their own equipment. According to the content recorded in the standard contract, while the date of machine deployment at the site is documented, most cases do not record the expected completion date of the work.

According to the content recorded in the standard contract, it is challenging to determine the usage hours of our construction machinery. Most construction machinery is constructed with steel structures, and the

welding points on the machinery can be particularly susceptible to fatigue failure. Currently, obtaining data to establish the service life, considering the wear and tear of major components in construction machinery, is a difficult task. (The construction machinery lease agreement is regulated to specify the following items according to the "Construction Machinery Management Act" Article 22 Contract on Construction Machinery Lease, etc.) [3], (and the "Construction Machinery Management Act Enforcement Decree" Article 16 Contents to Be Included in the Construction Machinery Lease Agreement) [4], yet cases where the contracting parties fully comply with these obligations have not been confirmed.

### 2.3 Actual Conditions of Information Sharing

#### 2.3.1 Data of Formal Approval

(In the case of tower cranes, they were previously subject to formal reporting requirements until June 23, 2020. However, after that date, they became subject to formal approval requirements.) [5] Since November 5, 2007, the "Construction Machinery Management Act" was amended to regulate tower cranes. Due to this change and the dual management of documentation related to standards for manufacturing tower cranes, the state of data sharing has been inadequate.

In the case of tower cranes that were registered before June 23, 2020, we find that there are several instances where the sharing of relevant information for tower crane production is inadequate or absent. This situation imposes limitations on the effectiveness of inspection agencies in performing thorough inspections. Therefore, there is a need for the establishment of a system that allows inspection agencies to freely access relevant information for tower crane production on the platform in the future.

#### 2.3.2 Manufacturing Year of Construction Equipment

For tower cranes, the service life is determined considering the manufacturing year of Equipment. The fatigue life of structural materials varies significantly depending on the occurrence of stress and the number of repetitive actions. Nonetheless, setting the equipment's lifespan to a simple 20 years disregards this situation and is considered irrational due to the failure to account for these factors.

In construction sites, there is an excessive restriction on the manufacturing year construction equipment, including tower cranes. Some large companies have adopted the practice of importing equipment with an age limit of 3 to 5 years, which has led to cases where rental operators face disadvantages as a result. The accurate prediction of the fatigue life of tower cranes requires the management of information such as usage location, load capacity, and frequency of use. Additionally, efficient management of information related to idle equipment allows for the effective management of service life.

#### 2.3.3 Status of Construction Machinery Accident Investigation System

Buyers looking to purchase construction machinery want to access basic information to select high-quality equipment. They are interested in reviewing data specific to each construction machinery model, such as accident occurrence frequencies, and other relevant information to aid in their decision-making process. Such attitudes from buyers are likely to encourage equipment manufacturers to make efforts to enhance the quality of their equipment and contribute to protecting the rights and interests of buyers. Therefore, it is necessary to collect and publish data that includes the results of accident investigations, which have been gathered and analyzed.

There is an opinion that sharing the results of accident investigations, including the causes of accidents (equipment defects, operator errors, poor working conditions, etc.), the names of the equipment that caused

the accidents (including model names), the type of construction site (civil engineering, construction, or plant, etc.), the extent of personal injuries (death or injury), and measures to prevent recurrences, by uploading them to a platform, would significantly contribute to accident prevention caused by construction machinery.

### 2.4 Status of Establishing a Safety Management Information Network for Equipment

(Examples of the establishment of a safety management information network for equipment include the Construction Safety Management Comprehensive Information Network (CSI)) [6] and the National Elevator Information Center.

(CSI, which stands for the Construction Safety Management Integrated Information, was established under the "Construction Technology Promotion Act" and is a regulatory framework related to construction safety.) [7] It is designed to incorporate elements such as design safety review, safety management plan review, safety inspection results, safety management level assessment, and on-site inspection results. Furthermore, CSI comprehensively manages data related to the reporting of secondary accidents, accident investigations and statistical management for construction, smart safety information for construction, and inspection management for quality testing. Additionally, CSI operates with a user manual to facilitate the smooth operation of the information-sharing system. In other words, they have incorporated a manual that provides detailed guidance on the registration process for membership, various documents, and procedures for reviewing and commissioning safety management plans. This helps users review and submit safety management plans effectively.

(The Korea Elevator Safety Agency is a corporation established under Article 54 of the " Elevator Safety Management Act") [8], and this agency is responsible for tasks such as investigating, researching, and developing elevator safety, providing elevator safety education, and conducting promotional activities. The Korea Elevator Safety Agency operates a representative web portal site using an information network. In addition to this, they have established various web portals such as "Elevator Citizen Center 24," "Elevator Education Center," "Elevator Technical Documents," "Elevator Safety Technology Institute," an electronic library, and a cyber promotion center to share various resources and information.

Since it is believed that the National Elevator Information Center operates a network of information similar to that of construction machinery, it is considered advisable to benchmark the background and operational status of this information network to guide its establishment. The construction machinery doesn't have a comprehensive information network. (However, it operates an online system called "CEROI," which allows users to access information such as inspection and reservation, inspection fee payments, inspection history, and expiration dates for construction machinery. This system has been in operation since September 5, 2022.) [9]

The "CEROI" is an online system that allows users to access information related to the inspection and reservation of construction machinery, payment of inspection fees, as well as the inspection history and expiration dates. With the use of mobile devices, inspection applications can be made without being restricted by time or location. By simply entering the construction machinery vehicle number and date of birth or business registration number, you can apply for and make reservations for the inspection of construction machinery.

Currently, "CEROI" is limited to inspection tasks. However, in the future, there will be a need to establish a construction machinery public platform for various purposes, including equipment history management, parts certification, operator career management, sharing of accident cases, transparency in lease contracts, and simplification of various legal and administrative tasks.

# 3. Public Platform Requirements Survey

## 3.1 Overview of Requirements Survey

We conducted a requirements survey for the establishment of a public platform, gathering opinions from construction machinery owners, users, and relevant experts regarding the content, scope, and usage of the public platform. We conducted interviews with seven stakeholders (organizations) related to construction machinery. Additionally, we collaborated with three user organizations (specialized construction companies) and two experts to gather input on the requirements and direction for building the public platform.

## 3.2 Intermediary Platform for Renting Construction Machinery

From the perspective of consumers and individual businesses, they may partially agree with the work of establishing a platform for public brokerage. However, among general operators, relatively large operators tended to oppose most because they were concerned that the consumer (customer) market they had formed so far would be violated.

From the perspective of consumers and individual operators, some of them may support the establishment of a public intermediary platform. However, among general business operators, relatively large-scale enterprises tend to oppose it because they are concerned that their established consumer (customer) market may be encroached upon. Table 1 below summarizes the advantages and disadvantages of building a public brokerage platform for leasing construction machinery by combining the opinions of tenants, users, and experts. We summarized the strengths and weaknesses of landlords, users, and experts on the establishment of a public brokerage platform for construction machinery as follows. We summarized the positive and negative opinions as follows by collecting opinions from landlords, users, and experts on the establishment of a platform for public brokerage for construction machinery.

**Table 1. A comparison of the pros and cons of building a public platform for building construction machinery lease**

| Positive opinion | Negative opinion |
|---|---|
| ·Minimize mismatches between tenants and consumers<br>·Eliminate payment of brokerage fees according to direct contracts between tenants and consumers<br>·Minimize unfair transactions, overdue rent, etc<br>·Securing transparency in rental fees<br>·Contributes to the protection of the rights and interests of individual small businesses<br>·Eliminate unfair brokerage by large-scale private brokerage platform operators<br>·It is advantageous for the government to fulfill its responsibilities, such as controlling supply and demand of construction machinery and confirming the implementation of standard contracts | ·The government's excessive involvement in private market contracts<br>·Infringement of job formation created by the trend of the times, such as private brokerage platforms<br>·When rent is not paid due to bankruptcy of consumers, the government mediates and has certain responsibilities<br>·There is a limit to the government's quick response to rapid market changes<br>·Government intervention in the autonomous competition system in the rental market may be an obstacle to the growth of the rental market for construction machinery |

Considering the opinions of experts, it is not desirable to involve intermediaries in the platform development process between lessees and users. It is necessary to establish a system that allows users, especially small construction businesses, to easily access information about the lessors (such as location, types of construction machinery, and capabilities). (For the guarantee of payment for construction work, a safety mechanism, similar to Article 22-2 of the "Construction Industry Basic Act" (Guarantee of Payment for Construction Work)) [10], should be established by construction machinery lessors to prepare for situations where the lease payment is not received.

Efforts are needed to assess the current demand and supply situation for construction machinery, conduct surveys on leasing contracts in the rental market, and establish measures for investigating the usage environment of construction machinery (including purpose, frequency of use, and location).

### 3.3 Information Network for Construction Machinery Safety Management

Among the rapidly advancing advanced systems like big data, artificial intelligence (AI), and automation in various industrial sectors, the construction machinery sector still remains at an early stage. Construction machine safety management can be secured only when the information on type approval (reporting) for construction machinery, registration, inspection, use, and maintenance are properly managed.

There is a need to establish an information management system that verifies the lifecycle of construction machinery parts, the extent of wear and tear based on the operating environment, and emphasizes management information for the year of manufacture. This will allow for systematic improvements to the current uniform equipment inspection cycle and content based on equipment characteristics. It will also aid in simplifying administrative procedures, such as reporting by local government heads to the Minister of Land, Infrastructure and Transport.

The following table2 summarizes the input gathered for the establishment of a construction machinery safety management information network from stakeholders such as leasing companies, users, inspection agencies, and experts:

**Table 2. Collection of opinions on the establishment of safety management information network for construction machinery**

| Sortation | Contents of collecting opinions |
|---|---|
| Rental Entrepreneur | ·Checking information on the characteristics of each type<br>·Checking sales price information for each type of construction machine<br>·Checking intermediary information for used construction machinery<br>·Check the frequency of accidents by construction machine type<br>·Check the current status of registered construction machines<br>·Check information on parts certification items and parts manufacturers<br>·Check information on the timing of replacement of each component of the construction machine<br>·Notification service for maintenance cycle of construction equipment<br>·Improvement plan of insurance subscription system<br>·Provide information about inspection agencies |
| Employer | ·Checking the experience of the pilot of the construction machine<br>·How to check how the construction machine was used in the previous site<br>·Establishment of a system that allows differential application of rental costs |

| | |
|---|---|
| | according to the model year of the construction machine and the experience of the pilot<br>·A system that allows rental businesses to prove their own inspection and maintenance results in addition to court inspections<br>·Introduction of the lower limit of accident insurance due to construction machinery |
| An inspection agency (Tower Crane) | ·Provide history management information for each construction machine<br>·Obtaining information on the relevant construction equipment before the inspection date<br>·You need to be familiar with information related to type approval in advance<br>·Replacement history of parts such as maintenance history, accident history, use history, and mast of the construction machine to be inspected<br>·What was pointed out in the previous inspection<br>·Improvement of the tendency to avoid inspection<br>·Establishment of a system that officially provides information on the performance of construction machinery as prescribed by the Construction Equipment Inspection Standards<br>·Information management by construction machine type of construction machine other than tower crane |
| Expert | ·Establishment of information network related to construction machinery<br>·Constructed to be linked to the comprehensive information network for safety management of construction works<br>·Establishment of a system to collect and manage safety management information for each life cycle of construction machinery<br>·Management of information on construction machinery manufacturers, assemblies, and importers, construction machinery operators, and construction machinery pilots<br>·Establishment of a system in which administrative procedures prescribed by laws and regulations are submitted, approved, and generated through information networks, and DB<br>·Disclosure management of collected information<br>·Information on certified parts and information of manufacturers linked to the component certification system<br>·Information on laws and regulations related to construction machinery, procedures for complying with legal standards, etc<br>·Collection and management of information on accident cases<br>·Provide information on various manuals and instructions for maintenance of construction machinery<br>·Collection of information related to lease contracts<br>·Initially, information collection-related contents are applied differently for each case, and gradually expanded while analyzing the implementation status<br>·Properly establish the process of generating-verifying-confirming information<br>·Construction equipment safety management information network is urgently needed to prevent related accidents |

Construction Industry Basic Act [Enforced on August 4, 2022] [Law No. 18823, February 3, 2022, Partial Amendment]

Our survey on the requirements for the establishment of a construction machinery safety management information network revealed that leasing companies, users, inspection agencies (tower cranes), experts, and other stakeholders had varying perspectives on the direction, but all provided positive feedback. However, it was prevalent that careful consideration is needed when determining the content of information to be disclosed, separate from the data collection process.

In construction accidents, more than 25% of the fatalities occur annually as a result of construction machinery-related incidents. To establish practical measures for preventing recurrences, it is crucial to begin by thoroughly identifying the accident causes and, furthermore, there is a demand to build a system for accumulating and analyzing such data. Table 3 summarizes the contents and precautions necessary for establishing a safety management information network and disclosing information.

**Table 3. Contents and precautions of construction equipment safety management information network**

| Items required to establish a safety management information network | Precautions for establishing information networks |
|---|---|
| ·Information of manufacturers, assemblies, and importers of construction machinery<br>·Information of construction machinery operators<br>·Information related to type approval (report) of construction machinery<br>·Information of construction machinery inspection agency<br>·Information related to construction machine history (use, maintenance, type change, parts replacement, accident)<br>·Information on legal inspection results of construction machinery<br>·History management information of construction machinery pilots (training, etc.)<br>·Information on laws and administrative procedures related to construction machinery<br>·Construction accident investigation results and information on measures to prevent recurrence<br>·Manufacturer and variety information of parts subject to component certification<br>·Information on the insurance coverage status of individual construction machines | ·Management of information to be collected by law and information to be disclosed separately<br>·Information disclosure must be managed by strictly separating information disclosure grades such as issuance, provision, viewing, and posting<br>-Matters concerning information disclosure need to be established by collecting opinions from construction machinery officials<br>·In order to ensure the reliability of information management, procedures such as input-check-generation of information must be in place<br>·Security management system should be established, such as strict management of persons with access to information networks<br>·Information networks need to be integrated and managed in conjunction with the national information network system |

## 4. Design of Construction Machinery Platform (draft)

### 4.1 Process of Information Generation

There is a need to integrate the information processed through computer information processing organizations, such as the registration of construction machinery and construction machinery operators, into the construction machinery platform that we are establishing. However, in cases where the specific details are lacking, it will be necessary to collect and manage additional information as needed.

As shown in Figure 1, a pre-processing computer network (information sharing system) should be established as a pre-step to generate information for the construction machine platform, and once the information is confirmed, it should be mounted on the platform and converted into a database (DB).

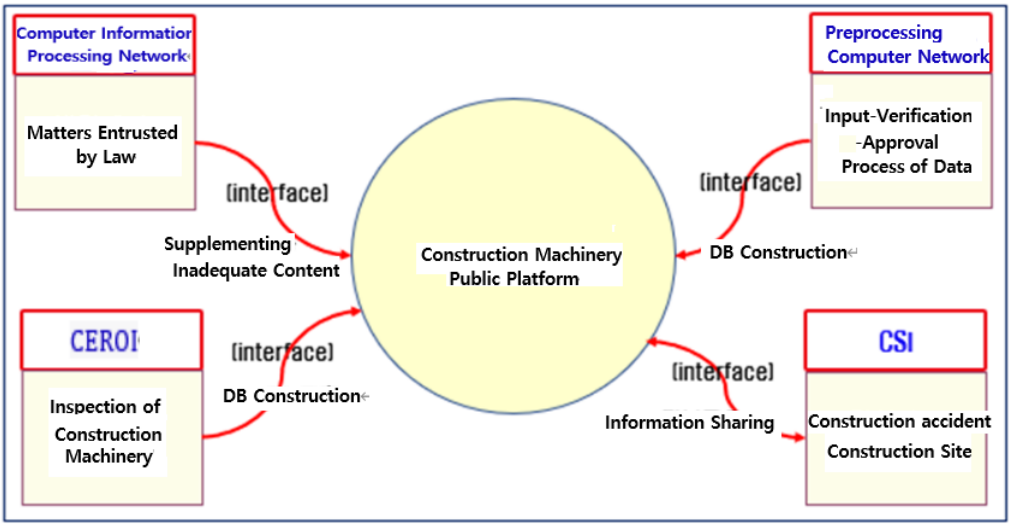


**Figure 1. Information generation and deployment procedures**

As shown in Figure 2, all data converted to a database (DB) needs to be input, validation, and approval procedures to ensure the reliability of the data, and as part of this process, each authorized individual should be allowed to grant permission.

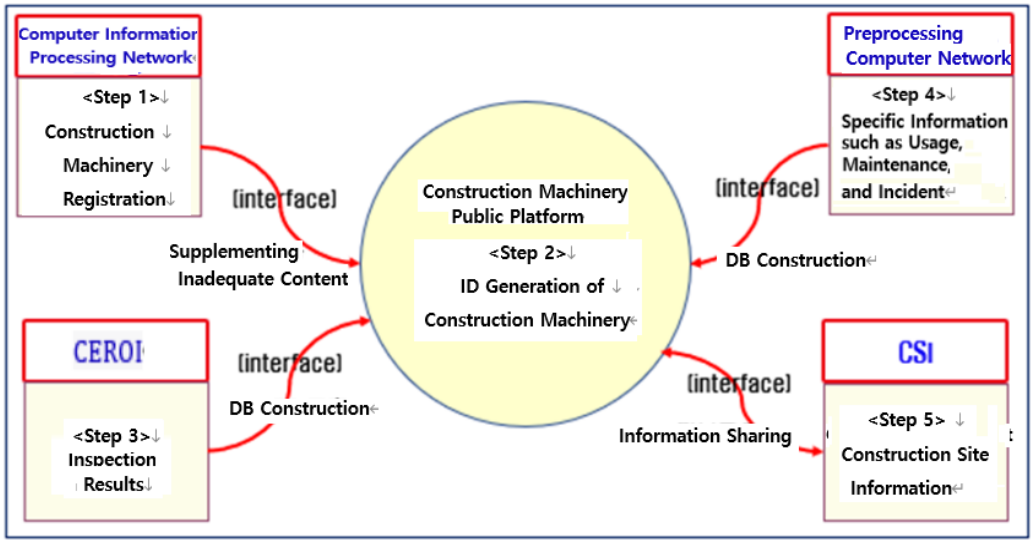


**Figure 2. Construction machine history management information collection system (example)**

### 4.2 Membership Registration

As shown in Table 4, a membership registration process is necessary to enable users to register, generate and access information on the platform and receive information, and it is suggested that it is desirable to register as a member of the joint platform of construction machinery

**Table 4. Types of construction equipment public platform members and access to information**

| Classification of members | Access to information |
|---|---|
| A central government official in charge of construction machinery | ·Providing information to inspection agencies Manage history of each construction machine (type, inspection, use, maintenance, accident, etc.)<br>·Information of construction machinery business operators (address, representative, contact information, penalties, fines, etc.) |
| Local government officials dedicated to construction machinery | ·History management for each construction machine registered in the area (type, inspection, use, maintenance, accident, etc.)<br>·Information of construction machinery business operators in the relevant area (address, representative, contact information, penalties, fines, etc.)<br>·Information on pilots of construction machinery in the area (license issuance, aptitude test, safety training, etc.) |
| An inspection agency | ·Differentiation is given according to the grade of the manager and the inspector<br>-The inspector shall only provide information related to the relevant construction machine |
| A construction machinery operator | ·Related information (type, history, etc.) and type approval (report) of construction machinery by inspection agency<br>·Evaluation results of your own inspection agent |
| The maker of the registration number ticket | ·The current status of your business operator<br>·Information such as the history of construction machinery owned (or maintenance, sale, dismantling and recycling) |
| A construction machine pilot | ·The current status of your business operator and the current status of the production of the registration number table produced by yourself |
| A safety education institution | ·Pilot's license issuance history, aptitude test results, and training completion status |
| Associated associations | ·Performance of the pilot training for construction machinery that you trained |

The platform will assign a unique Main ID to each institution and, based on the nature of their responsibilities, institutions can further assign Sub IDs to individual staff members. To implement this, each member should establish a membership registration system. Even without membership registration, it is essential to design a system that allows access to various information that can be publicly viewed. This information may include construction machinery-related statistics, basic information about construction machinery operators (location, contact details, etc.), construction machinery parts certification, accident investigation status, safety management knowledge, and various legal document templates.

### 4.3 Types of Information

The platform will assign a unique Main ID to each institution and, based on the nature of their responsibilities, institutions can further assign Sub IDs to individual staff members. To implement this, each member should establish a membership registration system. Even without membership registration, it is essential to design a system that allows access to various information that can be publicly viewed. This information may include construction machinery-related statistics, basic information about construction machinery operators (location, contact details, etc.), construction machinery parts certification, accident

investigation status, safety management knowledge, and various legal document templates. Through Table 5, we investigated items that the government has the authority and obligation to collect under the Construction Machinery Management Act to build a construction machinery platform, and suggested ways to build and utilize the platform.

**Table 5. Types and utilization methods of public platform information for construction machinery**

| A legal provision | Type of information | How to use |
|---|---|---|
| Article 3 | ·Registration of construction machinery (including modification and cancellation) | ·Registration of construction machinery through information network |
| Article 8-2 | ·Maker of the registration number table (including change and cancellation) | ·Application for designation of the manufacturer of the registration number table through the information network |
| Article 13 | ·Construction machine inspection results<br>·Record of suspension of operation of construction machinery | ·Management and inquiry of inspection results<br>·Management of construction machine inspection certificates and confirmation of users |
| Article 14 | ·Inspection agency (including designation and cancellation) | ·Real-time statistics management of various information DB situations |
| Article 14-2 | ·Evaluation indicators and results of the inspection agency | ·Inspection of the evaluation results of the inspection agency |
| Article 18 | ·Information about the person who makes and assembles it | ·The inspection agent checks the construction machine to be inspected before inspection |
| Article 18 | ·Application data for type approval of construction machinery | ·Submission of documents related to type approval of construction machinery and notification of approval results |
| Article 18 | ·Application data for type reporting of construction machinery | ·DB management in the form of construction machinery |
| Article 19 | ·Confirmation test results | ·Application for confirmation inspection<br>·Notification of inspection results |
| Article 20 | ·Information on follow-up management of construction machinery | ·Collection of data on the replacement cycle of parts and consumer prices |
| Article 20-2 | ·Information on production defects | ·Request for correcting manufacturing defects by construction machine owner and issue order for correcting manufacturing defects by manufacturer |
| Article 20-3 | ·Precision diagnosis results for durability extension | ·Notify the user of the durability period of the construction machine when the durability period of the construction machine is imminent or exceeded |
| Article 20-4 | ·Certification information for construction machinery parts | ·Application for component certification of construction machinery and submission of certification documents |
| Article 20-6 | ·Production defect review and evaluation results | ·Check the contents of deliberation on construction machinery and components that have been corrected |
| Article 21 | ·Information of construction machinery operators | ·Registration and inquiry of construction machinery business |
| Article 22 | ·Lease contract information | ·Prepare and confirm a contract when renting a construction machine |
| Article 22-2 | ·Survey on the actual conditions of lease contracts | ·Inquiry on whether or not the contract is written |
| Article 25 | ·Information on construction machinery | ·Report on the sale of construction machinery through the |

| | | |
|---|---|---|
| | for sale | information network |
| Article 25-2 | ·Report of export of construction machinery requested for disposal | ·Check the status of disposal of construction machinery in the information network |
| Article 25-3 | ·Checking whether construction machinery operators fulfill their obligations | ·Check the relevant information before the sales contract |
| Article 26 | ·Pilot license issuance status (license number) | ·Inquiry on information related to construction machine pilots |
| Article 26 | ·Information related to the construction machine operator's license | ·Inquiries about obtaining a construction machine pilot's license or completing the curriculum |
| Article 28 | ·Cancellation and suspension of pilot's license | ·Check the pilot's license validity information |
| Article 29 | ·Results of the pilot's regularity test | ·Management and inquiry of pilot aptitude test information |
| Article 30 | ·Results of the pilot's occasional suitability test | ·Management and inquiry of pilot aptitude test information |
| Article 30-2 | ·Career management of pilot | ·Information inquiry about construction machine pilots |
| Article 31 | ·Safety training for pilots | ·Management and inquiry of safety education records |
| Article 31 | ·Designation of pilot safety education institutions | ·Notification of the pilot's safety training period and information on related educational institutions are provided |
| Article 32 | ·Information of business organizations | ·Checking the business contents and roles of the association |
| Article 32-2 | ·Deduction project | ·Possible to check the use status of construction machinery indirectly |
| Article 33 | ·Prohibited Activities Reporting Center | ·Minimize violations by disclosing the owner or occupant |
| Article 33-2 | ·Public parking lot installation status | ·Protection of small rental businesses by easily checking the installation and operation status of public parking lots |
| Article 34 | ·Rent delinquency report center | ·Matters concerning the status of delinquency reports and follow-up measures |
| Article 34-2 | ·Forced processing procedures for construction machinery | ·Posting a notice of compulsory processing procedures, etc |
| Article 35 | ·Accident investigation results | ·Use it as a window to report to the Minister |
| Article 35-2 | ·Results of administrative disposition against business operators | ·Provide information about business operators that are suspended or unregistered |
| Article 35-3 | ·Results of imposition of fines | ·Encourage business operators to fulfill their obligations by posting the fact that they are fined |
| Article 36 | ·Results of hearing (Hearing resolution) | ·Checking the progress of the hearing on the person subject to the hearing |
| Article 40 | ·Penalty | ·Use to check the soundness of business operators and reflect evaluation data |
| Article 43 | ·Information that punished corporations (or individuals) in accordance with the punishment regulations | ·Use to check the soundness of business operators and reflect evaluation data |
| Article 44 | ·Results of disposition of fines | ·Use to check business soundness and reflect evaluation data |

## 5. Conclusion

In this paper, we have conducted research on the current status of the construction machinery rental

market and the safety management status throughout the life cycle of construction machinery to ensure the soundness of the construction machinery rental market and to strengthen safety management practices. Additionally, to assess the requirements of construction machinery ISP, we have gathered input from relevant experts and professionals regarding the issues and potential solutions related to the construction machinery rental market and safety management.

Through a series of research processes, we proposed a plan to build a construction machine information network by presenting a basic design for public intermediation platforms and a method for managing data related to construction machines. Establishing a public platform for construction machinery is considered to be the most urgent task in the field of construction machinery to enhance the effectiveness of the government's fulfillment of obligations prescribed by laws and regulations for the promotion and safety of the construction machinery industry.

To successfully establish a public platform for construction machinery, it is essential to benchmark the current status of platform development in various fields and engage with stakeholders in the construction machinery industry to ensure the effectiveness of the public platform's implementation. If a public platform for construction machinery is established and operated correctly, it is expected that construction machinery can be efficiently managed by comprehensively managing data necessary for the promotion and safety management of the construction machinery industry. If a public platform for construction machinery is established and operated correctly, it will contribute to fostering and safety of the construction machinery industry by allowing officials to freely view the results of systematic analysis of information on various laws, safety activities, and accident status, and it will be an opportunity to induce efforts to improve technology in manufacturing by collecting basic data by construction machinery and parts.

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